SEQUENCE LISTING

<110> Halozyme, Inc.
Jiang, Ping
Shepard, H. Michael
Huang, Lei

<120> Companion Diagnostic for Anti-Hyaluronan Agent Therapy and Methods of Use Thereof

<130> 33320.03096.WO01/3096PC

<140> Not yet assigned
<141> Herewith

<150> US 61/628,187
<151> 2011-10-24

<150> US 61/559,011
<151> 2011-11-11

<150> US 61/630,765
<151> 2011-12-16

<150> US 61/714,700
<151> 2012-10-16

<160> 426

<170> FastSEQ for Windows Version 4.0

<210> 1
<211> 509
<212> PRT
<213> Homo sapiens

<220>
<223> precursor human PH20

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 1

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 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
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Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val
                485                 490                 495
Ser Ile Leu Phe Leu Ile Ile Ser Ser Val Ala Ser Leu
            500                 505
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<210> 2
<211> 474

<212> PRT
<213> Homo sapiens

<220>
<223> mature human PH20, amino acid residues 36-509

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 1   5   10   15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20   25   30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35   40   45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50   55   60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65   70   75   80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85   90   95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100   105   110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115   120   125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130   135   140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145   150   155   160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165   170   175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180   185   190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195   200   205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210   215   220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225   230   235   240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245   250   255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260   265   270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275   280   285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290   295   300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305   310   315   320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325   330   335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340   345   350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355   360   365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370   375   380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385   390   395   400

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Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435                 440                 445
Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val Ser Ile Leu
    450                 455                 460
Phe Leu Ile Ile Ser Ser Val Ala Ser Leu
465                 470


<210> 3
<211> 482
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-482


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 3
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
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Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr
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<210> 4
<211> 447
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-482

<400> 4

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Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
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            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr
        435                 440                 445
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<210> 5
<211> 446
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-481

<400> 5

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Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
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Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe
        435                 440                 445
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<210> 6
<211> 445

<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-480

<400> 6
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1   5   10   15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20   25   30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35   40   45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50   55   60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65   70   75   80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85   90   95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100   105   110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115   120   125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130   135   140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145   150   155   160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165   170   175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180   185   190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195   200   205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210   215   220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225   230   235   240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245   250   255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260   265   270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275   280   285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290   295   300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305   310   315   320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325   330   335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340   345   350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355   360   365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370   375   380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys

385 390 395 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
405 410 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
420 425 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
435 440 445

<210> 7
<211> 444
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-479

<400> 7
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
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20 25 30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
35 40 45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
50 55 60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65 70 75 80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
85 90 95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
100 105 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
115 120 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
130 135 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145 150 155 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
165 170 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
180 185 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
195 200 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
210 215 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225 230 235 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
245 250 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
260 265 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
275 280 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
290 295 300

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Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln
        435                 440
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<210> 8
<211> 443
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-478

<400> 8

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Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
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Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
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    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro
        435                 440


<210> 9
<211> 442
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
      36-477


<400> 9
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
```

```
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu
        435                 440
```

<210> 10
<211> 450
<212> PRT
<213> Bos taurus

<220>
<223> cow hyaluronidase-1 precursor

<400> 10

```
Met Arg Pro Phe Ser Leu Glu Val Ser Leu His Leu Pro Trp Ala Met
 1               5                  10                  15
Ala Ala His Leu Leu Pro Val Cys Thr Leu Phe Leu Asn Leu Leu Ser
            20                  25                  30
Met Thr Gln Gly Ser Arg Asp Pro Val Val Pro Asn Gln Pro Phe Thr
        35                  40                  45
```

```
Thr Ile Trp Asn Ala Asn Thr Glu Trp Cys Met Lys Lys His Gly Val
    50                  55                  60
Asp Val Asp Ile Ser Ile Phe Asp Val Val Thr Asn Pro Gly Gln Thr
65                  70                  75                  80
Phe Arg Gly Pro Asn Met Thr Ile Phe Tyr Ser Ser Gln Leu Gly Thr
                85                  90                  95
Tyr Pro Tyr Tyr Thr Ser Ala Gly Glu Pro Val Phe Gly Gly Leu Pro
            100                 105                 110
Gln Asn Ala Ser Leu Asn Ala His Leu Ala Arg Thr Phe Gln Asp Ile
        115                 120                 125
Leu Ala Ala Met Pro Glu Pro Arg Phe Ser Gly Leu Ala Val Ile Asp
    130                 135                 140
Trp Glu Ala Trp Arg Pro Arg Trp Ala Phe Asn Trp Asp Thr Lys Asp
145                 150                 155                 160
Ile Tyr Arg Gln Arg Ser Arg Ala Leu Val Gln Lys Gln His Pro Asp
                165                 170                 175
Trp Leu Ala Pro Arg Val Glu Ala Ala Ala Gln Asp Gln Phe Glu Gly
            180                 185                 190
Ala Ala Glu Glu Trp Met Ala Gly Thr Leu Lys Leu Gly Gln Ala Leu
        195                 200                 205
Arg Pro Gln Gly Leu Trp Gly Phe Tyr Asn Phe Pro Glu Cys Tyr Asn
    210                 215                 220
Tyr Asp Phe Lys Ser Pro Asn Tyr Thr Gly Arg Cys Pro Leu Asn Ile
225                 230                 235                 240
Cys Ala Gln Asn Asp Gln Leu Gly Trp Leu Trp Gly Gln Ser Arg Ala
                245                 250                 255
Leu Tyr Pro Ser Ile Tyr Leu Pro Ala Ala Leu Glu Gly Thr Lys Lys
            260                 265                 270
Thr Gln Met Phe Val Gln His Arg Val Ala Glu Ala Phe Arg Val Ala
        275                 280                 285
Ala Gly Ala Gly Asp Pro Lys Leu Pro Val Leu Pro Tyr Met Gln Leu
    290                 295                 300
Phe Tyr Asp Met Thr Asn His Phe Leu Pro Ala Glu Glu Leu Glu His
305                 310                 315                 320
Ser Leu Gly Glu Ser Ala Ala Gln Gly Ala Ala Gly Val Val Leu Trp
                325                 330                 335
Val Ser Trp Leu Ser Thr Ser Thr Lys Glu Ser Cys Gln Ala Ile Lys
            340                 345                 350
Glu Tyr Val Asp Thr Thr Leu Gly Pro Ser Ile Leu Asn Val Thr Ser
        355                 360                 365
Gly Ala Arg Leu Cys Ser Gln Val Leu Cys Ser Gly His Gly Arg Cys
    370                 375                 380
Ala Arg Arg Pro Ser Tyr Pro Lys Ala Arg Leu Ile Leu Asn Ser Thr
385                 390                 395                 400
Ser Phe Ser Ile Lys Pro Thr Pro Gly Gly Gly Pro Leu Thr Leu Gln
                405                 410                 415
Gly Ala Leu Ser Leu Glu Asp Arg Leu Arg Met Ala Val Glu Phe Glu
            420                 425                 430
Cys Arg Cys Tyr Arg Gly Trp Arg Gly Thr Arg Cys Glu Gln Trp Gly
        435                 440                 445
Met Trp
    450
```

<210> 11
<211> 553
<212> PRT
<213> Bos taurus

<220>
<223> cow PH20 hyaluronidase precursor

<400> 11
Met Arg Met Leu Arg Arg His His Ile Ser Phe Arg Ser Phe Ala Gly
 1   5   10   15
Ser Ser Gly Thr Pro Gln Ala Val Phe Thr Phe Leu Leu Leu Pro Cys
            20   25   30
Cys Leu Ala Leu Asp Phe Arg Ala Pro Pro Leu Ile Ser Asn Thr Ser
        35   40   45
Phe Leu Trp Ala Trp Asn Ala Pro Val Glu Arg Cys Val Asn Arg Arg
    50   55   60
Phe Gln Leu Pro Pro Asp Leu Arg Leu Phe Ser Val Lys Gly Ser Pro
65   70   75   80
Gln Lys Ser Ala Thr Gly Gln Phe Ile Thr Leu Phe Tyr Ala Asp Arg
                85   90   95
Leu Gly Tyr Tyr Pro His Ile Asp Glu Lys Thr Gly Lys Thr Val Phe
            100   105   110
Gly Gly Ile Pro Gln Leu Gly Asn Leu Lys Ser His Met Glu Lys Ala
        115   120   125
Lys Asn Asp Ile Ala Tyr Tyr Ile Pro Asn Asp Ser Val Gly Leu Ala
    130   135   140
Val Ile Asp Trp Glu Asn Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys
145   150   155   160
Pro Lys Asp Val Tyr Arg Asp Glu Ser Val Glu Leu Val Leu Gln Lys
                165   170   175
Asn Pro Gln Leu Ser Phe Pro Glu Ala Ser Lys Ile Ala Lys Val Asp
            180   185   190
Phe Glu Thr Ala Gly Lys Ser Phe Met Gln Glu Thr Leu Lys Leu Gly
        195   200   205
Lys Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp
    210   215   220
Cys Tyr Asn His Asn His Asn Gln Pro Thr Tyr Asn Gly Asn Cys Pro
225   230   235   240
Asp Val Glu Lys Arg Arg Asn Asp Asp Leu Glu Trp Leu Trp Lys Glu
                245   250   255
Ser Thr Ala Leu Phe Pro Ser Val Tyr Leu Asn Ile Arg Leu Lys Ser
            260   265   270
Thr Gln Asn Ala Ala Leu Tyr Val Arg Asn Arg Val Gln Glu Ala Ile
        275   280   285
Arg Leu Ser Lys Ile Ala Ser Val Glu Ser Pro Leu Pro Val Phe Val
    290   295   300
Tyr Ala Arg Pro Val Phe Thr Asp Gly Ser Ser Thr Tyr Leu Ser Gln
305   310   315   320
Gly Asp Leu Val Asn Ser Val Gly Glu Ile Val Ser Leu Gly Ala Ser
                325   330   335
Gly Ile Ile Met Trp Gly Ser Leu Asn Leu Ser Leu Ser Met Gln Ser
            340   345   350
Cys Met Asn Leu Gly Thr Tyr Leu Asn Thr Thr Leu Asn Pro Tyr Ile
        355   360   365
Ile Asn Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys His
    370   375   380
Asn Glu Gly Val Cys Thr Arg Lys His Trp Asn Ser Ser Asp Tyr Leu
385   390   395   400
His Leu Asn Pro Met Asn Phe Ala Ile Gln Thr Gly Glu Gly Gly Lys
                405   410   415

```
Tyr Thr Val Pro Gly Thr Val Thr Leu Glu Asp Leu Gln Lys Phe Ser
            420                 425                 430
Asp Thr Phe Tyr Cys Ser Cys Tyr Ala Asn Ile His Cys Lys Lys Arg
        435                 440                 445
Val Asp Ile Lys Asn Val His Ser Val Asn Val Cys Met Ala Glu Asp
    450                 455                 460
Ile Cys Ile Asp Ser Pro Val Lys Leu Gln Pro Ser Asp His Ser Ser
465                 470                 475                 480
Ser Gln Glu Ala Ser Thr Thr Thr Phe Ser Ser Ile Ser Pro Ser Thr
                485                 490                 495
Thr Thr Ala Thr Val Ser Pro Cys Thr Pro Glu Lys His Ser Pro Glu
            500                 505                 510
Cys Leu Lys Val Arg Cys Ser Glu Val Ile Pro Asn Val Thr Gln Lys
        515                 520                 525
Ala Cys Gln Ser Val Lys Leu Lys Asn Ile Ser Tyr Gln Ser Pro Ile
    530                 535                 540
Gln Asn Ile Lys Asn Gln Thr Thr Tyr
545                 550
```

<210> 12
<211> 331
<212> PRT
<213> Vespula vulgaris

<220>
<223> yellow jacket wasp hyaluronidase A

```
<400> 12
Ser Glu Arg Pro Lys Arg Val Phe Asn Ile Tyr Trp Asn Val Pro Thr
 1               5                  10                  15
Phe Met Cys His Gln Tyr Asp Leu Tyr Phe Asp Glu Val Thr Asn Phe
            20                  25                  30
Asn Ile Lys Arg Asn Ser Lys Asp Asp Phe Gln Gly Asp Lys Ile Ala
        35                  40                  45
Ile Phe Tyr Asp Pro Gly Glu Phe Pro Ala Leu Leu Ser Leu Lys Asp
    50                  55                  60
Gly Lys Tyr Lys Lys Arg Asn Gly Gly Val Pro Gln Glu Gly Asn Ile
65                  70                  75                  80
Thr Ile His Leu Gln Lys Phe Ile Glu Asn Leu Asp Lys Ile Tyr Pro
                85                  90                  95
Asn Arg Asn Phe Ser Gly Ile Gly Val Ile Asp Phe Glu Arg Trp Arg
            100                 105                 110
Pro Ile Phe Arg Gln Asn Trp Gly Asn Met Lys Ile His Lys Asn Phe
        115                 120                 125
Ser Ile Asp Leu Val Arg Asn Glu His Pro Thr Trp Asn Lys Lys Met
    130                 135                 140
Ile Glu Leu Glu Ala Ser Lys Arg Phe Glu Lys Tyr Ala Arg Phe Phe
145                 150                 155                 160
Met Glu Glu Thr Leu Lys Leu Ala Lys Lys Thr Arg Lys Gln Ala Asp
                165                 170                 175
Trp Gly Tyr Tyr Gly Tyr Pro Tyr Cys Phe Asn Met Ser Pro Asn Asn
            180                 185                 190
Leu Val Pro Glu Cys Asp Val Thr Ala Met His Glu Asn Asp Lys Met
        195                 200                 205
Ser Trp Leu Phe Asn Asn Gln Asn Val Leu Leu Pro Ser Val Tyr Val
```

210 215 220
Arg Gln Glu Leu Thr Pro Asp Gln Arg Ile Gly Leu Val Gln Gly Arg
225 230 235 240
Val Lys Glu Ala Val Arg Ile Ser Asn Asn Leu Lys His Ser Pro Lys
245 250 255
Val Leu Ser Tyr Trp Trp Tyr Val Tyr Gln Asp Glu Thr Asn Thr Phe
260 265 270
Leu Thr Glu Thr Asp Val Lys Lys Thr Phe Gln Glu Ile Val Ile Asn
275 280 285
Gly Gly Asp Gly Ile Ile Ile Trp Gly Ser Ser Ser Asp Val Asn Ser
290 295 300
Leu Ser Lys Cys Lys Arg Leu Gln Asp Tyr Leu Leu Thr Val Leu Gly
305 310 315 320
Pro Ile Ala Ile Asn Val Thr Glu Ala Val Asn
325 330

<210> 13
<211> 340
<212> PRT
<213> Vespula vulgaris

<220>
<223> yellow jacket wasp hyaluronidase B

<400> 13
Asp Arg Thr Ile Trp Pro Lys Lys Gly Phe Ser Ile Tyr Trp Asn Ile
1 5 10 15
Pro Thr His Phe Cys His Asn Phe Gly Val Tyr Phe Lys Glu Leu Lys
20 25 30
Gln Phe Asn Ile Lys Tyr Asn Ser Met Asn Asn Phe Arg Gly Glu Thr
35 40 45
Ile Ser Leu Phe Tyr Asp Pro Gly Asn Phe Pro Ser Met Val Leu Leu
50 55 60
Lys Asn Gly Thr Tyr Glu Ile Arg Asn Glu Gly Val Pro Gln Lys Gly
65 70 75 80
Asn Leu Thr Ile His Leu Glu Gln Phe Thr Lys Glu Leu Asp Glu Ile
85 90 95
Tyr Pro Lys Lys Ile Ala Gly Gly Ile Gly Val Ile His Phe His Asn
100 105 110
Trp Arg Pro Ile Phe Arg Arg Asn Val Asp Asn Leu Lys Ile Asn Lys
115 120 125
Asp Ile Ser Ile Asp Leu Val Arg Lys Glu His Pro Lys Trp Asp Lys
130 135 140
Ser Met Ile Glu Lys Glu Ala Ser Asn Arg Phe Glu Thr Ser Ala Lys
145 150 155 160
Ile Phe Met Glu Lys Thr Leu Lys Leu Ala Lys Glu Ile Arg Lys Lys
165 170 175
Thr Glu Trp Gly Tyr His Gly Tyr Pro His Cys Leu Ser Gly Ser Thr
180 185 190
Asp Lys Pro Ser Phe Asp Cys Asp Ala Leu Ser Met Ser Glu Asn Asp
195 200 205
Lys Met Ser Trp Leu Phe Asn Asn Gln Asn Val Leu Leu Pro Ser Ile
210 215 220
Tyr Leu Lys Asn Val Leu Lys Pro Asp Glu Lys Ile His Leu Val Gln

225 230 235 240
Glu Arg Leu Lys Glu Ala Ile Arg Ile Ser Lys Asn Phe Lys His Leu
245 250 255
Pro Lys Val Leu Pro Tyr Trp Trp Tyr Thr Tyr Gln Asp Lys Glu Ser
260 265 270
Ile Phe Leu Thr Glu Ala Asp Val Lys Asn Thr Phe Lys Glu Ile Leu
275 280 285
Thr Asn Gly Ala Asp Gly Ile Ile Ile Trp Gly Val Ser Tyr Glu Leu
290 295 300
Thr Asp Arg Lys Arg Cys Glu Lys Leu Lys Glu Tyr Leu Met Lys Ile
305 310 315 320
Leu Gly Pro Ile Ala Phe Lys Val Thr Lys Ala Val Lys Glu Asn Thr
325 330 335
Pro Leu Asn Phe
340

<210> 14
<211> 382
<212> PRT
<213> Apis mellifera

<220>
<223> honey bee hyaluronidase precursor

<400> 14
Met Ser Arg Pro Leu Val Ile Thr Glu Gly Met Met Ile Gly Val Leu
1 5 10 15
Leu Met Leu Ala Pro Ile Asn Ala Leu Leu Leu Gly Phe Val Gln Ser
20 25 30
Thr Pro Asp Asn Asn Lys Thr Val Arg Glu Phe Asn Val Tyr Trp Asn
35 40 45
Val Pro Thr Phe Met Cys His Lys Tyr Gly Leu Arg Phe Glu Glu Val
50 55 60
Ser Glu Lys Tyr Gly Ile Leu Gln Asn Trp Met Asp Lys Phe Arg Gly
65 70 75 80
Glu Glu Ile Ala Ile Leu Tyr Asp Pro Gly Met Phe Pro Ala Leu Leu
85 90 95
Lys Asp Pro Asn Gly Asn Val Val Ala Arg Asn Gly Gly Val Pro Gln
100 105 110
Leu Gly Asn Leu Thr Lys His Leu Gln Val Phe Arg Asp His Leu Ile
115 120 125
Asn Gln Ile Pro Asp Lys Ser Phe Pro Gly Val Gly Val Ile Asp Phe
130 135 140
Glu Ser Trp Arg Pro Ile Phe Arg Gln Asn Trp Ala Ser Leu Gln Pro
145 150 155 160
Tyr Lys Lys Leu Ser Val Glu Val Val Arg Arg Glu His Pro Phe Trp
165 170 175
Asp Asp Gln Arg Val Glu Gln Glu Ala Lys Arg Arg Phe Glu Lys Tyr
180 185 190
Gly Gln Leu Phe Met Glu Glu Thr Leu Lys Ala Ala Lys Arg Met Arg
195 200 205
Pro Ala Ala Asn Trp Gly Tyr Tyr Ala Tyr Pro Tyr Cys Tyr Asn Leu
210 215 220
Thr Pro Asn Gln Pro Ser Ala Gln Cys Glu Ala Thr Thr Met Gln Glu

225 230 235 240
Asn Asp Lys Met Ser Trp Leu Phe Glu Ser Glu Asp Val Leu Leu Pro
245 250 255
Ser Val Tyr Leu Arg Trp Asn Leu Thr Ser Gly Glu Arg Val Gly Leu
260 265 270
Val Gly Gly Arg Val Lys Glu Ala Leu Arg Ile Ala Arg Gln Met Thr
275 280 285
Thr Ser Arg Lys Lys Val Leu Pro Tyr Tyr Trp Tyr Lys Tyr Gln Asp
290 295 300
Arg Arg Asp Thr Asp Leu Ser Arg Ala Asp Leu Glu Ala Thr Leu Arg
305 310 315 320
Lys Ile Thr Asp Leu Gly Ala Asp Gly Phe Ile Ile Trp Gly Ser Ser
325 330 335
Asp Asp Ile Asn Thr Lys Ala Lys Cys Leu Gln Phe Arg Glu Tyr Leu
340 345 350
Asn Asn Glu Leu Gly Pro Ala Val Lys Arg Ile Ala Leu Asn Asn Asn
355 360 365
Ala Asn Asp Arg Leu Thr Val Asp Val Ser Val Asp Gln Val
370 375 380

<210> 15
<211> 331
<212> PRT
<213> Dolichovespula maculata

<220>
<223> white-face hornet hyaluronidase

<400> 15
Ser Glu Arg Pro Lys Arg Val Phe Asn Ile Tyr Trp Asn Val Pro Thr
1 5 10 15
Phe Met Cys His Gln Tyr Gly Leu Tyr Phe Asp Glu Val Thr Asn Phe
20 25 30
Asn Ile Lys His Asn Ser Lys Asp Asp Phe Gln Gly Asp Lys Ile Ser
35 40 45
Ile Phe Tyr Asp Pro Gly Glu Phe Pro Ala Leu Leu Pro Leu Lys Glu
50 55 60
Gly Asn Tyr Lys Ile Arg Asn Gly Gly Val Pro Gln Glu Gly Asn Ile
65 70 75 80
Thr Ile His Leu Gln Arg Phe Ile Glu Asn Leu Asp Lys Thr Tyr Pro
85 90 95
Asn Arg Asn Phe Asn Gly Ile Gly Val Ile Asp Phe Glu Arg Trp Arg
100 105 110
Pro Ile Phe Arg Gln Asn Trp Gly Asn Met Met Ile His Lys Lys Phe
115 120 125
Ser Ile Asp Leu Val Arg Asn Glu His Pro Phe Trp Asp Lys Lys Met
130 135 140
Ile Glu Leu Glu Ala Ser Lys Arg Phe Glu Lys Tyr Ala Arg Leu Phe
145 150 155 160
Met Glu Glu Thr Leu Lys Leu Ala Lys Lys Thr Arg Lys Gln Ala Asp
165 170 175
Trp Gly Tyr Tyr Gly Tyr Pro Tyr Cys Phe Asn Met Ser Pro Asn Asn
180 185 190
Leu Val Pro Asp Cys Asp Ala Thr Ala Met Leu Glu Asn Asp Lys Met
195 200 205

```
Ser Trp Leu Phe Asn Asn Gln Asn Val Leu Leu Pro Ser Val Tyr Ile
    210                 215                 220
Arg His Glu Leu Thr Pro Asp Gln Arg Val Gly Leu Val Gln Gly Arg
225                 230                 235                 240
Val Lys Glu Ala Val Arg Ile Ser Asn Asn Leu Lys His Ser Pro Lys
                245                 250                 255
Val Leu Ser Tyr Trp Trp Tyr Val Tyr Gln Asp Asp Thr Asn Thr Phe
            260                 265                 270
Leu Thr Glu Thr Asp Val Lys Lys Thr Phe Gln Glu Ile Ala Ile Asn
        275                 280                 285
Gly Gly Asp Gly Ile Ile Ile Trp Gly Ser Ser Ser Asp Val Asn Ser
    290                 295                 300
Leu Ser Lys Cys Lys Arg Leu Arg Glu Tyr Leu Leu Thr Val Leu Gly
305                 310                 315                 320
Pro Ile Thr Val Asn Val Thr Glu Thr Val Asn
                325                 330
```

<210> 16
<211> 367
<212> PRT
<213> Polistes annularis

<220>
<223> paper wasp hyaluronidase

<400> 16

```
Tyr Val Ser Leu Ser Pro Asp Ser Val Phe Asn Ile Ile Thr Asp Asp
 1               5                  10                  15
Ile Ser His Gln Ile Leu Ser Arg Ser Asn Cys Glu Arg Ser Lys Arg
            20                  25                  30
Pro Lys Arg Val Phe Ser Ile Tyr Trp Asn Val Pro Thr Phe Met Cys
        35                  40                  45
His Gln Tyr Gly Met Asn Phe Asp Glu Val Thr Asp Phe Asn Ile Lys
    50                  55                  60
His Asn Ser Lys Asp Asn Phe Arg Gly Glu Thr Ile Ser Ile Tyr Tyr
65                  70                  75                  80
Asp Pro Gly Lys Phe Pro Ala Leu Met Pro Leu Lys Asn Gly Asn Tyr
                85                  90                  95
Glu Glu Arg Asn Gly Gly Val Pro Gln Arg Gly Asn Ile Thr Ile His
            100                 105                 110
Leu Gln Gln Phe Asn Glu Asp Leu Asp Lys Met Thr Pro Asp Lys Asn
        115                 120                 125
Phe Gly Gly Ile Gly Val Ile Asp Phe Glu Arg Trp Lys Pro Ile Phe
    130                 135                 140
Arg Gln Asn Trp Gly Asn Thr Glu Ile His Lys Lys Tyr Ser Ile Glu
145                 150                 155                 160
Leu Val Arg Lys Glu His Pro Lys Trp Ser Glu Ser Met Ile Glu Ala
                165                 170                 175
Glu Ala Thr Lys Lys Phe Glu Lys Tyr Ala Arg Tyr Phe Met Glu Glu
            180                 185                 190
Thr Leu Lys Leu Ala Lys Lys Thr Arg Lys Arg Ala Lys Trp Gly Tyr
        195                 200                 205
Tyr Gly Phe Pro Tyr Cys Tyr Asn Val Thr Pro Asn Asn Pro Gly Pro
    210                 215                 220
Asp Cys Asp Ala Lys Ala Thr Ile Glu Asn Asp Arg Leu Ser Trp Met
```

225 230 235 240
Tyr Asn Asn Gln Glu Ile Leu Phe Pro Ser Val Tyr Val Arg His Glu
245 250 255
Gln Lys Pro Glu Glu Arg Val Tyr Leu Val Gln Gly Arg Ile Lys Glu
260 265 270
Ala Val Arg Ile Ser Asn Asn Leu Glu His Ser Pro Ser Val Leu Ala
275 280 285
Tyr Trp Trp Tyr Val Tyr Gln Asp Lys Met Asp Ile Tyr Leu Ser Glu
290 295 300
Thr Asp Val Glu Lys Thr Phe Gln Glu Ile Val Thr Asn Gly Gly Asp
305 310 315 320
Gly Ile Ile Ile Trp Gly Ser Ser Ser Asp Val Asn Ser Leu Ser Lys
325 330 335
Cys Lys Arg Leu Arg Glu Tyr Leu Leu Asn Thr Leu Gly Pro Phe Ala
340 345 350
Val Asn Val Thr Glu Thr Val Asn Gly Arg Ser Ser Leu Asn Phe
355 360 365

<210> 17
<211> 462
<212> PRT
<213> Mus musculus

<220>
<223> mouse hyaluronidase-1

<400> 17
Met Leu Gly Leu Thr Gln His Ala Gln Lys Val Trp Arg Met Lys Pro
1 5 10 15
Phe Ser Pro Glu Val Ser Pro Gly Ser Ser Pro Ala Thr Ala Gly His
20 25 30
Leu Leu Arg Ile Ser Thr Leu Phe Leu Thr Leu Leu Glu Leu Ala Gln
35 40 45
Val Cys Arg Gly Ser Val Val Ser Asn Arg Pro Phe Ile Thr Val Trp
50 55 60
Asn Gly Asp Thr His Trp Cys Leu Thr Glu Tyr Gly Val Asp Val Asp
65 70 75 80
Val Ser Val Phe Asp Val Val Ala Asn Lys Glu Gln Ser Phe Gln Gly
85 90 95
Ser Asn Met Thr Ile Phe Tyr Arg Glu Glu Leu Gly Thr Tyr Pro Tyr
100 105 110
Tyr Thr Pro Thr Gly Glu Pro Val Phe Gly Gly Leu Pro Gln Asn Ala
115 120 125
Ser Leu Val Thr His Leu Ala His Thr Phe Gln Asp Ile Lys Ala Ala
130 135 140
Met Pro Glu Pro Asp Phe Ser Gly Leu Ala Val Ile Asp Trp Glu Ala
145 150 155 160
Trp Arg Pro Arg Trp Ala Phe Asn Trp Asp Ser Lys Asp Ile Tyr Arg
165 170 175
Gln Arg Ser Met Glu Leu Val Gln Ala Glu His Pro Asp Trp Pro Glu
180 185 190
Thr Leu Val Glu Ala Ala Ala Lys Asn Gln Phe Gln Glu Ala Ala Glu
195 200 205
Ala Trp Met Ala Gly Thr Leu Gln Leu Gly Gln Val Leu Arg Pro Arg
210 215 220
Gly Leu Trp Gly Tyr Tyr Gly Phe Pro Asp Cys Tyr Asn Asn Asp Phe

```
225                 230                 235                 240
Leu Ser Leu Asn Tyr Thr Gly Gln Cys Pro Val Phe Val Arg Asp Gln
                245                 250                 255
Asn Asp Gln Leu Gly Trp Leu Trp Asn Gln Ser Tyr Ala Leu Tyr Pro
            260                 265                 270
Ser Ile Tyr Leu Pro Ala Ala Leu Met Gly Thr Gly Lys Ser Gln Met
        275                 280                 285
Tyr Val Arg His Arg Val Gln Glu Ala Leu Arg Val Ala Ile Val Ser
    290                 295                 300
Arg Asp Pro His Val Pro Val Met Pro Tyr Val Gln Ile Phe Tyr Glu
305                 310                 315                 320
Met Thr Asp Tyr Leu Leu Pro Leu Glu Glu Leu Glu His Ser Leu Gly
                325                 330                 335
Glu Ser Ala Ala Gln Gly Val Ala Gly Ala Val Leu Trp Leu Ser Ser
            340                 345                 350
Asp Lys Thr Ser Thr Lys Glu Ser Cys Gln Ala Ile Lys Ala Tyr Met
        355                 360                 365
Asp Ser Thr Leu Gly Pro Phe Ile Val Asn Val Thr Ser Ala Ala Leu
    370                 375                 380
Leu Cys Ser Glu Ala Leu Cys Ser Gly His Gly Arg Cys Val Arg His
385                 390                 395                 400
Pro Ser Tyr Pro Glu Ala Leu Leu Thr Leu Asn Pro Ala Ser Phe Ser
                405                 410                 415
Ile Glu Leu Thr His Asp Gly Arg Pro Pro Ser Leu Lys Gly Thr Leu
            420                 425                 430
Ser Leu Lys Asp Arg Ala Gln Met Ala Met Lys Phe Arg Cys Arg Cys
        435                 440                 445
Tyr Arg Gly Trp Arg Gly Lys Trp Cys Asp Lys Arg Gly Met
    450                 455                 460


<210> 18
<211> 473
<212> PRT
<213> Mus musculus

<220>
<223> mouse hyaluronidase-2 precursor


<400> 18
Met Arg Ala Gly Leu Gly Pro Ile Ile Thr Leu Ala Leu Val Leu Glu
 1               5                  10                  15
Val Ala Trp Ala Gly Glu Leu Lys Pro Thr Ala Pro Pro Ile Phe Thr
            20                  25                  30
Gly Arg Pro Phe Val Val Ala Trp Asn Val Pro Thr Gln Glu Cys Ala
        35                  40                  45
Pro Arg His Lys Val Pro Leu Asp Leu Arg Ala Phe Asp Val Lys Ala
    50                  55                  60
Thr Pro Asn Glu Gly Phe Phe Asn Gln Asn Ile Thr Thr Phe Tyr Tyr
65                  70                  75                  80
Asp Arg Leu Gly Leu Tyr Pro Arg Phe Asp Ala Ala Gly Thr Ser Val
                85                  90                  95
His Gly Gly Val Pro Gln Asn Gly Ser Leu Cys Ala His Leu Pro Met
            100                 105                 110
Leu Lys Glu Ser Val Glu Arg Tyr Ile Gln Thr Gln Glu Pro Gly Gly
        115                 120                 125
Leu Ala Val Ile Asp Trp Glu Glu Trp Arg Pro Val Trp Val Arg Asn
```

```
    130                 135                 140
Trp Gln Glu Lys Asp Val Tyr Arg Gln Ser Ser Arg Gln Leu Val Ala
145                 150                 155                 160
Ser Arg His Pro Asp Trp Pro Ser Asp Arg Val Met Lys Gln Ala Gln
                165                 170                 175
Tyr Glu Phe Glu Phe Ala Ala Arg Gln Phe Met Leu Asn Thr Leu Arg
            180                 185                 190
Tyr Val Lys Ala Val Arg Pro Gln His Leu Trp Gly Phe Tyr Leu Phe
        195                 200                 205
Pro Asp Cys Tyr Asn His Asp Tyr Val Gln Asn Trp Glu Ser Tyr Thr
    210                 215                 220
Gly Arg Cys Pro Asp Val Glu Val Ala Arg Asn Asp Gln Leu Ala Trp
225                 230                 235                 240
Leu Trp Ala Glu Ser Thr Ala Leu Phe Pro Ser Val Tyr Leu Asp Glu
                245                 250                 255
Thr Leu Ala Ser Ser Val His Ser Arg Asn Phe Val Ser Phe Arg Val
            260                 265                 270
Arg Glu Ala Leu Arg Val Ala His Thr His His Ala Asn His Ala Leu
        275                 280                 285
Pro Val Tyr Val Phe Thr Arg Pro Thr Tyr Thr Arg Gly Leu Thr Gly
    290                 295                 300
Leu Ser Gln Val Asp Leu Ile Ser Thr Ile Gly Glu Ser Ala Ala Leu
305                 310                 315                 320
Gly Ser Ala Gly Val Ile Phe Trp Gly Asp Ser Glu Asp Ala Ser Ser
                325                 330                 335
Met Glu Thr Cys Gln Tyr Leu Lys Asn Tyr Leu Thr Gln Leu Leu Val
            340                 345                 350
Pro Tyr Ile Val Asn Val Ser Trp Ala Thr Gln Tyr Cys Ser Trp Thr
        355                 360                 365
Gln Cys His Gly His Gly Arg Cys Val Arg Arg Asn Pro Ser Ala Asn
    370                 375                 380
Thr Phe Leu His Leu Asn Ala Ser Ser Phe Arg Leu Val Pro Gly His
385                 390                 395                 400
Thr Pro Ser Glu Pro Gln Leu Arg Pro Glu Gly Gln Leu Ser Glu Ala
                405                 410                 415
Asp Leu Asn Tyr Leu Gln Lys His Phe Arg Cys Gln Cys Tyr Leu Gly
            420                 425                 430
Trp Gly Gly Glu Gln Cys Gln Arg Asn Tyr Lys Gly Ala Ala Gly Asn
        435                 440                 445
Ala Ser Arg Ala Trp Ala Gly Ser His Leu Thr Ser Leu Leu Gly Leu
    450                 455                 460
Val Ala Val Ala Leu Thr Trp Thr Leu
465                 470


<210> 19
<211> 412
<212> PRT
<213> Mus musculus

<220>
<223> mouse hyaluronidase-3 precursor



<400> 19
Met Ile Met His Leu Gly Leu Met Met Val Val Gly Leu Thr Leu Cys
 1               5                  10                  15
```

```
Leu Met His Gly Gln Ala Leu Leu Gln Val Pro Glu His Pro Phe Ser
            20                  25                  30
Val Val Trp Asn Val Pro Ser Ala Arg Cys Lys Ala His Phe Gly Val
        35                  40                  45
His Leu Pro Leu Asp Ala Leu Gly Ile Val Ala Asn His Gly Gln His
    50                  55                  60
Phe His Gly Gln Asn Ile Ser Ile Phe Tyr Lys Asn Gln Phe Gly Leu
65                  70                  75                  80
Tyr Pro Tyr Phe Gly Pro Arg Gly Thr Ala His Asn Gly Gly Ile Pro
                85                  90                  95
Gln Ala Val Ser Leu Asp His His Leu Ala Arg Ala Ala His Gln Ile
            100                 105                 110
Leu His Ser Leu Gly Ser Ser Phe Ala Gly Leu Ala Val Leu Asp Trp
        115                 120                 125
Glu Glu Trp Tyr Pro Leu Trp Ala Gly Asn Trp Gly Pro His Arg Gln
    130                 135                 140
Val Tyr Leu Ala Ala Ser Trp Val Trp Thr Gln Gln Met Phe Pro Gly
145                 150                 155                 160
Leu Asp Pro Gln Glu Gln Leu His Lys Ala His Thr Ser Phe Glu Gln
                165                 170                 175
Ala Ala Arg Ala Leu Met Glu Tyr Thr Leu Gln Leu Gly Arg Thr Leu
            180                 185                 190
Arg Pro Ser Gly Leu Trp Gly Phe Tyr Arg Tyr Pro Ala Cys Gly Asn
        195                 200                 205
Gly Trp His Lys Met Ala Ser Asn Tyr Thr Gly His Cys His Ala Ala
    210                 215                 220
Ile Thr Thr Gln Asn Thr Gln Leu Arg Trp Leu Trp Ala Ala Ser Ser
225                 230                 235                 240
Ala Leu Phe Pro Ser Ile Tyr Leu Pro Pro Arg Leu Pro Leu Ala Tyr
                245                 250                 255
Arg Gln Ala Phe Val Arg His Arg Leu Glu Glu Ala Phe Arg Val Ala
            260                 265                 270
Leu Leu Glu His Ser His Pro Leu Pro Val Leu Ala Tyr Ser Arg Leu
        275                 280                 285
Thr His Arg Ser Ser Gly Arg Phe Leu Ser Leu Asp Asp Leu Met Gln
    290                 295                 300
Thr Ile Gly Val Ser Ala Ala Leu Gly Thr Ala Gly Val Val Leu Trp
305                 310                 315                 320
Gly Asp Leu Ser Phe Ser Ser Ser Glu Glu Lys Cys Trp Arg Leu His
                325                 330                 335
Asp Tyr Leu Val Gly Thr Leu Gly Pro Tyr Val Ile Asn Val Thr Lys
            340                 345                 350
Ala Asp Met Ala Cys Ser His Gln Arg Cys His Gly His Gly Arg Cys
        355                 360                 365
Ala Arg Lys Asp Pro Gly Gln Met Glu Ala Phe Leu His Leu Gln Pro
    370                 375                 380
Asp Asp Ser Leu Gly Ala Trp Asn Ser Phe Arg Cys His Cys Tyr Ser
385                 390                 395                 400
Gly Trp Ala Gly Pro Thr Cys Leu Glu Pro Lys Pro
                405                 410
```

<210> 20
<211> 435
<212> PRT
<213> Sus scrofa

<220>

<223> pig hyaluronidase-1 precursor

<400> 20
Met Ala Ala His Leu Leu Pro Ile Cys Thr Leu Phe Leu Asn Leu Leu
 1   5   10   15
Ser Val Ala Gln Gly Ser Arg Asp Pro Val Val Leu Asn Arg Pro Phe
            20   25   30
Thr Thr Ile Trp Asn Ala Asn Thr Gln Trp Cys Leu Lys Arg His Gly
        35   40   45
Val Asp Val Asp Val Ser Val Phe Glu Val Val Val Asn Pro Gly Gln
    50   55   60
Thr Phe Arg Gly Pro Asn Met Thr Ile Phe Tyr Ser Ser Gln Leu Gly
65   70   75   80
Thr Tyr Pro Tyr Tyr Thr Ser Ala Gly Glu Pro Val Phe Gly Gly Leu
                85   90   95
Pro Gln Asn Ala Ser Leu Asp Val His Leu Asn Arg Thr Phe Lys Asp
            100   105   110
Ile Leu Ala Ala Met Pro Glu Ser Asn Phe Ser Gly Leu Ala Val Ile
        115   120   125
Asp Trp Glu Ala Trp Arg Pro Arg Trp Ala Phe Asn Trp Asp Ala Lys
    130   135   140
Asp Ile Tyr Arg Gln Arg Ser Arg Ala Leu Val Gln Lys Gln His Pro
145   150   155   160
Asp Trp Pro Ala Pro Trp Val Glu Ala Ala Ala Gln Asp Gln Phe Gln
                165   170   175
Glu Ala Ala Gln Thr Trp Met Ala Gly Thr Leu Lys Leu Gly Gln Thr
            180   185   190
Leu Arg Pro His Gly Leu Trp Gly Phe Tyr Gly Phe Pro Asp Cys Tyr
        195   200   205
Asn Tyr Asp Phe Gln Ser Ser Asn Tyr Thr Gly Gln Cys Pro Pro Gly
    210   215   220
Val Ser Ala Gln Asn Asp Gln Leu Gly Trp Leu Trp Gly Gln Ser Arg
225   230   235   240
Ala Leu Tyr Pro Ser Ile Tyr Leu Pro Ser Ala Leu Glu Gly Thr Asn
                245   250   255
Lys Thr Gln Leu Tyr Val Gln His Arg Val Asn Glu Ala Phe Arg Val
            260   265   270
Ala Ala Ala Ala Gly Asp Pro Asn Leu Pro Val Leu Pro Tyr Ala Gln
        275   280   285
Ile Phe His Asp Met Thr Asn Arg Leu Leu Ser Arg Glu Glu Leu Glu
    290   295   300
His Ser Leu Gly Glu Ser Ala Ala Gln Gly Ala Ala Gly Val Val Leu
305   310   315   320
Trp Val Ser Trp Glu Asn Thr Arg Thr Lys Glu Ser Cys Gln Ser Ile
                325   330   335
Lys Glu Tyr Val Asp Thr Thr Leu Gly Pro Phe Ile Leu Asn Val Thr
            340   345   350
Ser Gly Ala Leu Leu Cys Ser Gln Ala Val Cys Ser Gly His Gly Arg
        355   360   365
Cys Val Arg Arg Pro Ser His Thr Glu Ala Leu Pro Ile Leu Asn Pro
    370   375   380
Ser Ser Phe Ser Ile Lys Pro Thr Pro Gly Gly Gly Pro Leu Thr Leu
385   390   395   400
Gln Gly Ala Leu Ser Leu Lys Asp Arg Val Gln Met Ala Glu Glu Phe
                405   410   415
Gln Cys Arg Cys Tyr Pro Gly Trp Arg Gly Thr Trp Cys Glu Gln Gln
            420   425   430

Gly Thr Arg
        435

<210> 21
<211> 419
<212> PRT
<213> Sus scrofa

<220>
<223> pig hyaluronidase-3 precursor

<400> 21
Met Thr Met Gln Leu Gly Leu Ala Leu Val Leu Gly Val Ala Met Cys
 1   5   10   15
Leu Gly Cys Gly Gln Pro Leu Leu Arg Ala Pro Glu Arg Pro Phe Cys
            20   25   30
Val Leu Trp Asn Val Pro Ser Ala Arg Cys Lys Ala Arg Phe Gly Val
        35   40   45
His Leu Pro Leu Glu Ala Leu Gly Ile Thr Ala Asn His Gly Gln Arg
    50   55   60
Phe His Gly Gln Asn Ile Thr Ile Phe Tyr Lys Ser Gln Leu Gly Leu
65   70   75   80
Tyr Pro Tyr Phe Gly Pro Arg Gly Thr Ala His Asn Gly Gly Ile Pro
                85   90   95
Gln Ala Val Ser Leu Asp His His Leu Ala Arg Ala Ala Tyr Gln Ile
            100   105   110
His Arg Ser Leu Arg Pro Gly Phe Thr Gly Leu Ala Val Leu Asp Trp
        115   120   125
Glu Glu Trp Cys Pro Leu Trp Ala Gly Asn Trp Gly Arg Arg Gln Ala
    130   135   140
Tyr Gln Ala Ala Ser Cys Ala Trp Ala Gln Arg Val Tyr Pro Asn Leu
145   150   155   160
Asp Pro Gln Glu Gln Leu Cys Lys Ala Arg Ala Gly Phe Glu Glu Ala
                165   170   175
Ala Arg Ala Leu Met Glu Asp Thr Leu Arg Leu Gly Arg Met Leu Arg
            180   185   190
Pro His Gly Leu Trp Gly Phe Tyr His Tyr Pro Ala Cys Gly Asn Gly
        195   200   205
Trp His Gly Thr Ala Ser Asn Tyr Thr Gly His Cys His Ala Ala Ala
    210   215   220
Leu Ala Arg Asn Thr Gln Leu Tyr Trp Leu Trp Ala Ala Ser Ser Ala
225   230   235   240
Leu Phe Pro Ser Ile Tyr Leu Pro Pro Gly Leu Pro Pro Ala Tyr His
                245   250   255
Gln Ala Phe Val Arg Tyr Arg Leu Glu Glu Ala Phe Arg Val Ala Leu
            260   265   270
Val Gly His Pro His Pro Leu Pro Val Leu Ala Tyr Ala Arg Leu Thr
        275   280   285
His Arg Asn Ser Gly Arg Phe Leu Ser Gln Asp Glu Leu Val Gln Thr
    290   295   300
Ile Gly Val Ser Ala Ala Leu Gly Ala Ser Gly Val Val Leu Trp Gly
305   310   315   320
Asp Leu Ser Phe Ser Ser Ser Glu Glu Glu Cys Trp His Leu Arg Gly
                325   330   335
Tyr Leu Val Gly Thr Leu Gly Pro Tyr Val Ile Asn Val Thr Arg Ala
            340   345   350

```
Ala Met Ala Cys Ser His Gln Arg Cys His Gly His Gly Arg Cys Ala
        355                 360                 365
Trp Gln Asp Pro Gly Gln Leu Lys Val Phe Leu His Leu His Pro Gly
    370                 375                 380
Gly Ser Pro Gly Ala Trp Glu Ser Phe Ser Cys Arg Cys Tyr Trp Gly
385                 390                 395                 400
Trp Ala Gly Pro Thr Cys Gln Glu Pro Arg Pro Glu Leu Gly Pro Glu
                405                 410                 415
Glu Ala Thr
```

<210> 22
<211> 449
<212> PRT
<213> Rattus norvegicus

<220>
<223> rat hyaluronidase-1 precursor

<400> 22

```
Met Lys Pro Phe Ser Pro Glu Val Ser Pro Asp Pro Cys Pro Ala Thr
 1               5                  10                  15
Ala Ala His Leu Leu Arg Thr Tyr Thr Leu Phe Leu Thr Leu Leu Glu
            20                  25                  30
Leu Ala Gln Gly Cys Arg Gly Ser Met Val Ser Asn Arg Pro Phe Ile
        35                  40                  45
Thr Val Trp Asn Ala Asp Thr His Trp Cys Leu Lys Asp His Gly Val
    50                  55                  60
Asp Val Asp Val Ser Val Phe Asp Val Val Ala Asn Lys Glu Gln Asn
65                  70                  75                  80
Phe Gln Gly Pro Asn Met Thr Ile Phe Tyr Arg Glu Glu Leu Gly Thr
                85                  90                  95
Tyr Pro Tyr Tyr Thr Pro Thr Gly Glu Pro Val Phe Gly Gly Leu Pro
            100                 105                 110
Gln Asn Ala Ser Leu Val Thr His Leu Ala His Ala Phe Gln Asp Ile
        115                 120                 125
Lys Ala Ala Met Pro Glu Pro Asp Phe Ser Gly Leu Ala Val Ile Asp
    130                 135                 140
Trp Glu Ala Trp Arg Pro Arg Trp Ala Phe Asn Trp Asp Ser Lys Asp
145                 150                 155                 160
Ile Tyr Gln Gln Arg Ser Met Glu Leu Val Arg Ala Glu His Pro Asp
                165                 170                 175
Trp Pro Glu Thr Leu Val Glu Ala Glu Ala Gln Gly Gln Phe Gln Glu
            180                 185                 190
Ala Ala Glu Ala Trp Met Ala Gly Thr Leu Gln Leu Gly Gln Val Leu
        195                 200                 205
Arg Pro Arg Gly Leu Trp Gly Tyr Tyr Gly Phe Pro Asp Cys Tyr Asn
    210                 215                 220
Tyr Asp Phe Leu Ser Pro Asn Tyr Thr Gly Gln Cys Ser Leu Ser Ile
225                 230                 235                 240
His Asp Gln Asn Asp Gln Leu Gly Trp Leu Trp Asn Gln Ser Tyr Ala
                245                 250                 255
Leu Tyr Pro Ser Ile Tyr Leu Pro Ala Ala Leu Met Gly Thr Gly Lys
            260                 265                 270
Ser Gln Met Tyr Val Arg Tyr Arg Val Gln Glu Ala Phe Arg Leu Ala
        275                 280                 285
```

Leu Val Ser Arg Asp Pro His Val Pro Ile Met Pro Tyr Val Gln Ile
290 295 300
Phe Tyr Glu Lys Thr Asp Tyr Leu Leu Pro Leu Glu Glu Leu Glu His
305 310 315 320
Ser Leu Gly Glu Ser Ala Ala Gln Gly Ala Ala Gly Ala Val Leu Trp
325 330 335
Ile Ser Ser Glu Lys Thr Ser Thr Lys Glu Ser Cys Gln Ala Ile Lys
340 345 350
Ala Tyr Met Asp Ser Thr Leu Gly Pro Phe Ile Leu Asn Val Thr Ser
355 360 365
Ala Ala Leu Leu Cys Ser Glu Ala Leu Cys Ser Gly Arg Gly Arg Cys
370 375 380
Val Arg His Pro Ser Tyr Pro Glu Ala Leu Leu Thr Leu Ser Pro Ala
385 390 395 400
Ser Phe Ser Ile Glu Pro Thr His Asp Gly Arg Pro Leu Ser Leu Lys
405 410 415
Gly Thr Leu Ser Leu Lys Asp Arg Ala Gln Met Ala Met Lys Phe Lys
420 425 430
Cys Arg Cys Tyr Arg Gly Trp Ser Gly Glu Trp Cys Lys Lys Gln Asp
435 440 445
Met

<210> 23
<211> 473
<212> PRT
<213> Rattus norvegicus

<220>
<223> rat hyaluronidase-2 precursor

<400> 23
Met Arg Ala Gly Leu Gly Pro Ile Ile Thr Leu Ala Leu Val Leu Glu
1 5 10 15
Val Ala Trp Ala Ser Glu Leu Lys Pro Thr Ala Pro Pro Ile Phe Thr
20 25 30
Gly Arg Pro Phe Val Val Ala Trp Asn Val Pro Thr Gln Glu Cys Ala
35 40 45
Pro Arg His Lys Val Pro Leu Asp Leu Arg Ala Phe Asp Val Glu Ala
50 55 60
Thr Pro Asn Glu Gly Phe Phe Asn Gln Asn Ile Thr Thr Phe Tyr Tyr
65 70 75 80
Asp Arg Leu Gly Leu Tyr Pro Arg Phe Asp Ala Ala Gly Met Ser Val
85 90 95
His Gly Gly Val Pro Gln Asn Gly Ser Leu Cys Ala His Leu Pro Met
100 105 110
Leu Lys Glu Ala Val Glu Arg Tyr Ile Gln Thr Gln Glu Pro Ala Gly
115 120 125
Leu Ala Val Ile Asp Trp Glu Glu Trp Arg Pro Val Trp Val Arg Asn
130 135 140
Trp Gln Glu Lys Asp Val Tyr Arg Gln Ser Ser Arg Gln Leu Val Ala
145 150 155 160
Ser Arg His Pro Asp Trp Pro Ser Asp Arg Ile Val Lys Gln Ala Gln
165 170 175
Tyr Glu Phe Glu Phe Ala Ala Arg Gln Phe Met Leu Asn Thr Leu Arg
180 185 190

```
Tyr Val Lys Ala Val Arg Pro Gln His Leu Trp Gly Phe Tyr Leu Phe
        195                 200                 205
Pro Asp Cys Tyr Asn His Asp Tyr Val Gln Asn Trp Asp Ser Tyr Thr
    210                 215                 220
Gly Arg Cys Pro Asp Val Glu Val Ala Gln Asn Asp Gln Leu Ala Trp
225                 230                 235                 240
Leu Trp Ala Glu Asn Thr Ala Leu Phe Pro Ser Val Tyr Leu Asp Lys
                245                 250                 255
Thr Leu Ala Ser Ser Lys His Ser Arg Asn Phe Val Ser Phe Arg Val
            260                 265                 270
Gln Glu Ala Leu Arg Val Ala His Thr His His Ala Asn His Ala Leu
        275                 280                 285
Pro Val Tyr Val Phe Thr Arg Pro Thr Tyr Thr Arg Arg Leu Thr Glu
    290                 295                 300
Leu Asn Gln Met Asp Leu Ile Ser Thr Ile Gly Glu Ser Ala Ala Leu
305                 310                 315                 320
Gly Ser Ala Gly Val Ile Phe Trp Gly Asp Ser Val Tyr Ala Ser Ser
                325                 330                 335
Met Glu Asn Cys Gln Asn Leu Lys Lys Tyr Leu Thr Gln Thr Leu Val
            340                 345                 350
Pro Tyr Ile Val Asn Val Ser Trp Ala Thr Gln Tyr Cys Ser Trp Thr
        355                 360                 365
Gln Cys His Gly His Gly Arg Cys Val Arg Arg Asn Pro Ser Ala Ser
    370                 375                 380
Thr Phe Leu His Leu Ser Pro Ser Ser Phe Arg Leu Val Pro Gly Arg
385                 390                 395                 400
Thr Pro Ser Glu Pro Gln Leu Arg Pro Glu Gly Glu Leu Ser Glu Asp
                405                 410                 415
Asp Leu Ser Tyr Leu Gln Met His Phe Arg Cys His Cys Tyr Leu Gly
            420                 425                 430
Trp Gly Gly Glu Gln Cys Gln Trp Asn His Lys Arg Ala Ala Gly Asp
        435                 440                 445
Ala Ser Arg Ala Trp Ala Gly Ala His Leu Ala Ser Leu Leu Gly Leu
    450                 455                 460
Val Ala Met Thr Leu Thr Trp Thr Leu
465                 470


<210> 24
<211> 412
<212> PRT
<213> Rattus norvegicus

<220>
<223> rat hyaluronidase-3 precursor


<400> 24
Met Ile Thr Gln Leu Gly Leu Thr Leu Val Val Gly Leu Thr Leu Cys
 1               5                  10                  15
Leu Val His Val Gln Ala Leu Leu Gln Val Pro Glu Phe Pro Phe Ser
            20                  25                  30
Val Leu Trp Asn Val Pro Ser Ala Arg Cys Lys Thr Arg Phe Gly Val
        35                  40                  45
His Leu Pro Leu Asp Ala Leu Gly Ile Ile Ala Asn His Gly Gln Arg
    50                  55                  60
Phe His Gly Gln Asn Ile Thr Ile Phe Tyr Lys Asn Gln Phe Gly Leu
65                  70                  75                  80
```

```
Tyr Pro Tyr Phe Gly Pro Arg Gly Thr Ala His Asn Gly Gly Ile Pro
                85                  90                  95
Gln Ala Val Ser Leu Asp His His Leu Ala Gln Ala Ala His Gln Ile
            100                 105                 110
Leu His Asn Leu Gly Ser Ser Phe Ala Gly Leu Ala Val Leu Asp Trp
        115                 120                 125
Glu Glu Trp Tyr Pro Leu Trp Ala Gly Asn Trp Gly Thr His Arg Gln
    130                 135                 140
Val Tyr Gln Ala Ala Ser Trp Ala Trp Ala Gln Gln Met Phe Pro Asp
145                 150                 155                 160
Leu Asn Pro Gln Glu Gln Leu His Lys Ala Gln Thr Gly Phe Glu Gln
                165                 170                 175
Ala Ala Arg Ala Leu Met Glu His Thr Leu Arg Leu Gly Gln Met Leu
            180                 185                 190
Arg Pro His Gly Leu Trp Gly Phe Tyr Arg Tyr Pro Val Cys Gly Asn
        195                 200                 205
Gly Trp His Asn Met Ala Ser Asn Tyr Thr Gly His Cys His Pro Ala
    210                 215                 220
Ile Ile Thr Arg Asn Thr Gln Leu Arg Trp Leu Trp Ala Ala Ser Ser
225                 230                 235                 240
Ala Leu Phe Pro Ser Ile Tyr Leu Pro Pro Arg Leu Pro Pro Ala Tyr
                245                 250                 255
His Gln Thr Phe Val Arg His Arg Leu Glu Glu Ala Phe Arg Val Ala
            260                 265                 270
Leu Thr Gly His Ala His Pro Leu Pro Val Leu Ala Tyr Val Arg Leu
        275                 280                 285
Thr His Arg Ser Ser Gly Arg Phe Leu Ser Leu Asp Asp Leu Met Gln
    290                 295                 300
Thr Ile Gly Val Ser Ala Ala Leu Gly Ala Ala Gly Val Val Leu Trp
305                 310                 315                 320
Gly Asp Leu Ser Val Ser Ser Ser Glu Glu Glu Cys Trp Arg Leu His
                325                 330                 335
Asp Tyr Leu Val Gly Thr Leu Gly Pro Tyr Val Ile Asn Val Thr Lys
            340                 345                 350
Ala Ala Thr Ala Cys Ser His Gln Arg Cys His Gly His Gly Arg Cys
        355                 360                 365
Ser Trp Lys Asp Pro Gly Gln Met Glu Ala Phe Leu His Leu Gln Pro
    370                 375                 380
Asp Asp Asn Leu Gly Ala Trp Lys Ser Phe Arg Cys Arg Cys Tyr Leu
385                 390                 395                 400
Gly Trp Ser Gly Pro Thr Cys Leu Glu Pro Lys Pro
                405                 410
```

<210> 25
<211> 545
<212> PRT
<213> Oryctolagus cuniculus

<220>
<223> rabbit hyaluronidase PH20 precursor

```
<400> 25
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Gly Ser Ala Val Glu
 1               5                  10                  15
Leu Ser Gly Val Phe Gln Ile Val Phe Ile Phe Leu Leu Ile Pro Cys
            20                  25                  30
```

```
Cys Leu Thr Ala Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
         35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Thr Glu Phe Cys Leu Gly Lys Ser
     50                  55                  60
Gly Glu Pro Leu Asp Met Ser Leu Phe Ser Leu Phe Gly Ser Pro Arg
65                  70                  75                  80
Lys Asn Lys Thr Gly Gln Gly Ile Thr Ile Phe Tyr Val Asp Arg Leu
                 85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Pro His Thr Gly Ala Ile Val His Gly
            100                 105                 110
Arg Ile Pro Gln Leu Gly Pro Leu Gln Gln His Leu Thr Lys Leu Arg
        115                 120                 125
Gln Glu Ile Leu Tyr Tyr Met Pro Lys Asp Asn Val Gly Leu Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Leu Pro Thr Trp Leu Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Ile Tyr Arg Ile Lys Ser Ile Glu Leu Val Lys Ser Gln His
                165                 170                 175
Pro Gln Tyr Asn His Ser Tyr Ala Thr Glu Lys Ala Lys Arg Asp Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Met Glu Glu Thr Leu Lys Leu Gly Arg
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Asp Lys Pro Asn Leu Tyr Lys Gly Ser Cys Phe
225                 230                 235                 240
Asp Ile Glu Lys Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Lys Glu
                245                 250                 255
Ser Thr Ala Leu Phe Pro Ser Val Tyr Leu Thr Ser Arg Ala Arg Ser
            260                 265                 270
Ala Thr Ala Leu Ser Lys Leu Tyr Val Val Arg Asn Arg Val His Glu
        275                 280                 285
Ala Ile Arg Val Ser Lys Ile Pro Asp Asp Lys Ser Pro Leu Pro Asn
    290                 295                 300
Phe Val Tyr Thr Arg Leu Val Phe Thr Asp Gln Ile Phe Gln Phe Leu
305                 310                 315                 320
Ser His His Asp Leu Val Tyr Thr Ile Gly Glu Ile Val Ala Leu Gly
                325                 330                 335
Ala Ser Gly Ile Val Val Trp Gly Ser Gln Ser Leu Ala Arg Ser Met
            340                 345                 350
Lys Ser Cys Leu His Leu Asp Asn Tyr Met Lys Thr Ile Leu Asn Pro
        355                 360                 365
Tyr Leu Ile Asn Val Thr Leu Ala Ala Lys Met Cys Asn Gln Val Leu
    370                 375                 380
Cys Gln Glu Gln Gly Val Cys Thr Arg Lys Asn Trp Asn Pro Asn Asp
385                 390                 395                 400
Tyr Leu His Leu Asn Pro Gly Asn Phe Ala Ile Gln Leu Gly Ser Asn
                405                 410                 415
Gly Thr Tyr Lys Val Asp Gly Lys Pro Thr Leu Thr Asp Leu Glu Gln
            420                 425                 430
Phe Ser Lys Asn Phe Gln Cys Ser Cys Tyr Thr Asn Leu Asn Cys Lys
        435                 440                 445
Glu Arg Thr Asp Met Asn Asn Val Arg Thr Val Asn Val Cys Ala Val
    450                 455                 460
Glu Asn Val Cys Ile Asp Thr Asn Val Gly Pro Gln Ala Val Thr Tyr
465                 470                 475                 480
Ala Pro Lys Glu Lys Lys Asp Val Ala His Ile Leu Ser Asn Thr Thr
                485                 490                 495
```

Ser Ile Asn Ser Ser Thr Thr Met Ser Leu Pro Phe Pro Arg Lys His
            500   505   510
Val Ser Gly Cys Leu Leu Val Leu Cys Met Tyr Ser Gln Tyr Leu Asn
        515   520   525
Ile Cys Tyr Arg Leu Val Ala Ile Gly Ile Gln His Gly Tyr Tyr Leu
    530   535   540
Lys
545

<210> 26
<211> 476
<212> PRT
<213> Ovis aries

<220>
<223> sheep hyaluronidase-2 precursor

<400> 26
Met Trp Thr Gly Leu Gly Pro Ala Val Thr Leu Ala Leu Val Leu Val
 1   5   10   15
Val Ala Trp Ala Thr Glu Leu Lys Pro Thr Ala Pro Pro Ile Phe Thr
            20   25   30
Gly Arg Pro Phe Val Val Ala Trp Asp Val Pro Thr Gln Asp Cys Gly
        35   40   45
Pro Arg His Lys Met Pro Leu Asp Pro Lys Asp Met Lys Ala Phe Asp
    50   55   60
Val Gln Ala Ser Pro Asn Glu Gly Phe Val Asn Gln Asn Ile Thr Ile
65   70   75   80
Phe Tyr Arg Asp Arg Leu Gly Met Tyr Pro His Phe Asn Ser Val Gly
                85   90   95
Arg Ser Val His Gly Gly Val Pro Gln Asn Gly Ser Leu Trp Val His
            100   105   110
Leu Glu Met Leu Lys Gly His Val Glu His Tyr Ile Arg Thr Gln Glu
        115   120   125
Pro Ala Gly Leu Ala Val Ile Asp Trp Glu Asp Trp Arg Pro Val Trp
    130   135   140
Val Arg Asn Trp Gln Asp Lys Asp Val Tyr Arg Arg Leu Ser Arg Gln
145   150   155   160
Leu Val Ala Ser His His Pro Asp Trp Pro Pro Glu Arg Ile Val Lys
                165   170   175
Glu Ala Gln Tyr Glu Phe Glu Phe Ala Ala Arg Gln Phe Met Leu Glu
            180   185   190
Thr Leu Arg Phe Val Lys Ala Phe Arg Pro Arg His Leu Trp Gly Phe
        195   200   205
Tyr Leu Phe Pro Asp Cys Tyr Asn His Asp Tyr Val Gln Asn Trp Glu
    210   215   220
Thr Tyr Thr Gly Arg Cys Pro Asp Val Glu Val Ser Arg Asn Asp Gln
225   230   235   240
Leu Ser Trp Leu Trp Ala Glu Ser Thr Ala Leu Phe Pro Ser Val Tyr
                245   250   255
Leu Glu Glu Thr Leu Ala Ser Ser Thr His Gly Arg Asn Phe Val Ser
            260   265   270
Phe Arg Val Gln Glu Ala Leu Arg Val Ala Asp Val His His Ala Asn
        275   280   285
His Ala Leu Pro Val Tyr Val Phe Thr Arg Pro Thr Tyr Ser Arg Gly

```
    290                 295                 300
Leu Thr Gly Leu Ser Glu Met Asp Leu Ile Ser Thr Ile Gly Glu Ser
305                 310                 315                 320
Ala Ala Leu Gly Ala Ala Gly Val Ile Leu Trp Gly Asp Ala Gly Phe
                325                 330                 335
Thr Thr Ser Asn Glu Thr Cys Arg Arg Leu Lys Asp Tyr Leu Thr Arg
            340                 345                 350
Ser Leu Val Pro Tyr Val Val Asn Val Ser Trp Ala Ala Gln Tyr Cys
        355                 360                 365
Ser Trp Ala Gln Cys His Gly His Gly Arg Cys Val Arg Arg Asp Pro
    370                 375                 380
Asn Ala His Thr Phe Leu His Leu Ser Ala Ser Ser Phe Arg Leu Val
385                 390                 395                 400
Pro Ser His Ala Pro Asp Glu Pro Arg Leu Arg Pro Glu Gly Glu Leu
                405                 410                 415
Ser Trp Ala Asp Arg Asn His Leu Gln Thr His Phe Arg Cys Gln Cys
            420                 425                 430
Tyr Leu Gly Trp Gly Gly Glu Gln Cys Gln Trp Asp Arg Arg Arg Ala
        435                 440                 445
Ala Gly Gly Ala Ser Gly Ala Trp Ala Gly Ser His Leu Thr Gly Leu
    450                 455                 460
Leu Ala Val Ala Val Leu Ala Phe Thr Trp Thr Ser
465                 470                 475
```

<210> 27
<211> 114
<212> PRT
<213> Ovis aries

<220>
<223> sheep sperm membrane protein PH20 (partial sequence)

<400> 27

```
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Leu Ser Lys Ile
 1               5                  10                  15
Ala Ser Val Glu Ser Pro Leu Pro Val Phe Val Tyr His Arg Pro Val
            20                  25                  30
Phe Thr Asp Gly Ser Ser Thr Tyr Leu Ser Gln Gly Asp Leu Val Asn
        35                  40                  45
Ser Val Gly Glu Ile Val Ala Leu Gly Ala Ser Gly Ile Ile Met Trp
    50                  55                  60
Gly Ser Leu Asn Leu Ser Leu Thr Met Gln Ser Cys Met Asn Leu Gly
65                  70                  75                  80
Asn Tyr Leu Asn Thr Thr Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                85                  90                  95
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            100                 105                 110
Ile Arg
```

<210> 28
<211> 414
<212> PRT

<213> Pongo pygmaeus

<220>
<223> orangutan hyaluronidase-3 precursor

<400> 28
Met Thr Thr Arg Leu Gly Pro Ala Leu Val Leu Gly Val Ala Leu Cys
 1   5   10   15
Leu Gly Cys Gly Gln Pro Leu Pro Gln Val Pro Glu Arg Pro Phe Ser
            20   25   30
Val Leu Trp Asn Val Pro Ser Ala His Cys Lys Ser Arg Phe Gly Val
        35   40   45
His Leu Pro Leu Asn Ala Leu Gly Ile Ile Ala Asn Arg Gly Gln His
    50   55   60
Phe His Gly Gln Asn Met Thr Ile Phe Tyr Lys Asn Gln Leu Gly Leu
65   70   75   80
Tyr Pro Tyr Phe Gly Pro Lys Gly Thr Ala His Asn Gly Gly Ile Pro
                85   90   95
Gln Ala Leu Pro Leu Asp Arg His Leu Ala Leu Ala Ala Tyr Gln Ile
            100   105   110
His His Ser Leu Arg Pro Gly Phe Ala Gly Pro Ala Val Leu Asp Trp
        115   120   125
Glu Glu Trp Cys Pro Leu Trp Ala Gly Asn Trp Gly Arg Arg Arg Ala
    130   135   140
Tyr Gln Ala Ala Ser Trp Ala Trp Ala Gln Gln Val Phe Pro Asp Leu
145   150   155   160
Asp Pro Gln Glu Gln Leu Tyr Lys Ala Tyr Thr Gly Phe Glu Gln Ala
                165   170   175
Ala Arg Ala Leu Met Glu Asp Thr Leu Arg Val Ala Gln Ala Leu Arg
            180   185   190
Pro His Gly Leu Trp Gly Phe Tyr His Tyr Pro Ala Cys Gly Asn Gly
        195   200   205
Trp His Ser Met Ala Ser Asn Tyr Thr Gly Arg Cys His Ala Ala Thr
    210   215   220
Leu Ala Arg Asn Thr Gln Leu His Trp Leu Trp Ala Ala Ser Ser Ala
225   230   235   240
Leu Phe Pro Ser Ile Tyr Leu Pro Pro Arg Leu Pro Pro Ala His His
                245   250   255
Gln Ala Phe Val Arg His Arg Leu Glu Glu Ala Phe Arg Val Ala Leu
            260   265   270
Val Gly His Leu Pro Val Leu Ala Tyr Val Arg Leu Thr His Arg Arg
        275   280   285
Ser Gly Arg Phe Leu Ser Gln Asp Asp Leu Val Gln Thr Ile Gly Val
    290   295   300
Ser Ala Ala Leu Gly Ala Ala Gly Val Val Leu Trp Gly Asp Leu Ser
305   310   315   320
Leu Ser Ser Ser Glu Glu Glu Cys Trp His Leu His Asp Tyr Leu Val
                325   330   335
Asp Thr Leu Gly Pro Tyr Gly Ile Asn Val Thr Arg Ala Ala Met Ala
            340   345   350
Cys Ser His Gln Arg Cys His Gly His Gly Arg Cys Ala Arg Arg Asp
        355   360   365
Pro Gly Gln Met Glu Ala Phe Leu His Leu Trp Pro Asp Gly Ser Leu
    370   375   380
Gly Asp Trp Lys Ser Phe Ser Cys His Cys Tyr Trp Gly Trp Ala Gly
385   390   395   400

```
Pro Thr Cys Gln Glu Pro Arg Leu Gly Pro Lys Glu Ala Val
                405                 410


<210> 29
<211> 510
<212> PRT
<213> Macaca fascicularis

<220>
<223> cynomolgus monkey hyaluronidase PH20 precursor


<400> 29
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Ile Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asn Glu Pro Leu Asp Met Ser Leu Phe Thr Leu Met Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Val Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Leu Thr Thr Gly Val Thr Val His Gly
            100                 105                 110
Gly Ile Pro Gln Lys Val Ser Leu Gln Asp His Leu Asp Lys Ser Lys
        115                 120                 125
Gln Asp Ile Leu Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Pro Gln Ala Thr Asp Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Met Leu Glu Thr Ile Lys Leu Gly Arg
        195                 200                 205
Ser Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Arg Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asp
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Val Val
            260                 265                 270
Val Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Asn Pro Leu Pro Val Phe Val Tyr Ala
    290                 295                 300
Arg Leu Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Arg Glu Glu
305                 310                 315                 320
Leu Val Ser Thr Leu Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Ser Leu Ser Ile Thr Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
```

```
Leu Leu Asp Thr Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asp Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Asp Ile Arg Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val His Gly Lys Pro Thr Val Glu Asp Leu Glu Glu Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Thr Asn Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Ser Leu Lys Pro Pro Val Glu Thr Glu Gly Ser Pro Pro
465                 470                 475                 480
Ile Phe Tyr Asn Thr Ser Ser Ser Thr Val Ser Thr Thr Met Phe Ile
                485                 490                 495
Val Asn Ile Leu Phe Leu Ile Ile Ser Ser Val Ala Ser Leu
            500                 505                 510
```

<210> 30
<211> 529
<212> PRT
<213> Cavia porcellus

<220>
<223> guinea pig hyaluronidase PH20 precursor

<400> 30

```
Met Gly Ala Phe Thr Phe Lys His Ser Phe Phe Gly Ser Phe Val Glu
 1               5                  10                  15
Cys Ser Gly Val Leu Gln Thr Val Phe Ile Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Ala Asp Lys Arg Ala Pro Pro Leu Ile Pro Asn Val Pro Leu
        35                  40                  45
Leu Trp Val Trp Asn Ala Pro Thr Glu Phe Cys Ile Gly Gly Thr Asn
    50                  55                  60
Gln Pro Leu Asp Met Ser Phe Phe Ser Ile Val Gly Thr Pro Arg Lys
65                  70                  75                  80
Asn Ile Thr Gly Gln Ser Ile Thr Leu Tyr Tyr Val Asp Arg Leu Gly
                85                  90                  95
Tyr Tyr Pro Tyr Ile Asp Pro His Thr Gly Ala Ile Val His Gly Gly
            100                 105                 110
Leu Pro Gln Leu Met Asn Leu Gln Gln His Leu Arg Lys Ser Arg Gln
        115                 120                 125
Asp Ile Leu Phe Tyr Met Pro Thr Asp Ser Val Gly Leu Ala Val Ile
    130                 135                 140
Asp Trp Glu Glu Trp Arg Pro Thr Trp Thr Arg Asn Trp Arg Pro Lys
145                 150                 155                 160
Asp Ile Tyr Arg Asn Lys Ser Ile Glu Leu Val Lys Ser Gln His Pro
                165                 170                 175
Gln Tyr Asn His Ser Tyr Ala Val Ala Val Ala Lys Arg Asp Phe Glu
            180                 185                 190
Arg Thr Gly Lys Ala Phe Met Leu Glu Thr Leu Lys Leu Gly Lys Ser
        195                 200                 205
```

```
Leu Arg Pro Ser Ser Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr
    210                 215                 220
Asn Thr His Phe Thr Lys Pro Asn Tyr Asp Gly His Cys Pro Pro Ile
225                 230                 235                 240
Glu Leu Gln Arg Asn Asn Asp Leu Gln Trp Leu Trp Asn Asp Ser Thr
                245                 250                 255
Ala Leu Tyr Pro Ser Val Tyr Leu Thr Ser Arg Val Arg Ser Ser Gln
            260                 265                 270
Asn Gly Ala Leu Tyr Val Arg Asn Arg Val His Glu Ser Ile Arg Val
        275                 280                 285
Ser Lys Leu Met Asp Asp Lys Asn Pro Leu Pro Ile Tyr Val Tyr Ile
    290                 295                 300
Arg Leu Val Phe Thr Asp Gln Thr Thr Thr Phe Leu Glu Leu Asp Asp
305                 310                 315                 320
Leu Val His Ser Val Gly Glu Ile Val Pro Leu Gly Val Ser Gly Ile
                325                 330                 335
Ile Ile Trp Gly Ser Leu Ser Leu Thr Arg Ser Leu Val Ser Cys Ile
            340                 345                 350
Gly Leu Glu Asn Tyr Met Lys Gly Thr Leu Leu Pro Tyr Leu Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Gly Gln Val Leu Cys Lys Asn Gln
    370                 375                 380
Gly Ile Cys Thr Arg Lys Asp Trp Asn Thr Asn Thr Tyr Leu His Leu
385                 390                 395                 400
Asn Ala Thr Asn Phe Asp Ile Glu Leu Gln Gln Asn Gly Lys Phe Val
                405                 410                 415
Val His Gly Lys Pro Ser Leu Glu Asp Leu Gln Glu Phe Ser Lys Asn
            420                 425                 430
Phe His Cys Ser Cys Tyr Thr Asn Val Ala Cys Lys Asp Arg Leu Asp
        435                 440                 445
Val His Asn Val Arg Ser Val Asn Val Cys Thr Ala Asn Asn Ile Cys
    450                 455                 460
Ile Asp Ala Val Leu Asn Phe Pro Ser Leu Asp Asp Asp Asp Glu Pro
465                 470                 475                 480
Pro Ile Thr Asp Asp Thr Ser Gln Asn Gln Asp Ser Ile Ser Asp Ile
                485                 490                 495
Thr Ser Ser Ala Pro Pro Ser Ser His Ile Leu Pro Lys Asp Leu Ser
            500                 505                 510
Trp Cys Leu Phe Leu Leu Ser Ile Phe Ser Gln His Trp Lys Tyr Leu
        515                 520                 525
Leu
```

<210> 31
<211> 512
<212> PRT
<213> Rattus norvegicus

<220>
<223> rat hyaluronidase PH20 precursor

<400> 31

```
Met Gly Glu Leu Gln Phe Lys Trp Leu Phe Trp Arg Ser Phe Ala Glu
 1               5                  10                  15
Ser Gly Gly Thr Phe Gln Thr Val Leu Ile Phe Leu Phe Ile Pro Tyr
            20                  25                  30
```

```
Ser Leu Thr Val Asp Tyr Arg Ala Thr Pro Val Leu Ser Asp Thr Thr
        35                  40                  45
Phe Val Trp Val Trp Asn Val Pro Thr Glu Ala Cys Val Glu Asn Val
    50                  55                  60
Thr Glu Pro Ile Asp Leu Ser Phe Phe Ser Leu Ile Gly Ser Pro Arg
65                  70                  75                  80
Lys Thr Ala Ile Gly Gln Pro Val Thr Leu Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Asn Tyr Pro His Ile Asp Ala Gln Gln Thr Glu His His Gly Gly
            100                 105                 110
Ile Pro Gln Lys Gly Asp Leu Thr Thr His Leu Val Lys Ala Lys Glu
        115                 120                 125
Asp Val Glu Arg Tyr Ile Pro Thr Asp Lys Leu Gly Leu Ala Ile Ile
    130                 135                 140
Asp Trp Glu Glu Trp Arg Pro Thr Trp Met Arg Asn Trp Thr Pro Lys
145                 150                 155                 160
Asp Ile Tyr Arg Asn Lys Ser Ile Glu Leu Val Gln Ala Ala Asp Pro
                165                 170                 175
Ala Ile Asn Ile Thr Glu Ala Thr Val Arg Ala Lys Ala Gln Phe Glu
            180                 185                 190
Gly Ala Ala Lys Glu Phe Met Glu Gly Thr Leu Lys Leu Gly Lys His
        195                 200                 205
Ile Arg Pro Lys His Leu Trp Gly Phe Tyr Leu Phe Pro Asp Cys Tyr
    210                 215                 220
Asn Asn Lys Phe Gln Val Asp Asn Tyr Asp Gly Gln Cys Pro Asp Val
225                 230                 235                 240
Glu Lys Lys Arg Asn Asp Asp Leu Asp Trp Leu Trp Lys Glu Ser Thr
                245                 250                 255
Gly Leu Tyr Pro Ser Val Tyr Leu Lys Lys Asp Leu Lys Ser Ser Arg
            260                 265                 270
Lys Ala Thr Leu Tyr Val Arg Tyr Arg Val Leu Glu Ser Ile Arg Val
        275                 280                 285
Ser Lys Val Ser Asp Glu Ser Asn Pro Val Pro Ile Phe Val Tyr Ile
    290                 295                 300
Arg Leu Val Phe Thr Asp His Val Ser Glu Tyr Leu Leu Glu Asp Asp
305                 310                 315                 320
Leu Val Asn Thr Ile Gly Glu Ile Val Ala Gln Gly Thr Ser Gly Ile
                325                 330                 335
Ile Ile Trp Asp Ala Met Ser Leu Ala Gln Arg Ser Ala Gly Cys Pro
            340                 345                 350
Ile Leu Arg Gln Tyr Met Lys Thr Thr Leu Asn Pro Tyr Ile Val Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Thr Leu Cys Lys Glu Lys
    370                 375                 380
Gly Met Cys Ser Arg Lys Thr Glu Ser Ser Asp Ala Tyr Leu His Leu
385                 390                 395                 400
Asp Pro Ser Ser Phe Ser Ile Asn Val Thr Glu Ala Gly Lys Tyr Glu
                405                 410                 415
Val Leu Gly Lys Pro Glu Val Lys Asp Leu Glu Tyr Phe Ser Glu His
            420                 425                 430
Phe Lys Cys Ser Cys Phe Ser Lys Met Thr Cys Glu Glu Thr Ser Asp
        435                 440                 445
Met Arg Ser Ile Gln Asp Val Asn Val Cys Met Gly Asp Asn Val Cys
    450                 455                 460
Ile Lys Ala Thr Leu Gly Pro Asn Ser Ala Phe His Leu Leu Pro Gly
465                 470                 475                 480
Lys Gly Leu Leu Leu Met Thr Thr Leu Ala His Ile Leu His His Leu
                485                 490                 495
```

```
Pro His Asp Ile Phe Val Phe Pro Trp Lys Met Leu Val Ser Thr Pro
            500                 505                 510


<210> 32
<211> 512
<212> PRT
<213> Mus musculus

<220>
<223> mouse hyaluronidase PH20 precursor


<400> 32
Met Gly Glu Leu Arg Phe Lys His Leu Phe Trp Gly Ser Phe Val Glu
 1               5                  10                  15
Ser Gly Gly Thr Phe Gln Thr Val Leu Ile Phe Leu Leu Ile Pro Cys
            20                  25                  30
Ser Leu Thr Val Asp Tyr Arg Ala Ala Pro Ile Leu Ser Asn Thr Thr
        35                  40                  45
Phe Leu Trp Ile Trp Asn Val Pro Thr Glu Arg Cys Val Gly Asn Val
    50                  55                  60
Asn Asp Pro Ile Asp Leu Ser Phe Phe Ser Leu Ile Gly Ser Pro Arg
65                  70                  75                  80
Lys Thr Ala Thr Gly Gln Pro Val Thr Leu Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Leu Tyr Pro His Ile Asp Ala Asn Gln Ala Glu His Tyr Gly Gly
            100                 105                 110
Ile Pro Gln Arg Gly Asp Tyr Gln Ala His Leu Arg Lys Ala Lys Thr
        115                 120                 125
Asp Ile Glu His Tyr Ile Pro Asp Asp Lys Leu Gly Leu Ala Ile Ile
    130                 135                 140
Asp Trp Glu Glu Trp Arg Pro Thr Trp Leu Arg Asn Trp Lys Pro Lys
145                 150                 155                 160
Asp Asn Tyr Arg Asn Lys Ser Ile Glu Leu Val Gln Ser Thr Asn Pro
                165                 170                 175
Gly Leu Ser Ile Thr Glu Ala Thr Gln Lys Ala Ile Gln Gln Phe Glu
            180                 185                 190
Glu Ala Gly Arg Lys Phe Met Glu Gly Thr Leu His Leu Gly Lys Phe
        195                 200                 205
Leu Arg Pro Asn Gln Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr
    210                 215                 220
Asn Asn Lys Phe Gln Asp Pro Lys Tyr Asp Gly Gln Cys Pro Ala Val
225                 230                 235                 240
Glu Lys Lys Arg Asn Asp Asn Leu Lys Trp Leu Trp Lys Ala Ser Thr
                245                 250                 255
Gly Leu Tyr Pro Ser Val Tyr Leu Lys Lys Asp Leu Lys Ser Asn Arg
            260                 265                 270
Gln Ala Thr Leu Tyr Val Arg Tyr Arg Val Val Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Val Gly Asn Ala Ser Asp Pro Val Pro Ile Phe Val Tyr Ile
    290                 295                 300
Arg Leu Val Phe Thr Asp Arg Thr Ser Glu Tyr Leu Leu Glu Asp Asp
305                 310                 315                 320
Leu Val Asn Thr Ile Gly Glu Ile Val Ala Leu Gly Thr Ser Gly Ile
                325                 330                 335
Ile Ile Trp Asp Ala Met Ser Leu Ala Gln Arg Ala Ala Gly Cys Pro
            340                 345                 350
```

```
Ile Leu His Lys Tyr Met Gln Thr Thr Leu Asn Pro Tyr Ile Val Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Thr Leu Cys Asn Glu Lys
    370                 375                 380
Gly Met Cys Ser Arg Arg Lys Glu Ser Ser Asp Val Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Ser His Phe Asp Ile Met Leu Thr Glu Thr Gly Lys Tyr Glu
                405                 410                 415
Val Leu Gly Asn Pro Arg Val Gly Asp Leu Glu Tyr Phe Ser Glu His
            420                 425                 430
Phe Lys Cys Ser Cys Phe Ser Arg Met Thr Cys Lys Glu Thr Ser Asp
        435                 440                 445
Val Lys Asn Val Gln Asp Val Asn Val Cys Val Gly Asp Asn Val Cys
    450                 455                 460
Ile Lys Ala Lys Val Glu Pro Asn Pro Ala Phe Tyr Leu Leu Pro Gly
465                 470                 475                 480
Lys Ser Leu Leu Phe Met Thr Thr Leu Gly His Val Leu Tyr His Leu
                485                 490                 495
Pro Gln Asp Ile Phe Val Phe Pro Arg Lys Thr Leu Val Ser Thr Pro
            500                 505                 510
```

<210> 33
<211> 807
<212> PRT
<213> Staphylococcus aureus

<220>
<223> Staphylococcus aureus subsp. aureus COL
hyaluronate lyase

```
<400> 33
Met Thr Tyr Arg Ile Lys Lys Trp Gln Lys Leu Ser Thr Ile Thr Leu
 1               5                  10                  15
Leu Met Ala Gly Val Ile Thr Leu Asn Gly Gly Glu Phe Arg Ser Val
            20                  25                  30
Asp Lys His Gln Ile Ala Val Ala Asp Thr Asn Val Gln Thr Pro Asp
        35                  40                  45
Tyr Glu Lys Leu Arg Asn Thr Trp Leu Asp Val Asn Tyr Gly Tyr Asp
    50                  55                  60
Lys Tyr Asp Glu Asn Asn Pro Asp Met Lys Lys Lys Phe Asp Ala Thr
65                  70                  75                  80
Glu Lys Glu Ala Thr Asn Leu Leu Lys Glu Met Lys Thr Glu Ser Gly
                85                  90                  95
Arg Lys Tyr Leu Trp Ser Gly Ala Glu Thr Leu Glu Thr Asn Ser Ser
            100                 105                 110
His Met Thr Arg Thr Tyr Arg Asn Ile Glu Lys Ile Ala Glu Ala Met
        115                 120                 125
Arg Asn Pro Lys Thr Thr Leu Asn Thr Asp Glu Asn Lys Lys Lys Val
    130                 135                 140
Lys Asp Ala Leu Glu Trp Leu His Lys Asn Ala Tyr Gly Lys Glu Pro
145                 150                 155                 160
Asp Lys Lys Val Lys Glu Leu Ser Glu Asn Phe Thr Lys Thr Thr Gly
                165                 170                 175
Lys Asn Thr Asn Leu Asn Trp Trp Asp Tyr Glu Ile Gly Thr Pro Lys
            180                 185                 190
Ser Leu Thr Asn Thr Leu Ile Leu Leu Asn Asp Gln Phe Ser Asn Glu
```

```
        195                 200                 205
Glu Lys Lys Lys Phe Thr Ala Pro Ile Lys Thr Phe Ala Pro Asp Ser
    210                 215                 220
Asp Lys Ile Leu Ser Ser Val Gly Lys Ala Glu Leu Ala Lys Gly Gly
225                 230                 235                 240
Asn Leu Val Asp Ile Ser Lys Val Lys Leu Leu Glu Cys Ile Ile Glu
                245                 250                 255
Glu Asp Lys Asp Met Met Lys Lys Ser Ile Asp Ser Phe Asn Lys Val
            260                 265                 270
Phe Thr Tyr Val Gln Asp Ser Ala Thr Gly Lys Glu Arg Asn Gly Phe
        275                 280                 285
Tyr Lys Asp Gly Ser Tyr Ile Asp His Gln Asp Val Pro Tyr Thr Gly
    290                 295                 300
Ala Tyr Gly Val Val Leu Leu Glu Gly Ile Ser Gln Met Met Pro Met
305                 310                 315                 320
Ile Lys Glu Thr Pro Phe Asn Asp Lys Thr Gln Asn Asp Thr Thr Leu
                325                 330                 335
Lys Ser Trp Ile Asp Asp Gly Phe Met Pro Leu Ile Tyr Lys Gly Glu
            340                 345                 350
Met Met Asp Leu Ser Arg Gly Arg Ala Ile Ser Arg Glu Asn Glu Thr
        355                 360                 365
Ser His Ser Ala Ser Ala Thr Val Met Lys Ser Leu Leu Arg Leu Ser
    370                 375                 380
Asp Ala Met Asp Asp Ser Thr Lys Ala Lys Tyr Lys Lys Ile Val Lys
385                 390                 395                 400
Ser Ser Val Glu Ser Asp Ser Ser Tyr Lys Gln Asn Asp Tyr Leu Asn
                405                 410                 415
Ser Tyr Ser Asp Ile Asp Lys Met Lys Ser Leu Met Thr Asp Asn Ser
            420                 425                 430
Ile Ser Lys Asn Gly Leu Thr Gln Gln Leu Lys Ile Tyr Asn Asp Met
        435                 440                 445
Asp Arg Val Thr Tyr His Asn Lys Asp Leu Asp Phe Ala Phe Gly Leu
    450                 455                 460
Ser Met Thr Ser Lys Asn Val Ala Arg Tyr Glu Ser Ile Asn Gly Glu
465                 470                 475                 480
Asn Leu Lys Gly Trp His Thr Gly Ala Gly Met Ser Tyr Leu Tyr Asn
                485                 490                 495
Ser Asp Val Lys His Tyr His Asp Asn Phe Trp Val Thr Ala Asp Met
            500                 505                 510
Lys Arg Leu Ser Gly Thr Thr Thr Leu Asp Asn Glu Ile Leu Lys Asp
        515                 520                 525
Thr Asp Asp Lys Lys Ser Ser Lys Thr Phe Val Gly Gly Thr Lys Val
    530                 535                 540
Asp Asp Gln His Ala Ser Ile Gly Met Asp Phe Glu Asn Gln Asp Lys
545                 550                 555                 560
Thr Leu Thr Ala Lys Lys Ser Tyr Phe Ile Leu Asn Asp Lys Ile Val
                565                 570                 575
Phe Leu Gly Thr Gly Ile Lys Ser Thr Asp Ser Ser Lys Asn Pro Val
            580                 585                 590
Thr Thr Ile Glu Asn Arg Lys Ala Asn Gly Tyr Thr Leu Tyr Thr Asp
        595                 600                 605
Asp Lys Gln Thr Thr Asn Ser Asp Asn Gln Glu Asn Asn Ser Val Phe
    610                 615                 620
Leu Glu Ser Thr Asp Thr Lys Lys Asn Ile Gly Tyr His Phe Leu Asn
625                 630                 635                 640
Lys Pro Lys Ile Thr Val Lys Lys Glu Ser His Thr Gly Lys Trp Lys
                645                 650                 655
Glu Ile Asn Lys Ser Gln Lys Asp Thr Gln Lys Thr Asp Glu Tyr Tyr
```

```
            660                 665                 670
Glu Val Thr Gln Lys His Ser Asn Ser Asp Asn Lys Tyr Gly Tyr Val
        675                 680                 685
Leu Tyr Pro Gly Leu Ser Lys Asp Val Phe Lys Thr Lys Lys Asp Glu
    690                 695                 700
Val Thr Val Val Lys Gln Glu Asp Asp Phe His Val Val Lys Asp Asn
705                 710                 715                 720
Glu Ser Val Trp Ala Gly Val Asn Tyr Ser Asn Ser Thr Gln Thr Phe
                725                 730                 735
Asp Ile Asn Asn Thr Lys Val Glu Val Lys Ala Lys Gly Met Phe Ile
            740                 745                 750
Leu Lys Lys Lys Asp Asp Asn Thr Tyr Glu Cys Ser Phe Tyr Asn Pro
        755                 760                 765
Glu Ser Thr Asn Ser Ala Ser Asp Ile Glu Ser Lys Ile Ser Met Thr
    770                 775                 780
Gly Tyr Ser Ile Thr Asn Lys Asn Thr Ser Thr Ser Asn Glu Ser Gly
785                 790                 795                 800
Val His Phe Glu Leu Thr Lys
                805
```

<210> 34
<211> 371
<212> PRT
<213> Streptococcus pyogenes

<220>
<223> Streptococcus pyogenes bacteriophage H4489A
hyaluronidase

<400> 34

```
Met Thr Glu Asn Ile Pro Leu Arg Val Gln Phe Lys Arg Met Ser Ala
 1               5                  10                  15
Asp Glu Trp Ala Arg Ser Asp Val Ile Leu Leu Glu Gly Glu Ile Gly
            20                  25                  30
Phe Glu Thr Asp Thr Gly Phe Ala Lys Phe Gly Asp Gly Gln Asn Thr
        35                  40                  45
Phe Ser Lys Leu Lys Tyr Leu Thr Gly Pro Lys Gly Pro Lys Gly Asp
    50                  55                  60
Thr Gly Leu Gln Gly Lys Thr Gly Gly Thr Gly Pro Arg Gly Pro Ala
65                  70                  75                  80
Gly Lys Pro Gly Thr Thr Asp Tyr Asp Gln Leu Gln Asn Lys Pro Asp
                85                  90                  95
Leu Gly Ala Phe Ala Gln Lys Glu Glu Thr Asn Ser Lys Ile Thr Lys
            100                 105                 110
Leu Glu Ser Ser Lys Ala Asp Lys Ser Ala Val Tyr Ser Lys Ala Glu
        115                 120                 125
Ser Lys Ile Glu Leu Asp Lys Lys Leu Ser Leu Thr Gly Gly Ile Val
    130                 135                 140
Thr Gly Gln Leu Gln Phe Lys Pro Asn Lys Ser Gly Ile Lys Pro Ser
145                 150                 155                 160
Ser Ser Val Gly Gly Ala Ile Asn Ile Asp Met Ser Lys Ser Glu Gly
                165                 170                 175
Ala Ala Met Val Met Tyr Thr Asn Lys Asp Thr Thr Asp Gly Pro Leu
            180                 185                 190
Met Ile Leu Arg Ser Asp Lys Asp Thr Phe Asp Gln Ser Ala Gln Phe
        195                 200                 205
```

```
Val Asp Tyr Ser Gly Lys Thr Asn Ala Val Asn Ile Val Met Arg Gln
    210                 215                 220
Pro Ser Ala Pro Asn Phe Ser Ser Ala Leu Asn Ile Thr Ser Ala Asn
225                 230                 235                 240
Glu Gly Gly Ser Ala Met Gln Ile Arg Gly Val Glu Lys Ala Leu Gly
                245                 250                 255
Thr Leu Lys Ile Thr His Glu Asn Pro Asn Val Glu Ala Lys Tyr Asp
            260                 265                 270
Glu Asn Ala Ala Ala Leu Ser Ile Asp Ile Val Lys Lys Gln Lys Gly
        275                 280                 285
Gly Lys Gly Thr Ala Ala Gln Gly Ile Tyr Ile Asn Ser Thr Ser Gly
    290                 295                 300
Thr Ala Gly Lys Met Leu Arg Ile Arg Asn Lys Asn Glu Asp Lys Phe
305                 310                 315                 320
Tyr Val Gly Pro Asp Gly Gly Phe His Ser Gly Ala Asn Ser Thr Val
                325                 330                 335
Ala Gly Asn Leu Thr Val Lys Asp Pro Thr Ser Gly Lys His Ala Ala
            340                 345                 350
Thr Lys Asp Tyr Val Asp Glu Lys Ile Ala Glu Leu Lys Lys Leu Ile
        355                 360                 365
Leu Lys Lys
    370
```

<210> 35
<211> 1628
<212> PRT
<213> Clostridium perfringens

<220>
<223> Clostridium perfringens str. 13 hyaluronidase

<400> 35

```
Met Asn Lys Asn Ile Arg Lys Ile Ile Thr Ser Thr Val Leu Ala Ala
 1               5                  10                  15
Met Thr Ile Ser Val Leu Pro Ser Asn Leu Val Val Phe Ala Thr Asp
            20                  25                  30
Gly Ile Thr Glu Asn Phe Tyr Glu Ile Tyr Pro Lys Pro Gln Glu Ile
        35                  40                  45
Ser Tyr Ser Gly Gly Glu Phe Gln Ile Ser Asp Glu Ile Asn Ile Val
    50                  55                  60
Tyr Asp Asp Gly Ile Asp Thr Tyr Thr Lys Lys Arg Val Asp Glu Val
65                  70                  75                  80
Leu Glu Ala Ser Asn Leu Glu Ala Thr Val Ser Asn Glu Ile Val Pro
                85                  90                  95
Gly Lys Thr Asn Phe Leu Val Gly Ile Asn Glu Ser Gly Gly Val Val
            100                 105                 110
Asp Asn Tyr Phe Asn Lys Asn Ile Pro His Asp Glu Ser Phe Phe Asp
        115                 120                 125
Glu Lys Met Asp Ala Asn Ile Val Ser Val Lys Asp Gly Val Ile Gly
    130                 135                 140
Val Ile Gly Glu Asp Thr Asp Ser Ala Phe Tyr Gly Val Thr Thr Leu
145                 150                 155                 160
Lys His Val Phe Asn Gln Leu Glu Glu Gly Asn Lys Ile Gln Ser Phe
                165                 170                 175
Arg Ala Asp Asp Tyr Ala Glu Val Ala His Arg Gly Phe Ile Glu Gly
            180                 185                 190
```

```
Tyr Tyr Gly Asn Pro Trp Ser Asn Glu Asp Arg Ala Glu Leu Met Lys
        195                 200                 205
Phe Gly Gly Asp Tyr Lys Leu Asn Gln Tyr Val Phe Ala Pro Lys Asp
    210                 215                 220
Asp Pro Tyr His Asn Ser Lys Trp Arg Asp Leu Tyr Pro Glu Glu Lys
225                 230                 235                 240
Leu Ser Glu Ile Lys Lys Leu Ala Gln Val Gly Asn Glu Thr Lys Asn
                245                 250                 255
Arg Tyr Val Tyr Ala Leu His Pro Phe Met Asn Asn Pro Val Arg Phe
            260                 265                 270
Asp Thr Glu Glu Asn Tyr Gln Asn Asp Leu Gly Val Ile Lys Ala Lys
        275                 280                 285
Phe Thr Gln Leu Leu Glu Asn Asp Val Arg Gln Phe Ala Ile Leu Ala
    290                 295                 300
Asp Asp Ala Ser Ala Pro Ala Gln Gly Ala Ser Met Tyr Val Lys Leu
305                 310                 315                 320
Leu Thr Asp Leu Thr Arg Trp Leu Glu Glu Gln Gln Ser Thr Tyr Pro
                325                 330                 335
Asp Leu Lys Thr Asp Leu Met Phe Cys Pro Ser Asp Tyr Tyr Gly Asn
            340                 345                 350
Gly Ser Ser Ala Gln Leu Lys Glu Leu Asn Lys Ala Glu Asp Asn Val
        355                 360                 365
Ser Ile Val Met Thr Gly Gly Arg Ile Trp Gly Glu Val Asp Glu Asn
    370                 375                 380
Phe Ala Asn Asn Phe Met Asn Asn Ile Ser Thr Glu Gly His Pro Gly
385                 390                 395                 400
Arg Ala Pro Phe Phe Trp Ile Asn Trp Pro Cys Ser Asp Asn Ser Lys
                405                 410                 415
Gln His Leu Ile Met Gly Gly Asn Asp Thr Phe Leu His Pro Gly Val
            420                 425                 430
Asp Pro Ser Lys Ile Asp Gly Ile Val Leu Asn Pro Met Gln Gln Ala
        435                 440                 445
Glu Ala Asn Lys Ser Ala Leu Phe Ala Ile Ala Asp Tyr Ala Trp Asn
    450                 455                 460
Ile Trp Asp Asn Lys Glu Glu Ala Asp Glu Asn Trp Asn Asp Ser Phe
465                 470                 475                 480
Lys Tyr Met Asp His Gly Thr Ala Glu Glu Thr Asn Ser Ser Leu Ala
                485                 490                 495
Leu Arg Glu Ile Ser Lys His Met Ile Asn Gln Asn Met Asp Gly Arg
            500                 505                 510
Val Arg Pro Leu Gln Glu Ser Val Glu Leu Ala Pro Lys Leu Glu Ala
        515                 520                 525
Phe Lys Gln Lys Tyr Asp Ser Gly Ala Ser Ile Lys Glu Asp Ala Leu
    530                 535                 540
Glu Leu Ile Ala Glu Phe Thr Asn Leu Gln Lys Ala Ala Asp Tyr Tyr
545                 550                 555                 560
Lys Asn Asn Pro Gly Asn Glu Arg Thr Arg Asp Gln Ile Ile Tyr Trp
                565                 570                 575
Leu Asn Cys Trp Glu Asp Thr Met Asp Ala Ala Ile Gly Tyr Leu Lys
            580                 585                 590
Ser Ala Ile Ala Ile Glu Glu Gly Asp Asp Glu Ala Ala Trp Ala Asn
        595                 600                 605
Tyr Ser Glu Ala Gln Gly Ala Phe Glu Lys Ser Lys Thr Tyr Gly Phe
    610                 615                 620
His Tyr Val Asp His Thr Glu Tyr Ala Glu Val Gly Val Gln His Ile
625                 630                 635                 640
Val Pro Phe Ile Lys Ser Met Gly Gln Asn Leu Ser Val Val Ile Gly
                645                 650                 655
```

```
Ser Ile Val Asp Pro Asn Arg Ile Ile Ala Thr Tyr Ile Ser Asn Arg
            660                 665                 670
Gln Asp Ala Pro Thr Gly Asn Pro Asp Asn Ile Phe Asp Asn Asn Ala
        675                 680                 685
Ser Thr Glu Leu Val Tyr Lys Asn Pro Asn Arg Ile Asp Val Gly Thr
    690                 695                 700
Tyr Val Gly Val Lys Tyr Ser Asn Pro Ile Thr Leu Asn Asn Val Glu
705                 710                 715                 720
Phe Leu Met Gly Ala Asn Ser Asn Pro Asn Asp Thr Met Gln Lys Ala
                725                 730                 735
Lys Ile Gln Tyr Thr Val Asp Gly Arg Glu Trp Ile Asp Leu Glu Glu
            740                 745                 750
Gly Val Glu Tyr Thr Met Pro Gly Ala Ile Lys Val Glu Asn Leu Asp
        755                 760                 765
Leu Lys Val Arg Gly Val Arg Leu Ile Ala Thr Glu Ala Arg Glu Asn
    770                 775                 780
Thr Trp Leu Gly Val Arg Asp Ile Asn Val Asn Lys Lys Glu Asp Ser
785                 790                 795                 800
Asn Ser Gly Val Glu Phe Asn Pro Ser Leu Ile Arg Ser Glu Ser Trp
                805                 810                 815
Gln Val Tyr Glu Gly Asn Glu Ala Asn Leu Leu Asp Gly Asp Asp Asn
            820                 825                 830
Thr Gly Val Trp Tyr Lys Thr Leu Asn Gly Asp Thr Ser Leu Ala Gly
        835                 840                 845
Glu Phe Ile Gly Leu Asp Leu Gly Lys Glu Ile Lys Leu Asp Gly Ile
    850                 855                 860
Arg Phe Val Ile Gly Lys Asn Gly Gly Gly Ser Ser Asp Lys Trp Asn
865                 870                 875                 880
Lys Phe Lys Leu Glu Tyr Ser Leu Asp Asn Glu Ser Trp Thr Thr Ile
                885                 890                 895
Lys Glu Tyr Asp Lys Thr Gly Ala Pro Ala Gly Lys Asp Val Ile Glu
            900                 905                 910
Glu Ser Phe Glu Thr Pro Ile Ser Ala Lys Tyr Ile Arg Leu Thr Asn
        915                 920                 925
Met Glu Asn Ile Asn Lys Trp Leu Thr Phe Ser Glu Phe Ala Ile Ile
    930                 935                 940
Ser Asp Glu Leu Glu Asn Ala Gly Asn Lys Glu Asn Val Tyr Thr Asn
945                 950                 955                 960
Thr Glu Leu Asp Leu Leu Ser Leu Ala Lys Glu Asp Val Thr Lys Leu
                965                 970                 975
Ile Pro Thr Asp Asp Ile Ser Leu Asn His Gly Glu Tyr Ile Gly Val
            980                 985                 990
Lys Leu Asn Arg Ile Lys Asp Leu Ser Asn Ile Asn Leu Glu Ile Ser
        995                 1000                1005
Asn Asp Thr Gly Leu Lys Leu Gln Ser Ser Met Asn Gly Val Glu Trp
    1010                1015                1020
Thr Glu Ile Thr Asp Lys Asn Thr Leu Glu Asp Gly Arg Tyr Val Arg
1025                1030                1035                1040
Leu Ile Asn Thr Ser Asn Glu Ala Val Asn Phe Asn Leu Thr Lys Phe
                1045                1050                1055
Glu Val Asn Ser Asn Glu Val Tyr Glu Pro Ser Leu Val Asp Ala Tyr
            1060                1065                1070
Val Gly Asp Asp Gly Ala Lys Lys Ala Val Asp Gly Asp Leu Lys Thr
        1075                1080                1085
Arg Val Lys Phe Leu Gly Ala Pro Ser Thr Gly Asp Thr Ile Val Tyr
    1090                1095                1100
Asp Leu Gly Gln Glu Ile Leu Val Asp Asn Leu Lys Tyr Val Val Leu
1105                1110                1115                1120
```

```
Asp Thr Glu Val Asp His Val Arg Asp Gly Lys Ile Gln Leu Ser Leu
                1125                1130                1135
Asp Gly Glu Thr Trp Thr Asp Ala Ile Thr Ile Gly Asp Gly Val Glu
            1140                1145                1150
Asn Gly Val Asp Asp Met Phe Ser Thr Pro Leu Lys Asn Gly Tyr Lys
        1155                1160                1165
His Gly Asn Gln Ser Gly Gly Ile Val Pro Ile Asp Ser Ala Tyr Val
    1170                1175                1180
Glu Gly Asp Asn Leu Asn Gln Lys Ala Arg Tyr Val Arg Ile Leu Phe
1185                1190                1195                1200
Thr Ala Pro Tyr Arg His Arg Trp Thr Val Ile Asn Glu Leu Met Ile
                1205                1210                1215
Asn Asn Gly Glu Tyr Ile Ser Thr Val Asn Asp Pro Thr Tyr Ile Ser
            1220                1225                1230
Asn Pro Ile Glu Glu Arg Gly Phe Ala Pro Ser Asn Leu Arg Asp Gly
        1235                1240                1245
Asn Leu Thr Thr Ser Tyr Lys Pro Asn Thr Asn Asn Gly Glu Ile Ser
    1250                1255                1260
Glu Gly Ser Ile Thr Tyr Arg Leu Ser Glu Lys Thr Asp Val Arg Lys
1265                1270                1275                1280
Val Thr Ile Val Gln Ser Gly Ser Ser Ile Ser Asn Ala Lys Val Met
                1285                1290                1295
Ala Arg Val Gly Asp Gly Ser Glu Asn Val Thr Asp Gln Trp Val Gln
            1300                1305                1310
Leu Gly Thr Leu Ser Asn Ser Leu Asn Glu Phe Ile Asn Arg Asp Tyr
        1315                1320                1325
Asn Asn Ile Tyr Glu Ile Lys Ile Glu Trp Thr Asp Val Ala Pro Asn
    1330                1335                1340
Ile Tyr Glu Ile Ile Thr Leu Asn Gln Glu Phe Glu Phe Pro Val Asn
1345                1350                1355                1360
Asp Ser Leu Lys Ala Lys Tyr Asp Glu Leu Ile Asn Leu Ser Gly Asp
                1365                1370                1375
Glu Tyr Thr Leu Ser Ser Phe Glu Thr Leu Lys Glu Ala Leu Asn Glu
            1380                1385                1390
Ala Lys Ser Ile Leu Asp Asp Ser Asn Ser Ser Gln Lys Lys Ile Asp
        1395                1400                1405
Lys Ala Leu Glu Lys Leu Asn Lys Ala Glu Glu Arg Leu Asp Leu Arg
    1410                1415                1420
Ala Thr Asp Phe Glu Asp Phe Asn Lys Val Leu Thr Leu Gly Asn Ser
1425                1430                1435                1440
Leu Val Glu Glu Glu Tyr Thr Ala Glu Ser Trp Ala Leu Phe Ser Glu
                1445                1450                1455
Val Leu Glu Ala Ala Asn Glu Ala Asn Lys Asn Lys Ala Asp Tyr Thr
            1460                1465                1470
Gln Asp Gln Ile Asn Gln Ile Val Ile Asp Leu Asp Ala Ser Ile Lys
        1475                1480                1485
Ala Leu Val Lys Glu Thr Pro Glu Val Asp Lys Thr Asn Leu Gly Glu
    1490                1495                1500
Leu Ile Asn Gln Gly Lys Ser Leu Leu Asp Glu Ser Val Glu Gly Phe
1505                1510                1515                1520
Asn Val Gly Glu Tyr His Lys Gly Ala Lys Asp Gly Leu Thr Val Glu
                1525                1530                1535
Ile Asn Lys Ala Glu Glu Val Phe Asn Lys Glu Asp Ala Thr Glu Glu
            1540                1545                1550
Glu Ile Asn Leu Ala Lys Glu Ser Leu Glu Gly Ala Ile Ala Arg Phe
        1555                1560                1565
Asn Ser Leu Leu Ile Glu Glu Ser Thr Gly Asp Phe Asn Gly Asn Gly
    1570                1575                1580
```

```
Lys Ile Asp Ile Gly Asp Leu Ala Met Val Ser Lys Asn Ile Gly Ser
1585                1590                1595                1600
Thr Thr Asn Thr Ser Leu Asp Leu Asn Lys Asp Gly Ser Ile Asp Glu
                1605                1610                1615
Tyr Glu Ile Ser Phe Ile Asn His Arg Ile Leu Asn
            1620                1625
```

<210> 36
<211> 435
<212> PRT
<213> Homo sapiens

<220>
<223> human hyaluronidase-1 precursor

<220>
<221> SIGNAL
<222> (1)...(21)
<223> signal sequence

<400> 36

```
Met Ala Ala His Leu Leu Pro Ile Cys Ala Leu Phe Leu Thr Leu Leu
 1               5                  10                  15
Asp Met Ala Gln Gly Phe Arg Gly Pro Leu Leu Pro Asn Arg Pro Phe
            20                  25                  30
Thr Thr Val Trp Asn Ala Asn Thr Gln Trp Cys Leu Glu Arg His Gly
        35                  40                  45
Val Asp Val Asp Val Ser Val Phe Asp Val Val Ala Asn Pro Gly Gln
    50                  55                  60
Thr Phe Arg Gly Pro Asp Met Thr Ile Phe Tyr Ser Ser Gln Leu Gly
65                  70                  75                  80
Thr Tyr Pro Tyr Tyr Thr Pro Thr Gly Glu Pro Val Phe Gly Gly Leu
                85                  90                  95
Pro Gln Asn Ala Ser Leu Ile Ala His Leu Ala Arg Thr Phe Gln Asp
            100                 105                 110
Ile Leu Ala Ala Ile Pro Ala Pro Asp Phe Ser Gly Leu Ala Val Ile
        115                 120                 125
Asp Trp Glu Ala Trp Arg Pro Arg Trp Ala Phe Asn Trp Asp Thr Lys
    130                 135                 140
Asp Ile Tyr Arg Gln Arg Ser Arg Ala Leu Val Gln Ala Gln His Pro
145                 150                 155                 160
Asp Trp Pro Ala Pro Gln Val Glu Ala Val Ala Gln Asp Gln Phe Gln
                165                 170                 175
Gly Ala Ala Arg Ala Trp Met Ala Gly Thr Leu Gln Leu Gly Arg Ala
            180                 185                 190
Leu Arg Pro Arg Gly Leu Trp Gly Phe Tyr Gly Phe Pro Asp Cys Tyr
        195                 200                 205
Asn Tyr Asp Phe Leu Ser Pro Asn Tyr Thr Gly Gln Cys Pro Ser Gly
    210                 215                 220
Ile Arg Ala Gln Asn Asp Gln Leu Gly Trp Leu Trp Gly Gln Ser Arg
225                 230                 235                 240
Ala Leu Tyr Pro Ser Ile Tyr Met Pro Ala Val Leu Glu Gly Thr Gly
                245                 250                 255
Lys Ser Gln Met Tyr Val Gln His Arg Val Ala Glu Ala Phe Arg Val
            260                 265                 270
```

```
Ala Val Ala Ala Gly Asp Pro Asn Leu Pro Val Leu Pro Tyr Val Gln
        275                 280                 285
Ile Phe Tyr Asp Thr Thr Asn His Phe Leu Pro Leu Asp Glu Leu Glu
    290                 295                 300
His Ser Leu Gly Glu Ser Ala Ala Gln Gly Ala Ala Gly Val Val Leu
305                 310                 315                 320
Trp Val Ser Trp Glu Asn Thr Arg Thr Lys Glu Ser Cys Gln Ala Ile
                325                 330                 335
Lys Glu Tyr Met Asp Thr Thr Leu Gly Pro Phe Ile Leu Asn Val Thr
            340                 345                 350
Ser Gly Ala Leu Leu Cys Ser Gln Ala Leu Cys Ser Gly His Gly Arg
        355                 360                 365
Cys Val Arg Arg Thr Ser His Pro Lys Ala Leu Leu Leu Leu Asn Pro
    370                 375                 380
Ala Ser Phe Ser Ile Gln Leu Thr Pro Gly Gly Gly Pro Leu Ser Leu
385                 390                 395                 400
Arg Gly Ala Leu Ser Leu Glu Asp Gln Ala Gln Met Ala Val Glu Phe
                405                 410                 415
Lys Cys Arg Cys Tyr Pro Gly Trp Gln Ala Pro Trp Cys Glu Arg Lys
            420                 425                 430
Ser Met Trp
        435
```

<210> 37
<211> 473
<212> PRT
<213> Homo sapiens

<220>
<223> human hyaluronidase-2 precursor

<220>
<221> SIGNAL
<222> (1)...(20)
<223> signal sequence

<400> 37

```
Met Arg Ala Gly Pro Gly Pro Thr Val Thr Leu Ala Leu Val Leu Ala
 1               5                  10                  15
Val Ala Trp Ala Met Glu Leu Lys Pro Thr Ala Pro Pro Ile Phe Thr
            20                  25                  30
Gly Arg Pro Phe Val Val Ala Trp Asp Val Pro Thr Gln Asp Cys Gly
        35                  40                  45
Pro Arg Leu Lys Val Pro Leu Asp Leu Asn Ala Phe Asp Val Gln Ala
    50                  55                  60
Ser Pro Asn Glu Gly Phe Val Asn Gln Asn Ile Thr Ile Phe Tyr Arg
65                  70                  75                  80
Asp Arg Leu Gly Leu Tyr Pro Arg Phe Asp Ser Ala Gly Arg Ser Val
                85                  90                  95
His Gly Gly Val Pro Gln Asn Val Ser Leu Trp Ala His Arg Lys Met
            100                 105                 110
Leu Gln Lys Arg Val Glu His Tyr Ile Arg Thr Gln Glu Ser Ala Gly
        115                 120                 125
Leu Ala Val Ile Asp Trp Glu Asp Trp Arg Pro Val Trp Val Arg Asn
    130                 135                 140
```

```
Trp Gln Asp Lys Asp Val Tyr Arg Arg Leu Ser Arg Gln Leu Val Ala
145                 150                 155                 160
Ser Arg His Pro Asp Trp Pro Pro Asp Arg Ile Val Lys Gln Ala Gln
                165                 170                 175
Tyr Glu Phe Glu Phe Ala Ala Gln Gln Phe Met Leu Glu Thr Leu Arg
            180                 185                 190
Tyr Val Lys Ala Val Arg Pro Arg His Leu Trp Gly Phe Tyr Leu Phe
        195                 200                 205
Pro Asp Cys Tyr Asn His Asp Tyr Val Gln Asn Trp Glu Ser Tyr Thr
    210                 215                 220
Gly Arg Cys Pro Asp Val Glu Val Ala Arg Asn Asp Gln Leu Ala Trp
225                 230                 235                 240
Leu Trp Ala Glu Ser Thr Ala Leu Phe Pro Ser Val Tyr Leu Asp Glu
                245                 250                 255
Thr Leu Ala Ser Ser Arg His Gly Arg Asn Phe Val Ser Phe Arg Val
            260                 265                 270
Gln Glu Ala Leu Arg Val Ala Arg Thr His His Ala Asn His Ala Leu
        275                 280                 285
Pro Val Tyr Val Phe Thr Arg Pro Thr Tyr Ser Arg Arg Leu Thr Gly
    290                 295                 300
Leu Ser Glu Met Asp Leu Ile Ser Thr Ile Gly Glu Ser Ala Ala Leu
305                 310                 315                 320
Gly Ala Ala Gly Val Ile Leu Trp Gly Asp Ala Gly Tyr Thr Thr Ser
                325                 330                 335
Thr Glu Thr Cys Gln Tyr Leu Lys Asp Tyr Leu Thr Arg Leu Leu Val
            340                 345                 350
Pro Tyr Val Val Asn Val Ser Trp Ala Thr Gln Tyr Cys Ser Arg Ala
        355                 360                 365
Gln Cys His Gly His Gly Arg Cys Val Arg Arg Asn Pro Ser Ala Ser
    370                 375                 380
Thr Phe Leu His Leu Ser Thr Asn Ser Phe Arg Leu Val Pro Gly His
385                 390                 395                 400
Ala Pro Gly Glu Pro Gln Leu Arg Pro Val Gly Glu Leu Ser Trp Ala
                405                 410                 415
Asp Ile Asp His Leu Gln Thr His Phe Arg Cys Gln Cys Tyr Leu Gly
            420                 425                 430
Trp Ser Gly Glu Gln Cys Gln Trp Asp His Arg Gln Ala Ala Gly Gly
        435                 440                 445
Ala Ser Glu Ala Trp Ala Gly Ser His Leu Thr Ser Leu Leu Ala Leu
    450                 455                 460
Ala Ala Leu Ala Phe Thr Trp Thr Leu
465                 470


<210> 38
<211> 417
<212> PRT
<213> Homo sapiens

<220>
<223> human hyaluronidase-3 precursor


<220>
<221> SIGNAL
<222> (1)...(20)
<223> signal sequence
```

<400> 38
Met Thr Thr Gln Leu Gly Pro Ala Leu Val Leu Gly Val Ala Leu Cys
 1   5   10   15
Leu Gly Cys Gly Gln Pro Leu Pro Gln Val Pro Glu Arg Pro Phe Ser
            20   25   30
Val Leu Trp Asn Val Pro Ser Ala His Cys Glu Ala Arg Phe Gly Val
        35   40   45
His Leu Pro Leu Asn Ala Leu Gly Ile Ile Ala Asn Arg Gly Gln His
    50   55   60
Phe His Gly Gln Asn Met Thr Ile Phe Tyr Lys Asn Gln Leu Gly Leu
65   70   75   80
Tyr Pro Tyr Phe Gly Pro Arg Gly Thr Ala His Asn Gly Gly Ile Pro
                85   90   95
Gln Ala Leu Pro Leu Asp Arg His Leu Ala Leu Ala Ala Tyr Gln Ile
            100   105   110
His His Ser Leu Arg Pro Gly Phe Ala Gly Pro Ala Val Leu Asp Trp
        115   120   125
Glu Glu Trp Cys Pro Leu Trp Ala Gly Asn Trp Gly Arg Arg Arg Ala
    130   135   140
Tyr Gln Ala Ala Ser Trp Ala Trp Ala Gln Gln Val Phe Pro Asp Leu
145   150   155   160
Asp Pro Gln Glu Gln Leu Tyr Lys Ala Tyr Thr Gly Phe Glu Gln Ala
                165   170   175
Ala Arg Ala Leu Met Glu Asp Thr Leu Arg Val Ala Gln Ala Leu Arg
            180   185   190
Pro His Gly Leu Trp Gly Phe Tyr His Tyr Pro Ala Cys Gly Asn Gly
        195   200   205
Trp His Ser Met Ala Ser Asn Tyr Thr Gly Arg Cys His Ala Ala Thr
    210   215   220
Leu Ala Arg Asn Thr Gln Leu His Trp Leu Trp Ala Ala Ser Ser Ala
225   230   235   240
Leu Phe Pro Ser Ile Tyr Leu Pro Pro Arg Leu Pro Pro Ala His His
                245   250   255
Gln Ala Phe Val Arg His Arg Leu Glu Glu Ala Phe Arg Val Ala Leu
            260   265   270
Val Gly His Arg His Pro Leu Pro Val Leu Ala Tyr Val Arg Leu Thr
        275   280   285
His Arg Arg Ser Gly Arg Phe Leu Ser Gln Asp Asp Leu Val Gln Ser
    290   295   300
Ile Gly Val Ser Ala Ala Leu Gly Ala Ala Gly Val Val Leu Trp Gly
305   310   315   320
Asp Leu Ser Leu Ser Ser Ser Glu Glu Glu Cys Trp His Leu His Asp
                325   330   335
Tyr Leu Val Asp Thr Leu Gly Pro Tyr Val Ile Asn Val Thr Arg Ala
            340   345   350
Ala Met Ala Cys Ser His Gln Arg Cys His Gly His Gly Arg Cys Ala
        355   360   365
Arg Arg Asp Pro Gly Gln Met Glu Ala Phe Leu His Leu Trp Pro Asp
    370   375   380
Gly Ser Leu Gly Asp Trp Lys Ser Phe Ser Cys His Cys Tyr Trp Gly
385   390   395   400
Trp Ala Gly Pro Thr Cys Gln Glu Pro Arg Pro Gly Pro Lys Glu Ala
                405   410   415
Val

<210> 39

<211> 481
<212> PRT
<213> Homo sapiens

<220>
<223> human hyaluronidase-4

<400> 39
Met Lys Val Leu Ser Glu Gly Gln Leu Lys Leu Cys Val Val Gln Pro
 1   5   10   15
Val His Leu Thr Ser Trp Leu Leu Ile Phe Phe Ile Leu Lys Ser Ile
            20   25   30
Ser Cys Leu Lys Pro Ala Arg Leu Pro Ile Tyr Gln Arg Lys Pro Phe
        35   40   45
Ile Ala Ala Trp Asn Ala Pro Thr Asp Gln Cys Leu Ile Lys Tyr Asn
    50   55   60
Leu Arg Leu Asn Leu Lys Met Phe Pro Val Ile Gly Ser Pro Leu Ala
65   70   75   80
Lys Ala Arg Gly Gln Asn Val Thr Ile Phe Tyr Val Asn Arg Leu Gly
                85   90   95
Tyr Tyr Pro Trp Tyr Thr Ser Gln Gly Val Pro Ile Asn Gly Gly Leu
            100   105   110
Pro Gln Asn Ile Ser Leu Gln Val His Leu Glu Lys Ala Asp Gln Asp
        115   120   125
Ile Asn Tyr Tyr Ile Pro Ala Glu Asp Phe Ser Gly Leu Ala Val Ile
    130   135   140
Asp Trp Glu Tyr Trp Arg Pro Gln Trp Ala Arg Asn Trp Asn Ser Lys
145   150   155   160
Asp Val Tyr Arg Gln Lys Ser Arg Lys Leu Ile Ser Asp Met Gly Lys
                165   170   175
Asn Val Ser Ala Thr Asp Ile Glu Tyr Leu Ala Lys Val Thr Phe Glu
            180   185   190
Glu Ser Ala Lys Ala Phe Met Lys Glu Thr Ile Lys Leu Gly Ile Lys
        195   200   205
Ser Arg Pro Lys Gly Leu Trp Gly Tyr Tyr Leu Tyr Pro Asp Cys His
    210   215   220
Asn Tyr Asn Val Tyr Ala Pro Asn Tyr Ser Gly Ser Cys Pro Glu Asp
225   230   235   240
Glu Val Leu Arg Asn Asn Glu Leu Ser Trp Leu Trp Asn Ser Ser Ala
                245   250   255
Ala Leu Tyr Pro Ser Ile Gly Val Trp Lys Ser Leu Gly Asp Ser Glu
            260   265   270
Asn Ile Leu Arg Phe Ser Lys Phe Arg Val His Glu Ser Met Arg Ile
        275   280   285
Ser Thr Met Thr Ser His Asp Tyr Ala Leu Pro Val Phe Val Tyr Thr
    290   295   300
Arg Leu Gly Tyr Arg Asp Glu Pro Leu Phe Phe Leu Ser Lys Gln Asp
305   310   315   320
Leu Val Ser Thr Ile Gly Glu Ser Ala Ala Leu Gly Ala Ala Gly Ile
                325   330   335
Val Ile Trp Gly Asp Met Asn Leu Thr Ala Ser Lys Ala Asn Cys Thr
            340   345   350
Lys Val Lys Gln Phe Val Ser Ser Asp Leu Gly Ser Tyr Ile Ala Asn
        355   360   365
Val Thr Arg Ala Ala Glu Val Cys Ser Leu His Leu Cys Arg Asn Asn
    370   375   380
Gly Arg Cys Ile Arg Lys Met Trp Asn Ala Pro Ser Tyr Leu His Leu

385 390 395 400
Asn Pro Ala Ser Tyr His Ile Glu Ala Ser Glu Asp Gly Glu Phe Thr
405 410 415
Val Lys Gly Lys Ala Ser Asp Thr Asp Leu Ala Val Met Ala Asp Thr
420 425 430
Phe Ser Cys His Cys Tyr Gln Gly Tyr Glu Gly Ala Asp Cys Arg Glu
435 440 445
Ile Lys Thr Ala Asp Gly Cys Ser Gly Val Ser Pro Ser Pro Gly Ser
450 455 460
Leu Met Thr Leu Cys Leu Leu Leu Leu Ala Ser Tyr Arg Ser Ile Gln
465 470 475 480
Leu

<210> 40
<211> 467
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-467

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 40
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
1 5 10 15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
20 25 30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
35 40 45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
50 55 60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65 70 75 80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
85 90 95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
100 105 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
115 120 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
130 135 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145 150 155 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
165 170 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
180 185 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
195 200 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys

```
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala
465


<210> 41
<211> 477
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-477


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence


<400> 41
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
```

```
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu
465                 470                 475
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<210> 42
<211> 478

<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-478

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 42
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1   5   10   15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20   25   30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35   40   45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50   55   60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65   70   75   80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85   90   95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100   105   110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115   120   125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130   135   140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145   150   155   160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165   170   175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180   185   190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195   200   205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210   215   220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225   230   235   240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245   250   255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260   265   270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275   280   285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290   295   300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305   310   315   320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325   330   335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340   345   350

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Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro
465                 470                 475


<210> 43
<211> 479
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-479


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 43
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1                5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
```

```
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln
465                 470                 475


<210> 44
<211> 480
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-480



<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 44
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
```

```
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
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<210> 45
<211> 481
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-481

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 45
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1   5   10   15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20   25   30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35   40   45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50   55   60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65   70   75   80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85   90   95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100   105   110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115   120   125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130   135   140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145   150   155   160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165   170   175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180   185   190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195   200   205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210   215   220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225   230   235   240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245   250   255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260   265   270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275   280   285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290   295   300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305   310   315   320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile

```
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe
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<210> 46
<211> 483
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-483

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 46

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Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
```

```
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn
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<210> 47
<211> 432
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-467

<400> 47

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Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
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Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
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<210> 48
<211> 448
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-483

<400> 48
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1   5   10   15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20   25   30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35   40   45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50   55   60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65   70   75   80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85   90   95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100   105   110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115   120   125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130   135   140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145   150   155   160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165   170   175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180   185   190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195   200   205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210   215   220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225   230   235   240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245   250   255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260   265   270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275   280   285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290   295   300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305   310   315   320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325   330   335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340   345   350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355   360   365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370   375   380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385   390   395   400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp

```
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435                 440                 445
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<210> 49
<211> 1446
<212> DNA
<213> Homo sapiens

<220>
<223> DNA encoding soluble human PH20 precursor

<400> 49
atgggagtgc taaaattcaa gcacatcttt ttcagaagct ttgttaaatc aagtggagta 60
tcccagatag ttttcacctt ccttctgatt ccatgttgct tgactctgaa tttcagagca 120
cctcctgtta ttccaaatgt gcctttcctc tgggcctgga atgccccaag tgaattttgt 180
cttggaaaat ttgatgagcc actagatatg agcctcttct ctttcatagg aagcccccga 240
ataaacgcca ccgggcaagg tgttacaata ttttatgttg atagacttgg ctactatcct 300
tacatagatt caatcacagg agtaactgtg aatggaggaa tcccccagaa gatttcctta 360
caagaccatc tggacaaagc taagaaagac attacatttt atatgccagt agacaatttg 420
ggaatggctg ttattgactg ggaagaatgg agacccactt gggcaagaaa ctggaaacct 480
aaagatgttt acaagaatag gtctattgaa ttggttcagc aacaaaatgt acaacttagt 540
ctcacagagg ccactgagaa agcaaaacaa gaatttgaaa aggcagggaa ggatttcctg 600
gtagagacta taaaattggg aaaattactt cggccaaatc acttgtgggg ttattatctt 660
tttccggatt gttacaacca tcactataag aaacccggtt acaatggaag ttgcttcaat 720
gtagaaataa aaagaaatga tgatctcagc tggttgtgga atgaaagcac tgctctttac 780
ccatccattt atttgaacac tcagcagtct cctgtagctg ctacactcta tgtgcgcaat 840
cgagttcggg aagccatcag agtttccaaa atacctgatg caaaaagtcc acttccggtt 900
tttgcatata cccgcatagt ttttactgat caagttttga aattcctttc tcaagatgaa 960
cttgtgtata catttggcga aactgttgct ctgggtgctt ctggaattgt aatatgggga 1020
accctcagta taatgcgaag tatgaaatct tgcttgctcc tagacaatta catggagact 1080
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Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
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Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
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Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
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Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
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Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
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Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
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Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
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Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
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Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
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Tyr Phe Gln Arg Met Thr Thr Thr Ser Ser Val Glu Gly Lys Gln Asn
        35   40   45
Leu Val Ile Met Gly Arg Lys Thr Trp Phe Ser Ile Pro Glu Lys Asn
    50   55   60
Arg Pro Leu Lys Asp Arg Ile Asn Ile Val Leu Ser Arg Glu Leu Lys

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Glu Pro Pro Arg Gly Ala His Phe Leu Ala Lys Ser Leu Asp Asp Ala
85 90 95
Leu Arg Leu Ile Glu Gln Pro Glu Leu Ala Ser Lys Val Asp Met Val
100 105 110
Trp Ile Val Gly Gly Ser Ser Val Tyr Gln Glu Ala Met Asn Gln Pro
115 120 125
Gly His Leu Arg Leu Phe Val Thr Arg Ile Met Gln Glu Phe Glu Ser
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<210> 55
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<210> 56
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<210> 58
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PH20, amino acid residues 431-446

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<213> Homo sapiens

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PH20, amino acid residues 431-445

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

<210> 60
<211> 14
<212> PRT
<213> Homo sapiens

<220>
<223> C-terminal peptide cleaved from soluble human
PH20, amino acid residues 431-444

<400> 60
Asp Ala Phe Lys Leu Pro Pro Met Glu Thr Glu Glu Pro Gln
1 5 10

<210> 61
<211> 13
<212> PRT
<213> Homo sapiens

<220>
<223> C-terminal peptide cleaved from soluble human
PH20, amino acid residues 431-443

<400> 61
Asp Ala Phe Lys Leu Pro Pro Met Glu Thr Glu Glu Pro
1 5 10

<210> 62
<211> 12
<212> PRT
<213> Homo sapiens

<220>
<223> C-terminal peptide cleaved from soluble human
PH20, amino acid residues 431-442

<400> 62
Asp Ala Phe Lys Leu Pro Pro Met Glu Thr Glu Glu
1 5 10

<210> 63

<211> 520
<212> PRT
<213> Ovis aries

<220>
<223> sheep PH20

<400> 63
Leu Asp Phe Pro Ala Pro Pro Leu Ile Ser Asn Thr Ser Phe Leu Trp
 1   5   10   15
Ala Trp Asn Ala Pro Ala Glu Arg Cys Val Lys Ile Phe Lys Leu Pro
            20   25   30
Pro Asp Leu Arg Leu Phe Ser Val Lys Gly Ser Pro Gln Lys Ser Ala
        35   40   45
Thr Gly Gln Phe Ile Thr Leu Phe Tyr Ala Asp Arg Leu Gly Tyr Tyr
    50   55   60
Pro His Ile Asp Glu Lys Thr Gly Asn Thr Val Tyr Gly Gly Ile Pro
65   70   75   80
Gln Leu Gly Asn Leu Lys Asn His Leu Glu Lys Ala Lys Lys Asp Ile
                85   90   95
Ala Tyr Tyr Ile Pro Asn Asp Ser Val Gly Leu Ala Val Ile Asp Trp
            100   105   110
Glu Asn Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115   120   125
Tyr Arg Asp Glu Ser Val Glu Leu Val Leu Gln Lys Asn Pro Gln Leu
    130   135   140
Ser Phe Pro Glu Ala Ser Lys Ile Ala Lys Val Asp Phe Glu Thr Ala
145   150   155   160
Gly Lys Ser Phe Met Gln Glu Thr Leu Lys Leu Gly Lys Leu Leu Arg
                165   170   175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180   185   190
Asn Tyr Asn Gln Pro Thr Tyr Asn Gly Asn Cys Ser Asp Leu Glu Lys
        195   200   205
Arg Arg Asn Asp Asp Leu Asp Trp Leu Trp Lys Glu Ser Thr Ala Leu
    210   215   220
Phe Pro Ser Val Tyr Leu Asn Ile Lys Leu Lys Ser Thr Pro Lys Ala
225   230   235   240
Ala Phe Tyr Val Arg Asn Arg Val Gln Glu Ala Ile Arg Leu Ser Lys
                245   250   255
Ile Ala Ser Val Glu Ser Pro Leu Pro Val Phe Val Tyr His Arg Pro
            260   265   270
Val Phe Thr Asp Gly Ser Ser Thr Tyr Leu Ser Gln Gly Asp Leu Val
        275   280   285
Asn Ser Val Gly Glu Ile Val Ala Leu Gly Ala Ser Gly Ile Ile Met
    290   295   300
Trp Gly Ser Leu Asn Leu Ser Leu Thr Met Gln Ser Cys Met Asn Leu
305   310   315   320
Gly Asn Tyr Asn Thr Thr Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325   330   335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys His Asp Glu Gly Val Cys
            340   345   350
Thr Arg Lys Gln Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Ile
        355   360   365
Met Asn Phe Ala Ile Gln Thr Gly Lys Gly Gly Lys Tyr Thr Val Pro
    370   375   380
Gly Lys Val Thr Leu Glu Asp Leu Gln Thr Phe Ser Asp Lys Phe Tyr

385 390 395 400
Cys Ser Cys Tyr Ala Asn Ile Asn Cys Lys Lys Arg Val Asp Ile Lys
405 410 415
Asn Val His Ser Val Asn Val Cys Met Ala Glu Asp Ile Cys Ile Glu
420 425 430
Gly Pro Val Lys Leu Gln Pro Ser Asp His Ser Ser Ser Gln Asn Glu
435 440 445
Ala Ser Thr Thr Thr Val Ser Ser Ile Ser Pro Ser Thr Thr Ala Thr
450 455 460
Thr Val Val Ser Pro Cys Thr Pro Glu Lys Gln Ser Pro Glu Cys Leu
465 470 475 480
Lys Val Arg Cys Leu Glu Ala Ile Ala Asn Val Thr Gln Thr Gly Cys
485 490 495
Gln Gly Val Lys Trp Lys Asn Thr Ser Ser Gln Ser Gln Ser Ser Ile
500 505 510
Gln Asn Ile Lys Asn Gln Thr Thr
515 520

<210> 64
<211> 474
<212> PRT
<213> Bos taurus

<220>
<223> cow hyaluronidase PH20

<400> 64
Met Gly Met Phe Arg Arg His His Ile Ser Phe Arg Ser Phe Ala Gly
1 5 10 15
Ser Ser Gly Thr Pro Gln Ala Val Phe Thr Phe Leu Leu Leu Pro Cys
20 25 30
Cys Leu Ala Leu Asp Phe Arg Ala Pro Pro Leu Ile Ser Asn Thr Ser
35 40 45
Phe Leu Trp Ala Trp Asn Ala Pro Val Glu Arg Cys Val Asn Arg Arg
50 55 60
Phe Gln Leu Pro Pro Asp Leu Arg Leu Phe Ser Val Lys Gly Ser Pro
65 70 75 80
Gln Lys Ser Ala Thr Gly Gln Phe Ile Thr Leu Phe Tyr Ala Asp Arg
85 90 95
Leu Gly Tyr Tyr Pro His Ile Asp Glu Lys Thr Gly Lys Thr Val Phe
100 105 110
Gly Gly Ile Pro Gln Leu Gly Asn Leu Lys Ser His Leu Glu Lys Ala
115 120 125
Lys Asn Asp Ile Ala Tyr Tyr Ile Pro Asn Asp Ser Val Gly Leu Ala
130 135 140
Val Ile Asp Trp Glu Asn Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys
145 150 155 160
Pro Lys Asp Val Tyr Arg Asp Glu Ser Val Glu Leu Val Leu Gln Lys
165 170 175
Asn Pro Gln Leu Ser Phe Pro Glu Ala Ser Lys Ile Ala Lys Val Asp
180 185 190
Phe Glu Thr Ala Gly Lys Ser Phe Met Gln Glu Thr Leu Lys Leu Gly
195 200 205
Lys Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp
210 215 220
Cys Tyr Asn His Asn His Asn Gln Pro Thr Tyr Asn Gly Asn Cys Pro

225 230 235 240
Asp Val Glu Lys Arg Arg Asn Asp Asp Leu Glu Trp Leu Trp Lys Glu
245 250 255
Ser Thr Ala Leu Phe Pro Ser Val Tyr Leu Asn Ile Arg Leu Lys Ser
260 265 270
Thr Gln Asn Ala Ala Leu Tyr Val Arg Asn Arg Val Gln Glu Ala Ile
275 280 285
Arg Leu Ser Lys Ile Ala Ser Val Glu Ser Pro Leu Pro Val Phe Val
290 295 300
Tyr Ala Arg Pro Val Phe Thr Asp Gly Ser Ser Thr Tyr Leu Ser Gln
305 310 315 320
Gly Asp Leu Val Asn Ser Val Gly Glu Ile Val Ser Leu Gly Ala Ser
325 330 335
Gly Ile Ile Met Trp Gly Ser Leu Asn Leu Ser Leu Ser Val Gln Ser
340 345 350
Cys Met Asn Leu Gly Thr Tyr Leu Asn Thr Thr Leu Asn Pro Tyr Ile
355 360 365
Ile Asn Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys His
370 375 380
Asp Gly Gly Val Cys Thr Arg Lys His Trp Asn Ser Ser Asp Tyr Leu
385 390 395 400
His Leu Asn Pro Met Asn Phe Ala Ile Gln Thr Gly Glu Gly Gly Lys
405 410 415
Tyr Thr Val Pro Gly Thr Leu Thr Leu Glu Asp Leu Gln Lys Phe Ser
420 425 430
Asp Thr Phe Tyr Cys Ser Cys Tyr Ser Asn Leu Ser Cys Lys Lys Arg
435 440 445
Val Asp Ile Lys Asn Val His Ser Val Asp Val Cys Met Ala Glu Asp
450 455 460
Val Cys Ile Asp Ala Phe Leu Lys Pro Pro
465 470

<210> 65
<211> 517
<212> PRT
<213> Ovis aries

<220>
<223> sheep PH20

<400> 65
Asp Phe Arg Ala Pro Pro Leu Ile Ser Asn Thr Ser Phe Leu Trp Ala
1 5 10 15
Trp Asn Ala Pro Ala Glu Arg Cys Ile Lys Ile Phe Lys Leu Pro Pro
20 25 30
Asp Leu Arg Leu Phe Ser Val Lys Gly Ser Pro Gln Lys Ser Ala Thr
35 40 45
Gly Gln Phe Ile Thr Leu Phe Tyr Ala Asp Arg Leu Gly Tyr Tyr Pro
50 55 60
His Ile Asp Glu Lys Thr Gly Asn Thr Val Tyr Gly Gly Ile Pro Gln
65 70 75 80
Leu Gly Asn Leu Lys Asn His Leu Glu Lys Ala Lys Lys Asp Ile Ala
85 90 95
Tyr Tyr Ile Pro Asn Asp Ser Val Gly Leu Ala Val Ile Asp Trp Glu
100 105 110
Asn Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val Tyr

```
        115                 120                 125
Arg Asp Glu Ser Val Glu Leu Val Leu Gln Lys Asn Pro Gln Leu Ser
    130                 135                 140
Phe Pro Glu Ala Ser Lys Ile Ala Lys Val Asp Phe Glu Thr Ala Gly
145                 150                 155                 160
Lys Ser Phe Met Gln Glu Thr Leu Lys Leu Gly Lys Leu Leu Arg Pro
                165                 170                 175
Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His Asn
            180                 185                 190
Tyr Asn Gln Pro Thr Tyr Asn Gly Asn Cys Ser Asp Leu Glu Lys Arg
        195                 200                 205
Arg Asn Asp Asp Leu Asp Trp Leu Trp Lys Glu Ser Thr Ala Leu Phe
    210                 215                 220
Pro Ser Val Tyr Leu Asn Ile Lys Leu Lys Ser Thr Pro Lys Ala Ala
225                 230                 235                 240
Phe Tyr Val Arg Asn Arg Val Gln Glu Ala Ile Arg Leu Ser Lys Ile
                245                 250                 255
Ala Ser Val Glu Ser Pro Leu Pro Val Phe Val Tyr His Arg Pro Val
            260                 265                 270
Phe Thr Asp Gly Ser Ser Thr Tyr Leu Ser Gln Gly Asp Leu Val Asn
        275                 280                 285
Ser Val Gly Glu Ile Val Ala Leu Gly Ala Ser Gly Ile Ile Met Trp
    290                 295                 300
Gly Ser Leu Asn Leu Ser Leu Thr Met Gln Ser Cys Met Asn Leu Gly
305                 310                 315                 320
Asn Tyr Leu Asn Thr Thr Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys His Asp Glu Gly Val Cys
            340                 345                 350
Thr Arg Lys Gln Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Met
        355                 360                 365
Asn Phe Ala Ile Gln Thr Gly Lys Gly Gly Lys Tyr Thr Val Pro Gly
    370                 375                 380
Lys Val Thr Leu Glu Asp Leu Gln Thr Phe Ser Asp Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ala Asn Ile Asn Cys Lys Lys Arg Val Asp Ile Lys Asn
                405                 410                 415
Val His Ser Val Asn Val Cys Met Ala Glu Asp Ile Cys Ile Glu Gly
            420                 425                 430
Pro Val Lys Leu Gln Pro Ser Asp His Ser Ser Ser Gln Asn Glu Ala
        435                 440                 445
Ser Thr Thr Thr Val Ser Ser Ile Ser Pro Ser Thr Thr Ala Thr Thr
    450                 455                 460
Val Ser Pro Cys Thr Pro Glu Lys Gln Ser Pro Glu Cys Leu Lys Val
465                 470                 475                 480
Arg Cys Leu Glu Ala Ile Ala Asn Val Thr Gln Thr Gly Cys Gln Gly
                485                 490                 495
Val Lys Trp Lys Asn Thr Ser Ser Gln Ser Ser Ile Gln Asn Ile Lys
            500                 505                 510
Asn Gln Thr Thr Tyr
        515
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<210> 66
<211> 1620
<212> DNA
<213> Ovis aries

<220>
<223> DNA encoding sheep PH20

<400> 66
ttttccgtgt tggttggctc tggacttcag agcacccccct ctcatttcaa acacttcttt 60
cctctgggcc tggaatgccc cagctgaacg ttgtattaaa atctttaaac tacctccaga 120
tctgagactc ttctctgtaa aaggaagccc ccaaaaaagt gctacgggac aatttattac 180
attattttat gctgatagac ttggctacta tcctcatata gatgaaaaaa caggcaacac 240
tgtatatgga ggaattcccc agttgggaaa cttaaaaaat catttggaaa aagccaaaaa 300
agacattgcc tattacatac caaatgacag cgtgggcttg gcggtcattg actgggaaaa 360
ctggaggcct acctgggcaa gaaactggaa acctaaagat gtttacaggg atgagtctgt 420
tgagttggtt ctgcaaaaaa atccacaact cagtttccca gaggcttcca agattgcaaa 480
agtggatttt gagacagcag gaaagagttt catgcaagag actttaaaac tgggaaaatt 540
acttcggcca aatcacttat ggggttatta tctttttcct gattgttaca atcataatta 600
taaccagcct acttacaatg gaaattgctc tgatttagaa aaaaggagaa atgatgatct 660
cgactggttg tggaaggaaa gcactgccct tttcccttct gtttatttga atatcaagtt 720
aaaatctact ccaaaagctg ccttctatgt tcgtaatcgt gtccaggaag ccattcggtt 780
gtctaaaata gcgagtgttg aaagtccact tcccgttttt gtatatcacc gtccagtttt 840
tactgatggg tcttcaacat acctttctca gggtgacctt gtgaattcgg ttggtgagat 900
cgttgctcta ggtgcctctg ggattataat gtggggcagt ctcaatctaa gcctaactat 960
gcaatcttgc atgaacctag gcaattactt gaacactaca ctgaatcctt acataatcaa 1020
cgtcacccta gcagccaaaa tgtgcagcca agtgctttgc cacgatgaag gagtgtgtac 1080
aaggaaacaa tggaattcaa gcgactatct tcacctgaac ccaatgaatt ttgctattca 1140
aactgggaaa ggtggaaaat acacagtacc tgggaaagtc acacttgaag acctgcaaac 1200
gttttctgat aaattttatt gcagttgtta tgccaacatc aactgtaaga agagagttga 1260
tataaaaaat gttcatagtg ttaatgtatg tatggcagaa gacatttgta tagagggccc 1320
tgtgaagtta caacccagtg atcattcctc tagccagaat gaggcatcta ctaccaccgt 1380
cagcagtatc tcacccctcta ctacagccac cacagtatct ccatgtactc ctgagaaaca 1440
gtcccctgag tgcctcaaag tcaggtgttt ggaagccatc gccaacgtca cccaaacggg 1500
gtgtcaaggt gttaaatgga agaacacttc cagtcagtca agtattcaaa atattaaaaa 1560
tcaaacaacc tattaaaata taaattcagt gcttataaaa aaaaaaaaaa aaaaaaaaaa 1620

<210> 67
<211> 793
<212> PRT
<213> Arthrobacter sp.

<220>
<223> Arthrobacter sp. FB24 hyaluronate lyase

<400> 67
Met Thr Arg Glu Phe Ser Arg Arg Thr Ala Leu Lys Gly Ala Ala Leu
 1   5   10   15
Ser Gly Leu Leu Leu Ala Met Val His Gly Pro Ala His Ala Ala Ala
            20   25   30
Thr Ala Asn Ala Thr Leu Thr Pro Ala Asp Phe Ala Gly Leu Arg Gln
        35   40   45
Arg Trp Val Asp Gln Ile Thr Gly Arg Lys Val Leu Val Ala Gly Asp
    50   55   60
Asn Asp Phe Val Thr Ala Leu Ala Ala Leu Asp Lys Lys Ala Arg Thr
65   70   75   80
Ala Ile Asp Leu Leu Glu Arg Ser Ala Gly Arg Leu Thr Val Phe Ser
                85   90   95
Asp Leu Ser Leu Ala Lys Asp Thr Asp Leu Val Thr Thr His Thr Arg
            100   105   110

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Leu Ala Thr Met Ala Thr Ala Trp Ala Thr Pro Gly Ser Glu His Phe
        115                 120                 125
Ala Asp Ala Gly Leu Leu Ala Ala Ile Arg Ala Gly Leu Ala Asp Ala
    130                 135                 140
Asn Ser Leu Cys Tyr Asn Ala Ser Lys Glu Glu Gln Gly Asn Trp Trp
145                 150                 155                 160
Ser Trp Glu Ile Gly Thr Pro Lys Ala Leu Ala Asp Thr Met Val Leu
                165                 170                 175
Leu His Ala Glu Leu Thr Ala Ala Glu Arg Ala Ala Tyr Cys Ala Ala
            180                 185                 190
Ile Asp His Phe Val Pro Asp Pro Trp Gln Gln Phe Pro Pro Lys Arg
        195                 200                 205
Gly Lys Ile Thr Ser Val Gly Ala Asn Arg Val Asp Leu Cys Gln Ala
    210                 215                 220
Val Thr Ile Arg Ser Leu Val Asp Glu Asp Ala Glu Lys Leu Thr His
225                 230                 235                 240
Ala Val Ala Gly Leu Ser Glu Val Trp Gln Tyr Val Ser Ala Gly Asn
                245                 250                 255
Gly Phe Phe Thr Asp Gly Ser Phe Ile Gln His Ser Thr Thr Pro Tyr
            260                 265                 270
Thr Gly Ser Tyr Gly Val Val Leu Leu Thr Gly Leu Ser Lys Leu Phe
        275                 280                 285
Ala Leu Leu Gly Gly Thr Gly Ala Glu Val Ser Asp Pro Ser Arg Asp
    290                 295                 300
Ile Leu Phe Lys Thr Val Glu Gly Ser Phe Ala Pro Phe Met Val Ala
305                 310                 315                 320
Gly Ala Met Ala Asp Ser Val Arg Gly Arg Ser Ile Ser Arg Glu Ser
                325                 330                 335
Asn Thr Gly Phe Asp Leu Gly Ala Ser Thr Ile Glu Ser Ile Leu Leu
            340                 345                 350
Leu Ala Arg Ala Val Asp Pro Val Thr Ala Arg Arg Trp Arg Ser Leu
        355                 360                 365
Cys Leu Ala Trp Ile Asn Gln Asn Arg Lys Ala Pro Ile Leu Ala Asp
    370                 375                 380
Ala Gly Val Gly Arg Thr Ala Leu Val Lys Glu Leu Leu Ala Met Gly
385                 390                 395                 400
Leu Thr Glu Thr Asp Leu Pro Gly Gly His Tyr Leu Phe Pro Ala Met
                405                 410                 415
Asp Arg Thr Met His His Ser Gln Gly Trp Thr Leu Ser Thr Ala Met
            420                 425                 430
Ala Ser Ser Arg Ile Ala Trp Tyr Glu Cys Gly Asn Gly Glu Asn Asn
        435                 440                 445
Arg Gly Tyr His Thr Gly Ser Gly Met Thr Tyr Val Tyr Asp Gly Asp
    450                 455                 460
Leu Gly Gln Tyr Asp Asp Ala Phe Trp Ala Thr Ala Asn His Cys Arg
465                 470                 475                 480
Leu Pro Gly Ile Thr Val Asp Thr Ser Ser Leu Pro Asp Lys Val Glu
                485                 490                 495
Gly Glu Trp Gly Ala Ala Thr Pro Ala Asn Glu Trp Thr Gly Ser Thr
            500                 505                 510
Ala Tyr Gly Asp Val Ala Ala Val Gly Gln His Leu Ile Gly Pro Gly
        515                 520                 525
Gly Thr Gly Leu Thr Ala Arg Lys Ser Trp Phe Val Ser Lys Asp Val
    530                 535                 540
Ile Val Cys Leu Gly Ala Asp Ile Arg Thr Gly Ser Gly Ser Arg Ile
545                 550                 555                 560
Glu Thr Val Val Asp His Arg Asn Leu His Ala Gly Phe Asn Ala Met
                565                 570                 575
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Gly Thr Ala Ala Gly Thr Val Ala Ala Thr Pro Gly His Pro Glu Val
            580                 585                 590
Leu Thr Val Asp Arg Trp Val His Leu Glu Gly Phe Gly Gly Tyr Val
        595                 600                 605
Val Leu Asp Ala Ala Pro Leu Gln Val Leu Arg Glu Gln Arg Glu Gly
    610                 615                 620
Ser Trp Ser Glu Val Asn Val Lys Gly Ser Ala Ala Arg Gln Thr Arg
625                 630                 635                 640
Asn Tyr Ala Thr Leu Tyr Phe Asp His Gly His Glu Pro Glu Ala Ala
                645                 650                 655
Ser Tyr Ala Tyr Leu Val Ala Pro Gly Ala Ser Ala Ser Met Thr Ser
            660                 665                 670
Ser Leu Ser Gly Gln Ser Phe His Thr Val Leu Arg Asn Asp Glu Val
        675                 680                 685
Ala Gln Ala Val Lys Phe Lys Lys Glu Lys Thr Thr Ala Ala Thr Phe
    690                 695                 700
Trp Arg Pro Gly Thr Val Gly Asp Leu Ala Leu Ser Gly Pro Ala Cys
705                 710                 715                 720
Val Val Val Lys Glu Val Gly Asp Arg Leu Ser Ile Ala Val Ser Asp
                725                 730                 735
Pro Thr Gln Asn Ala Ser Thr Leu Thr Leu Arg Leu Lys Thr Lys Arg
            740                 745                 750
Phe Phe Arg Ile Ile Glu Gly Gln Gly Ala Ser Leu Ser His Gly Ala
        755                 760                 765
Asp Gly Phe Thr Val Leu Glu Val Asp Ile Ala Asn His Ala Gly Arg
    770                 775                 780
Thr Lys Gln Ile Glu Leu Ser Ala Glu
785                 790
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<210> 68
<211> 557
<212> PRT
<213> Bdellovibrio bacteriovorus

<220>
<223> Bdellovibrio bacteriovorus HD100 hypothetical
hyaluronan lyase

<400> 68

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Met Thr Lys Phe Phe Phe Leu Leu Thr Leu Ile Ser Ala Thr Ala Phe
 1               5                  10                  15
Ala Gln Ser Glu Pro Asp Trp Thr Ala Gly Val Pro Val Pro Pro Gly
            20                  25                  30
Gly Arg Ser Asn Ile Tyr Ser Trp Asn Asp Phe Asp Phe Gln Ala Thr
        35                  40                  45
Leu Asn Lys Gly Lys Ile His Ala Gln Val Tyr Pro Val Thr Val Thr
    50                  55                  60
Gly Met Leu Pro Pro Tyr Glu Pro Val Arg Arg Leu Ile Glu Glu Lys
65                  70                  75                  80
Asn Ser Asn Pro Leu Arg Lys Trp Ile Gln Ser Leu Met Lys Gly Leu
                85                  90                  95
Ser Gly Phe Arg Ser Phe Glu Asp Val Leu Lys Asn Leu Gly Leu His
            100                 105                 110
Lys Tyr Pro Leu Glu Asn Glu Arg Gly Val Tyr Ala Val Pro Tyr Pro
        115                 120                 125
Asn Glu Ile Arg Pro Asp Thr Leu Met Gly Phe Gly Leu Ile Glu Arg
```

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    130                 135                 140
Asn Gly Ala Glu Gly Phe Thr Phe Ser Cys Ala Ala Cys His Ser Ser
145                 150                 155                 160
Asn Leu Phe Gly Lys Thr Val Leu Gly Met Thr Asn Arg Phe Pro Arg
                165                 170                 175
Ala Asn Glu Phe Phe Ile Lys Ala Lys Lys Val Met Pro Leu Met Asp
            180                 185                 190
Pro His Ile Phe Gln Ala Tyr Thr Arg Ala Thr Asp Ala Glu Thr Ala
        195                 200                 205
Leu Leu Val Glu Ser Lys Glu Arg Leu Lys Ser Val Ala Leu Lys Gln
    210                 215                 220
Pro Ile Ala Leu Gly Leu Asp Thr Ser Leu Ala Gln Val Ser Leu Ser
225                 230                 235                 240
Leu Asn Arg Arg Ala Lys Asp Gly Tyr Ala Asn Tyr Ser Asp Lys Ala
                245                 250                 255
Ala Arg Ser Pro Arg Ala Asp Ala Tyr Leu Asp Asn Lys Pro Ala Asp
            260                 265                 270
Ser Lys Pro Ala Val Trp Trp Asn Val Lys Tyr Lys Asn Arg Trp Leu
        275                 280                 285
Ser Asp Gly Ser Val Leu Ser Gly Asn Pro Ile Phe Thr Asn Leu Ile
    290                 295                 300
Trp Asn Glu Ile Gly Arg Gly Ala Asp Leu His Glu Leu Glu Gln Trp
305                 310                 315                 320
Leu Ala Asp Asn Asp His Ile Ile Lys Glu Leu Thr Thr Ala Val Phe
                325                 330                 335
Ala Ser Glu Ala Pro His Ile Thr Asp Phe Tyr Pro Ala Glu Lys Ile
            340                 345                 350
Asp Leu Gly Arg Ala Lys Ala Gly Glu Gln Ile Phe Lys Asn Thr Cys
        355                 360                 365
Ala Lys Cys His Gly His Tyr Glu Lys Ala Trp Asn Leu Pro Gln Ala
    370                 375                 380
Leu Val Leu Ser Ala Ala Glu Arg Leu Lys Thr Val Glu Val Arg Tyr
385                 390                 395                 400
Lys Glu Lys Thr Pro Val Val Asn Val Gly Thr Asp Pro Phe Arg Arg
                405                 410                 415
Gln Gly Met Lys Ser Leu Glu Gln Leu Asn Asp Leu Glu Ile Ser Lys
            420                 425                 430
Lys Asn Gly Ile Val Ile Lys Ala Gln Glu Gly Tyr Val Pro Pro Pro
        435                 440                 445
Leu Val Gly Ile Trp Ala Arg Trp Pro Tyr Met His Asn Asn Ser Ile
    450                 455                 460
Pro Asn Leu Cys Val Leu Leu Thr Pro Ala Lys Lys Arg Pro Ser Ile
465                 470                 475                 480
Tyr Tyr Ser Gly Glu Ala Leu Asn Lys Asp Thr Asp Tyr Asp Phe Ser
                485                 490                 495
Cys Gly Gly Tyr Pro Ile Gly Asp Lys Thr Pro Lys Ala Trp Lys Thr
            500                 505                 510
Arg Glu His Leu Tyr Asp Thr Arg Asn Pro Gly Met Gly Asn Met Gly
        515                 520                 525
His Asp Glu Gly Ile Phe Ile Lys Asp Gly Lys Glu Ile Leu Ser Ala
    530                 535                 540
Glu Asp Lys Tyr Asn Leu Ile Gln Phe Leu Gln Thr Leu
545                 550                 555
```

<210> 69
<211> 813
<212> PRT

<213> Propionibacterium acnes

<220>
<223> Propionibacterium acnes KPA171202 hyaluronate
lyase

<400> 69
Met Phe Gly Thr Pro Ser Arg Arg Thr Phe Leu Thr Ala Ser Ala Leu
 1   5   10   15
Ser Ala Met Ala Leu Ala Ala Ser Pro Thr Val Thr Asp Ala Ile Ala
            20   25   30
Ala Pro Gly Pro Asp Ser Trp Ser Ala Leu Cys Glu Arg Trp Ile Asp
        35   40   45
Ile Ile Thr Gly Arg Arg Ala Ala Arg Thr Ser Asp Pro Arg Ala Arg
    50   55   60
Ala Ile Ile Ala Lys Thr Asp Arg Lys Val Ala Glu Ile Leu Thr Asp
65   70   75   80
Leu Val Ser Gly Ser Ser Arg Gln Thr Val Leu Ile Ser Ala Asp Leu
                85   90   95
Arg Lys Glu Gln Ser Pro Phe Ile Thr Lys Thr Ala Arg Ala Ile Glu
            100   105   110
Ser Met Ala Cys Ala Trp Ala Thr Pro Gly Ser Ser Tyr His Lys Asp
        115   120   125
Pro Glu Ile Leu Ser Ala Cys Ile Glu Gly Leu Arg Asp Phe Cys Arg
    130   135   140
Leu Arg Tyr Asn Pro Ser Gln Asp Glu Tyr Gly Asn Trp Trp Asp Trp
145   150   155   160
Glu Asp Gly Ala Ser Arg Ala Val Ala Asp Val Met Cys Ile Leu His
                165   170   175
Asp Val Leu Pro Pro Glu Val Met Ser Ala Ala Ala Ala Gly Ile Asp
            180   185   190
His Phe Ile Pro Asp Pro Trp Phe Gln Gln Pro Ala Ser Val Lys Pro
        195   200   205
Thr Ala Asn Pro Val Gln Pro Val Val Ser Thr Gly Ala Asn Arg Met
    210   215   220
Asp Leu Thr Arg Ala Val Met Cys Arg Ser Ile Ala Thr Gly Asp Glu
225   230   235   240
Lys Arg Leu Arg His Ala Val Asp Gly Leu Pro Asp Ala Trp Arg Val
                245   250   255
Thr Thr Glu Gly Asp Gly Phe Arg Ala Asp Gly Gly Phe Ile Gln His
            260   265   270
Ser His Ile Pro Tyr Thr Gly Gly Tyr Gly Asp Val Leu Phe Ser Gly
        275   280   285
Leu Ala Met Leu Phe Pro Leu Val Ser Gly Met Arg Phe Asp Ile Val
    290   295   300
Glu Ser Ala Arg Lys Ala Phe His Asp Gln Val Glu Arg Gly Phe Ile
305   310   315   320
Pro Val Met Tyr Asn Gly Gln Ile Leu Asp Asp Val Arg Gly Arg Ser
                325   330   335
Ile Ser Arg Ile Asn Glu Ser Ala Ala Met His Gly Ile Ser Ile Ala
            340   345   350
Arg Ala Met Leu Met Met Ala Asp Ala Leu Pro Thr His Arg Ala Glu
        355   360   365
Gln Trp Arg Gly Ile Val His Gly Trp Met Ala Arg Asn Thr Phe Asp
    370   375   380
His Leu Ser Glu Pro Ser Thr Leu Val Asp Ile Ser Leu Phe Asp Ala
385   390   395   400

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Ala Ala Lys Ala Arg Pro Val Pro Glu Ser Ser Thr Pro Ser Tyr Phe
                405                 410                 415
Ala Ser Met Asp Arg Leu Val His Arg Thr Ala Asp Trp Leu Ile Thr
            420                 425                 430
Val Ser Asn Cys Ser Asp Arg Ile Ala Trp Tyr Glu Tyr Gly Asn Gly
        435                 440                 445
Glu Asn Glu Trp Ala Ser Arg Thr Ser Gln Gly Met Arg Tyr Leu Leu
    450                 455                 460
Leu Pro Gly Asp Met Gly Gln Tyr Glu Asp Gly Tyr Trp Ala Thr Val
465                 470                 475                 480
Asp Tyr Ser Ala Pro Thr Gly Thr Thr Val Asp Ser Thr Pro Leu Lys
                485                 490                 495
Arg Ala Val Gly Ala Ser Trp Ala Ala Lys Thr Pro Thr Asn Glu Trp
            500                 505                 510
Ser Gly Gly Leu Ala Ser Gly Ser Trp Ser Ala Ala Ala Ser His Ile
        515                 520                 525
Thr Ser Gln Asp Ser Ala Leu Lys Ala Arg Arg Leu Trp Val Gly Leu
    530                 535                 540
Lys Asp Ala Met Val Glu Leu Thr Thr Asp Val Thr Thr Asp Ala Ser
545                 550                 555                 560
Arg Ala Ile Thr Val Val Glu His Arg Lys Val Ala Ser Ser Ser Thr
                565                 570                 575
Lys Leu Leu Val Asp Gly Asn Arg Val Ser Ser Ala Thr Ser Phe Gln
            580                 585                 590
Asn Pro Arg Trp Ala His Leu Asp Gly Val Gly Gly Tyr Val Phe Ala
        595                 600                 605
Thr Asp Thr Asp Leu Ser Ala Asp Val Ala Thr Arg Lys Gly Thr Trp
    610                 615                 620
Ile Asp Val Asn Pro Ser Arg Lys Val Lys Gly Ala Asp Glu Val Ile
625                 630                 635                 640
Glu Arg Ala Tyr Ala Ser Leu His Val Thr His His Asp Arg Pro Val
                645                 650                 655
Ala Trp Ala Leu Leu Pro Thr Ala Ser Arg Ser His Thr Met Ala Leu
            660                 665                 670
Ala Thr Arg Pro Gly Val Glu Pro Phe Thr Val Leu Arg Asn Asp Ala
        675                 680                 685
Thr Val Gln Ala Val Arg Ser Ala Gly Ala Leu Leu Thr Lys Asp Pro
    690                 695                 700
Thr Val Val Thr Thr Leu Ala Phe Trp Lys Pro Ala Thr Cys Gly Gly
705                 710                 715                 720
Val Ala Val Asn Arg Pro Ala Leu Val Gln Thr Arg Glu Ser Ala Asn
                725                 730                 735
Gln Met Glu Val Val Ile Val Glu Pro Thr Gln Lys Arg Gly Ser Leu
            740                 745                 750
Thr Val Thr Ile Glu Gly Ser Trp Lys Val Lys Thr Ala Asp Ser His
        755                 760                 765
Val Asp Val Ser Cys Glu Asn Ala Ala Gly Thr Leu His Val Asp Thr
    770                 775                 780
Ala Gly Leu Gly Gly Gln Ser Val Arg Val Thr Leu Ala Arg Gln Val
785                 790                 795                 800
Thr Gln Thr Pro Ser Gly Gly Gly Arg His Asp Arg Ala
                805                 810
```

<210> 70
<211> 1072
<212> PRT
<213> Streptococcus agalactiae

<220>
<223> Streptococcus agalactiae hyaluronate lyase

<400> 70
Met Glu Ile Lys Lys Lys Tyr Arg Ile Met Leu Tyr Ser Ala Leu Ile
 1   5   10   15
Leu Gly Thr Ile Leu Val Asn Asn Ser Tyr Gln Ala Lys Ala Glu Glu
            20   25   30
Leu Thr Lys Thr Thr Ser Thr Ser Gln Ile Arg Asp Thr Gln Thr Asn
        35   40   45
Asn Ile Glu Val Leu Gln Thr Glu Ser Thr Thr Val Lys Glu Thr Ser
    50   55   60
Thr Thr Thr Thr Gln Gln Asp Leu Ser Asn Pro Thr Ala Ser Thr Ala
65   70   75   80
Thr Ala Thr Ala Thr His Ser Thr Met Lys Gln Val Val Asp Asn Gln
                85   90   95
Thr Gln Asn Lys Glu Leu Val Lys Asn Gly Asp Phe Asn Gln Thr Asn
            100   105   110
Pro Val Ser Gly Ser Trp Ser His Thr Ser Ala Arg Glu Trp Ser Ala
        115   120   125
Trp Ile Asp Lys Glu Asn Thr Ala Asp Lys Ser Pro Ile Ile Gln Arg
    130   135   140
Thr Glu Gln Gly Gln Val Ser Leu Ser Ser Asp Lys Gly Phe Arg Gly
145   150   155   160
Ala Val Thr Gln Lys Val Asn Ile Asp Pro Thr Lys Lys Tyr Glu Val
                165   170   175
Lys Phe Asp Ile Glu Thr Ser Asn Lys Ala Gly Gln Ala Phe Leu Arg
            180   185   190
Ile Met Glu Lys Lys Asp Asn Asn Thr Arg Leu Trp Leu Ser Glu Met
        195   200   205
Thr Ser Gly Thr Thr Asn Lys His Thr Leu Thr Lys Ile Tyr Asn Pro
    210   215   220
Lys Leu Asn Val Ser Glu Val Thr Leu Glu Leu Tyr Tyr Glu Lys Gly
225   230   235   240
Thr Gly Ser Ala Thr Phe Asp Asn Ile Ser Met Lys Ala Lys Gly Pro
                245   250   255
Lys Asp Ser Glu His Pro Gln Pro Val Thr Thr Gln Ile Glu Glu Ser
            260   265   270
Val Asn Thr Ala Leu Asn Lys Asn Tyr Val Phe Asn Lys Ala Asp Tyr
        275   280   285
Gln Tyr Thr Leu Thr Asn Pro Ser Leu Gly Lys Ile Val Gly Gly Ile
    290   295   300
Leu Tyr Pro Asn Ala Thr Gly Ser Thr Thr Val Lys Ile Ser Asp Lys
305   310   315   320
Ser Gly Lys Ile Ile Lys Glu Val Pro Leu Ser Val Thr Ala Ser Thr
                325   330   335
Glu Asp Lys Phe Thr Lys Leu Leu Asp Lys Trp Asn Asp Val Thr Ile
            340   345   350
Gly Asn His Val Tyr Asp Thr Asn Asp Ser Asn Met Gln Lys Ile Asn
        355   360   365
Gln Lys Leu Asp Glu Thr Asn Ala Lys Asn Ile Lys Thr Ile Lys Leu
    370   375   380
Asp Ser Asn His Thr Phe Leu Trp Lys Asp Leu Asp Asn Leu Asn Asn
385   390   395   400
Ser Ala Gln Leu Thr Ala Thr Tyr Arg Arg Leu Glu Asp Leu Ala Lys
                405   410   415

```
Gln Ile Thr Asn Pro His Ser Thr Ile Tyr Lys Asn Glu Lys Ala Ile
            420                 425                 430
Arg Thr Val Lys Glu Ser Leu Ala Trp Leu His Gln Asn Phe Tyr Asn
        435                 440                 445
Val Asn Lys Asp Ile Glu Gly Ser Ala Asn Trp Trp Asp Phe Glu Ile
    450                 455                 460
Gly Val Pro Arg Ser Ile Thr Ala Thr Leu Ala Leu Met Asn Asn Tyr
465                 470                 475                 480
Phe Thr Asp Ala Glu Ile Lys Thr Tyr Thr Asp Pro Ile Glu His Phe
                485                 490                 495
Val Pro Asp Ala Gly Tyr Phe Arg Lys Thr Leu Asp Asn Pro Phe Lys
            500                 505                 510
Ala Leu Gly Gly Asn Leu Val Asp Met Gly Arg Val Lys Ile Ile Glu
        515                 520                 525
Gly Leu Leu Arg Lys Asp Asn Thr Ile Ile Glu Lys Thr Ser His Ser
    530                 535                 540
Leu Lys Asn Leu Phe Thr Thr Ala Thr Lys Ala Glu Gly Phe Tyr Ala
545                 550                 555                 560
Asp Gly Ser Tyr Ile Asp His Thr Asn Val Ala Tyr Thr Gly Ala Tyr
                565                 570                 575
Gly Asn Val Leu Ile Asp Gly Leu Thr Gln Leu Leu Pro Ile Ile Gln
            580                 585                 590
Glu Thr Asp Tyr Lys Ile Ser Asn Gln Glu Leu Asp Met Val Tyr Lys
        595                 600                 605
Trp Ile Asn Gln Ser Phe Leu Pro Leu Ile Val Lys Gly Glu Leu Met
    610                 615                 620
Asp Met Ser Arg Gly Arg Ser Ile Ser Arg Glu Ala Ala Ser Ser His
625                 630                 635                 640
Ala Ala Ala Val Glu Val Leu Arg Gly Phe Leu Arg Leu Ala Asn Met
                645                 650                 655
Ser Asn Glu Glu Arg Asn Leu Asp Leu Lys Ser Thr Ile Lys Thr Ile
            660                 665                 670
Ile Thr Ser Asn Lys Phe Tyr Asn Val Phe Asn Asn Leu Lys Ser Tyr
        675                 680                 685
Ser Asp Ile Ala Asn Met Asn Lys Met Leu Asn Asp Ser Thr Val Ala
    690                 695                 700
Thr Lys Pro Leu Lys Ser Asn Leu Ser Thr Phe Asn Ser Met Asp Arg
705                 710                 715                 720
Leu Ala Tyr Tyr Asn Ala Glu Lys Asp Phe Gly Phe Ala Leu Ser Leu
                725                 730                 735
His Ser Lys Arg Thr Leu Asn Tyr Glu Gly Met Asn Asp Glu Asn Thr
            740                 745                 750
Arg Gly Trp Tyr Thr Gly Asp Gly Met Phe Tyr Leu Tyr Asn Ser Asp
        755                 760                 765
Gln Ser His Tyr Ser Asn His Phe Trp Pro Thr Val Asn Pro Tyr Lys
    770                 775                 780
Met Ala Gly Thr Thr Glu Lys Asp Ala Lys Arg Glu Asp Thr Thr Lys
785                 790                 795                 800
Glu Phe Met Ser Lys His Ser Lys Asp Ala Lys Glu Lys Thr Gly Gln
                805                 810                 815
Val Thr Gly Thr Ser Asp Phe Val Gly Ser Val Lys Leu Asn Asp His
            820                 825                 830
Phe Ala Leu Ala Ala Met Asp Phe Thr Asn Trp Asp Arg Thr Leu Thr
        835                 840                 845
Ala Gln Lys Gly Trp Val Ile Leu Asn Asp Lys Ile Val Phe Leu Gly
    850                 855                 860
Ser Asn Ile Lys Asn Thr Asn Gly Ile Gly Asn Val Ser Thr Thr Ile
865                 870                 875                 880
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Asp Gln Arg Lys Asp Asp Ser Lys Thr Pro Tyr Thr Thr Tyr Val Asn
                885                 890                 895
Gly Lys Thr Ile Asp Leu Lys Gln Ala Ser Ser Gln Gln Phe Thr Asp
            900                 905                 910
Thr Lys Ser Val Phe Leu Glu Ser Lys Glu Pro Gly Arg Asn Ile Gly
        915                 920                 925
Tyr Ile Phe Phe Lys Asn Ser Thr Ile Asp Ile Glu Arg Lys Glu Gln
    930                 935                 940
Thr Gly Thr Trp Asn Ser Ile Asn Arg Thr Ser Lys Asn Thr Ser Ile
945                 950                 955                 960
Val Ser Asn Pro Phe Ile Thr Ile Ser Gln Lys His Asp Asn Lys Gly
                965                 970                 975
Asp Ser Tyr Gly Tyr Met Met Val Pro Asn Ile Asp Arg Thr Ser Phe
            980                 985                 990
Asp Lys Leu Ala Asn Ser Lys Glu Val Glu Leu Leu Glu Asn Ser Ser
        995                 1000                1005
Lys Gln Gln Val Ile Tyr Asp Lys Asn Ser Gln Thr Trp Ala Val Ile
    1010                1015                1020
Lys His Asp Asn Gln Glu Ser Leu Ile Asn Asn Gln Phe Lys Met Asn
1025                1030                1035                1040
Lys Ala Gly Leu Tyr Leu Val Gln Lys Val Gly Asn Asp Tyr Gln Asn
                1045                1050                1055
Val Tyr Tyr Gln Pro Gln Thr Met Thr Lys Thr Asp Gln Leu Ala Ile
            1060                1065                1070
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<210> 71
<211> 1072
<212> PRT
<213> Streptococcus agalactiae

<220>
<223> Streptococcus agalactiae 18RS21 hyaluronate lyase

<400> 71

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Met Glu Ile Lys Lys Lys His Arg Ile Met Leu Tyr Ser Ala Leu Ile
 1               5                  10                  15
Leu Gly Thr Ile Leu Val Asn Asn Ser Tyr Gln Ala Lys Ala Glu Glu
            20                  25                  30
Leu Thr Lys Thr Thr Ser Thr Ser Gln Ile Arg Asp Thr Gln Thr Asn
        35                  40                  45
Asn Ile Glu Val Leu Gln Thr Glu Ser Thr Thr Val Lys Glu Thr Ser
    50                  55                  60
Thr Thr Thr Thr Gln Gln Asp Leu Ser Asn Pro Thr Ala Ser Thr Ala
65                  70                  75                  80
Thr Ala Thr Ala Thr His Ser Thr Met Lys Gln Val Val Asp Asn Gln
                85                  90                  95
Thr Gln Asn Lys Glu Leu Val Lys Asn Gly Asp Phe Asn Gln Thr Asn
            100                 105                 110
Pro Val Ser Gly Ser Trp Ser His Thr Ser Ala Arg Glu Trp Ser Ala
        115                 120                 125
Trp Ile Asp Lys Glu Asn Thr Ala Asp Lys Ser Pro Ile Ile Gln Arg
    130                 135                 140
Thr Glu Gln Gly Gln Val Ser Leu Ser Ser Asp Lys Gly Phe Arg Gly
145                 150                 155                 160
Ala Val Thr Gln Lys Val Asn Ile Asp Pro Thr Lys Lys Tyr Glu Val
                165                 170                 175
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Lys Phe Asp Ile Glu Thr Ser Asn Lys Ala Gly Gln Ala Phe Leu Arg
            180                 185                 190
Ile Met Glu Lys Lys Asp Asn Asn Thr Arg Leu Trp Leu Ser Glu Met
        195                 200                 205
Thr Ser Gly Thr Thr Asn Lys His Thr Leu Thr Lys Ile Tyr Asn Pro
    210                 215                 220
Lys Leu Asn Val Ser Glu Val Thr Leu Glu Leu Tyr Tyr Glu Lys Gly
225                 230                 235                 240
Thr Gly Ser Ala Thr Phe Asp Asn Ile Ser Met Lys Ala Lys Gly Pro
                245                 250                 255
Lys Asp Ser Glu His Pro Gln Pro Val Thr Thr Gln Ile Glu Glu Ser
            260                 265                 270
Val Asn Thr Ala Leu Asn Lys Asn Tyr Val Phe Asn Lys Ala Asp Tyr
        275                 280                 285
Gln Tyr Thr Leu Thr Asn Pro Ser Leu Gly Lys Ile Val Gly Gly Ile
    290                 295                 300
Leu Tyr Pro Asn Ala Thr Gly Ser Thr Thr Val Lys Ile Ser Asp Lys
305                 310                 315                 320
Ser Gly Lys Ile Ile Lys Glu Val Pro Leu Ser Val Thr Ala Ser Thr
                325                 330                 335
Glu Asp Lys Phe Thr Lys Leu Leu Asp Lys Trp Asn Asp Val Thr Ile
            340                 345                 350
Gly Asn His Val Tyr Asp Thr Asn Asp Ser Asn Met Gln Lys Ile Asn
        355                 360                 365
Gln Lys Leu Asp Glu Thr Asn Ala Lys Asn Ile Lys Thr Ile Lys Leu
    370                 375                 380
Asp Ser Asn His Thr Phe Leu Trp Lys Asp Leu Asp Asn Leu Asn Asn
385                 390                 395                 400
Ser Ala Gln Leu Thr Ala Thr Tyr Arg Arg Leu Glu Asp Leu Ala Lys
                405                 410                 415
Gln Ile Thr Asn Pro His Ser Thr Ile Tyr Lys Asn Glu Lys Ala Ile
            420                 425                 430
Arg Thr Val Lys Glu Ser Leu Ala Trp Leu His Gln Asn Phe Tyr Asn
        435                 440                 445
Val Asn Lys Asp Ile Glu Gly Ser Ala Asn Trp Trp Asp Phe Glu Ile
    450                 455                 460
Gly Val Pro Arg Ser Ile Thr Ala Thr Leu Ala Leu Met Asn Asn Tyr
465                 470                 475                 480
Phe Thr Asp Ala Glu Ile Lys Thr Tyr Thr Asp Pro Ile Glu His Phe
                485                 490                 495
Val Pro Asp Ala Gly Tyr Phe Arg Lys Thr Leu Asp Asn Pro Phe Lys
            500                 505                 510
Ala Leu Gly Gly Asn Leu Val Asp Met Gly Arg Val Lys Ile Ile Glu
        515                 520                 525
Gly Leu Leu Arg Lys Asp Asn Thr Ile Ile Glu Lys Thr Ser His Ser
    530                 535                 540
Leu Lys Asn Leu Phe Thr Thr Ala Thr Lys Ala Glu Gly Phe Tyr Ala
545                 550                 555                 560
Asp Gly Ser Tyr Ile Asp His Thr Asn Val Ala Tyr Thr Gly Ala Tyr
                565                 570                 575
Gly Asn Val Leu Ile Asp Gly Leu Thr Gln Leu Leu Pro Ile Ile Gln
            580                 585                 590
Glu Thr Asp Tyr Lys Ile Ser Asn Gln Glu Leu Asp Met Val Tyr Lys
        595                 600                 605
Trp Ile Asn Gln Ser Phe Leu Pro Leu Ile Val Lys Gly Glu Leu Met
    610                 615                 620
Asp Met Ser Arg Gly Arg Ser Ile Ser Arg Glu Ala Ala Ser Ser His
625                 630                 635                 640
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Ala Ala Ala Val Glu Val Leu Arg Gly Phe Leu Arg Leu Ala Asn Met
                645                 650                 655
Ser Asn Glu Glu Arg Asn Leu Asp Leu Ile Ser Thr Ile Lys Thr Ile
            660                 665                 670
Ile Thr Ser Asn Lys Phe Tyr Asn Val Phe Asn Asn Leu Lys Ser Tyr
        675                 680                 685
Ser Asp Ile Ala Asn Met Asn Lys Met Leu Asn Asp Ser Thr Val Ala
    690                 695                 700
Thr Lys Pro Leu Lys Ser Asn Leu Ser Thr Phe Asn Ser Met Asp Arg
705                 710                 715                 720
Leu Ala Tyr Tyr Asn Ala Glu Lys Asp Phe Gly Phe Ala Leu Ser Leu
                725                 730                 735
His Ser Lys Arg Thr Leu Asn Tyr Glu Gly Met Asn Asp Glu Asn Thr
            740                 745                 750
Arg Gly Trp Tyr Thr Gly Asp Gly Met Phe Tyr Leu Tyr Asn Ser Asp
        755                 760                 765
Gln Ser His Tyr Ser Asn His Phe Trp Pro Thr Val Asn Pro Tyr Lys
    770                 775                 780
Met Ala Gly Thr Thr Glu Lys Asp Ala Lys Arg Glu Asp Thr Thr Lys
785                 790                 795                 800
Glu Phe Met Ser Lys His Ser Lys Asp Ala Lys Glu Lys Thr Gly Gln
                805                 810                 815
Val Thr Gly Thr Ser Asp Phe Val Gly Ser Val Lys Leu Asn Asp His
            820                 825                 830
Phe Ala Leu Ala Ala Met Asp Phe Thr Asn Trp Asp Arg Thr Leu Thr
        835                 840                 845
Ala Gln Lys Gly Trp Val Ile Leu Asn Asp Lys Ile Val Phe Leu Gly
    850                 855                 860
Ser Asn Ile Lys Asn Thr Asn Gly Ile Gly Asn Val Ser Thr Thr Ile
865                 870                 875                 880
Asp Gln Arg Lys Asp Asp Ser Lys Thr Pro Tyr Thr Thr Tyr Val Asn
                885                 890                 895
Gly Lys Thr Ile Asp Leu Lys Gln Ala Ser Ser Gln Gln Phe Thr Asp
            900                 905                 910
Thr Lys Ser Val Phe Leu Glu Ser Lys Glu Pro Gly Arg Asn Ile Gly
        915                 920                 925
Tyr Ile Phe Phe Lys Asn Ser Thr Ile Asp Ile Glu Arg Lys Glu Gln
    930                 935                 940
Thr Gly Thr Trp Asn Ser Ile Asn Arg Thr Ser Lys Asn Thr Ser Ile
945                 950                 955                 960
Val Ser Asn Pro Phe Ile Thr Ile Ser Gln Lys His Asp Asn Lys Gly
                965                 970                 975
Asp Ser Tyr Gly Tyr Met Met Val Pro Asn Ile Asp Arg Thr Ser Phe
            980                 985                 990
Asp Lys Leu Ala Asn Ser Lys Glu Val Glu Leu Leu Glu Asn Ser Ser
        995                 1000                1005
Lys Gln Gln Val Ile Tyr Asp Lys Asn Ser Gln Thr Trp Ala Val Ile
    1010                1015                1020
Lys His Asp Asn Gln Glu Ser Leu Ile Asn Asn Gln Phe Lys Met Asn
1025                1030                1035                1040
Lys Ala Gly Leu Tyr Leu Val Gln Lys Val Gly Asn Asp Tyr Gln Asn
                1045                1050                1055
Val Tyr Tyr Gln Pro Gln Thr Met Thr Lys Thr Asp Gln Leu Ala Ile
            1060                1065                1070
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<210> 72
<211> 1081

<212> PRT
<213> Streptococcus agalactiae

<220>
<223> Streptococcus agalactiae A909 hyaluronate lyase

<400> 72
Met Glu Ile Lys Lys Lys His Arg Ile Met Leu Tyr Ser Ala Leu Ile
 1   5   10   15
Leu Gly Thr Ile Leu Val Asn Asn Ser Tyr Gln Ala Lys Ala Glu Glu
            20   25   30
Phe Thr Lys Thr Thr Ser Thr Ser Gln Ile Arg Asp Thr Gln Thr Asn
        35   40   45
Asn Val Glu Val Pro Gln Thr Glu Ser Thr Thr Val Lys Gly Thr Ser
    50   55   60
Thr Thr Thr Thr Gln Gln Asp Leu Ser Asn Ser Thr Ala Ser Thr Ala
65   70   75   80
Thr Ala Thr Ala Thr His Ser Thr Met Lys Gln Val Val Asp Asn Gln
                85   90   95
Thr Gln Asn Lys Glu Leu Val Lys Asn Gly Asp Phe Lys Glu Lys Ile
            100   105   110
Ile Asp Lys Lys Ile Asp Lys Lys Ser Gln Trp Thr Asn Leu Tyr Gly
        115   120   125
Ala Lys Asp Trp Asn Thr Tyr Ile Asp Gln Thr Lys Ser Val Asn Lys
    130   135   140
Ser Pro Ile Ile Gln Arg Thr Glu Gln Gly Gln Val Ser Leu Ser Ser
145   150   155   160
Asp Lys Gly Phe Arg Gly Ala Val Thr Gln Lys Val Asn Ile Asp Pro
                165   170   175
Thr Lys Lys Tyr Glu Val Lys Phe Asp Ile Glu Thr Ser Asn Lys Val
            180   185   190
Gly Gln Ala Phe Leu Arg Ile Met Lys Lys Lys Asp Lys Asn Thr Arg
        195   200   205
Leu Trp Leu Ser Glu Met Thr Ser Gly Thr Thr Asn Lys His Thr Leu
    210   215   220
Thr Lys Ile Tyr Asn Pro Lys Leu Asn Val Ser Glu Val Thr Leu Glu
225   230   235   240
Leu Tyr Tyr Glu Lys Gly Thr Gly Ser Val Thr Phe Asp Asn Ile Ser
                245   250   255
Met Lys Ala Lys Gly Pro Lys Asp Ser Glu His Pro Gln Pro Val Thr
            260   265   270
Thr Gln Ile Glu Glu Ser Val Asn Thr Ala Leu Asn Lys Asn Tyr Val
        275   280   285
Phe Asn Lys Ala Asp Tyr Gln Tyr Thr Leu Thr Asn Pro Ser Leu Gly
    290   295   300
Lys Ile Val Gly Gly Ile Leu Tyr Pro Ser Ala Thr Gly Ser Thr Thr
305   310   315   320
Val Lys Ile Ser Asp Lys Ser Gly Lys Ile Ile Lys Glu Val Pro Leu
                325   330   335
Ser Val Thr Ala Ser Thr Glu Asp Asn Phe Thr Lys Leu Leu Asp Lys
            340   345   350
Trp Asn Asp Val Thr Ile Gly Asn His Val Tyr Asp Thr Asn Asp Ser
        355   360   365
Asn Met Gln Lys Leu Asn Gln Lys Leu Asp Glu Thr Asn Ala Lys Asn
    370   375   380
Ile Lys Asp Ile Lys Leu Asp Ser Asn Arg Thr Phe Leu Trp Glu Asp
385   390   395   400

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Leu Lys Gly Leu Asn Asn Ser Ala Gln Leu Thr Ala Thr Tyr Arg Arg
                405                 410                 415
Leu Glu Asp Leu Ala Lys Gln Ile Thr Asn Pro His Ser Thr Ile Tyr
            420                 425                 430
Lys Asn Glu Lys Ala Ile Arg Thr Val Lys Glu Ser Leu Ala Trp Leu
        435                 440                 445
His Gln Asn Phe Tyr Asn Val Asn Lys Asp Ile Glu Gly Ser Ala Asn
    450                 455                 460
Trp Trp Asp Phe Glu Ile Gly Val Pro Arg Ser Ile Thr Ala Thr Leu
465                 470                 475                 480
Ala Leu Met Asn Asn Tyr Phe Thr Asp Ala Glu Ile Lys Thr Tyr Thr
                485                 490                 495
Asp Pro Ile Glu His Phe Val Pro Asp Ala Gly Tyr Phe Arg Lys Thr
            500                 505                 510
Leu Val Asn Pro Phe Lys Ala Leu Gly Gly Asn Leu Val Asp Met Gly
        515                 520                 525
Arg Val Lys Ile Ile Glu Gly Leu Leu Arg Lys Asp Asn Thr Ile Ile
    530                 535                 540
Lys Lys Thr Ser His Ser Leu Lys Asn Leu Phe Thr Thr Ala Thr Lys
545                 550                 555                 560
Ala Glu Gly Phe Tyr Ala Asp Gly Ser Tyr Ile Asp His Thr Asn Val
                565                 570                 575
Ala Tyr Thr Gly Ala Tyr Gly Asn Val Leu Ile Asp Gly Leu Thr Gln
            580                 585                 590
Leu Leu Pro Ile Ile Gln Glu Thr Asp Tyr Lys Ile Ser Asn Gln Glu
        595                 600                 605
Leu Asp Met Val Tyr Lys Trp Ile Asn Gln Ser Phe Leu Pro Leu Ile
    610                 615                 620
Val Lys Gly Glu Leu Met Asp Met Ser Arg Gly Arg Ser Ile Ser Arg
625                 630                 635                 640
Glu Ala Ala Ser Ser His Ala Ala Ala Val Glu Val Leu Arg Gly Phe
                645                 650                 655
Leu Arg Leu Ala Asn Met Ser Asn Glu Glu Arg Asn Leu Asp Leu Lys
            660                 665                 670
Ser Thr Ile Lys Thr Ile Ile Thr Ser Asn Lys Phe Tyr Asn Val Phe
        675                 680                 685
Asn Asn Leu Lys Ser Tyr Ser Asp Ile Ala Asn Met Asn Lys Leu Leu
    690                 695                 700
Asn Asp Ser Thr Val Ala Thr Lys Pro Leu Lys Ser Asn Leu Ser Thr
705                 710                 715                 720
Phe Asn Ser Met Asp Arg Leu Ala Tyr Tyr Asn Ala Glu Lys Asp Phe
                725                 730                 735
Gly Phe Ala Leu Ser Leu His Ser Lys Arg Thr Leu Asn Tyr Glu Gly
            740                 745                 750
Met Asn Asp Glu Asn Thr Arg Gly Trp Tyr Thr Gly Asp Gly Met Phe
        755                 760                 765
Tyr Leu Tyr Asn Ser Asp Gln Ser His Tyr Ser Asn His Phe Trp Pro
    770                 775                 780
Thr Val Asn Pro Tyr Lys Met Ala Gly Thr Thr Glu Lys Asp Thr Gly
785                 790                 795                 800
Arg Glu Asp Thr Ile Lys Lys Leu Met Asn Arg Tyr Asp Lys Thr Asn
                805                 810                 815
Lys Asn Ser Lys Val Met Thr Gly Gln Val Thr Gly Thr Ser Asp Phe
            820                 825                 830
Val Gly Ser Val Lys Leu Asn Asp His Phe Ala Leu Ala Ala Met Asp
        835                 840                 845
Phe Thr Asn Trp Asp Arg Thr Leu Thr Ala Gln Lys Gly Trp Val Ile
    850                 855                 860
```

Leu Asn Asp Lys Ile Val Phe Leu Gly Ser Asn Ile Lys Asn Thr Asn
865 870 875 880
Gly Val Gly Asn Val Ser Thr Thr Ile Asp Gln Arg Lys Asp Asp Ser
885 890 895
Lys Thr Pro Tyr Thr Thr Tyr Val Asn Gly Lys Thr Val Asp Leu Lys
900 905 910
Gln Ala Ser Ser Gln Gln Phe Thr Asp Thr Lys Ser Val Phe Leu Glu
915 920 925
Ser Lys Glu Pro Gly Arg Asn Ile Gly Tyr Ile Phe Phe Lys Asn Ser
930 935 940
Thr Ile Asp Ile Glu Arg Lys Glu Gln Thr Gly Thr Trp Asn Ser Ile
945 950 955 960
Asn Arg Thr Ser Lys Asn Thr Ser Ile Val Ser Asn Pro Phe Ile Thr
965 970 975
Ile Ser Gln Lys His Asp Asn Lys Gly Asp Ser Tyr Gly Tyr Met Met
980 985 990
Val Pro Asn Ile Asp Arg Thr Ser Phe Asp Lys Leu Ala Asn Ser Lys
995 1000 1005
Glu Val Glu Leu Leu Glu Asn Ser Ser Lys Gln Gln Val Ile Tyr Asp
1010 1015 1020
Lys Asn Ser Gln Thr Trp Ala Val Ile Lys His Asp Asn Gln Glu Ser
1025 1030 1035 1040
Leu Ile Asn Asn Gln Phe Lys Met Asn Lys Ala Gly Leu Tyr Leu Val
1045 1050 1055
Gln Lys Val Gly Asn Asp Tyr Gln Asn Val Tyr Tyr Gln Pro Gln Thr
1060 1065 1070
Met Thr Lys Thr Asp Gln Leu Ala Ile
1075 1080

<210> 73
<211> 984
<212> PRT
<213> Streptococcus agalactiae

<220>
<223> Streptococcus agalactiae NEM316 hyaluronate lyase

<400> 73
Met Lys Gln Val Val Asp Asn Gln Thr Gln Asn Lys Glu Leu Val Lys
1 5 10 15
Asn Gly Asp Phe Asn Gln Thr Asn Pro Val Ser Gly Ser Trp Ser His
20 25 30
Thr Ser Ala Arg Glu Trp Ser Ala Trp Ile Asp Lys Glu Asn Thr Ala
35 40 45
Asp Lys Ser Pro Ile Ile Gln Arg Thr Glu Gln Gly Gln Val Ser Leu
50 55 60
Ser Ser Asp Lys Gly Phe Arg Gly Ala Val Thr Gln Lys Val Asn Ile
65 70 75 80
Asp Pro Thr Lys Lys Tyr Glu Val Lys Phe Asp Ile Glu Thr Ser Asn
85 90 95
Lys Ala Gly Gln Ala Phe Leu Arg Ile Met Glu Lys Lys Asp Asn Asn
100 105 110
Thr Arg Leu Trp Leu Ser Glu Met Thr Ser Gly Thr Thr Asn Lys His
115 120 125
Thr Leu Thr Lys Ile Tyr Asn Pro Lys Leu Asn Val Ser Glu Val Thr
130 135 140

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Leu Glu Leu Tyr Tyr Glu Lys Gly Thr Gly Ser Ala Thr Phe Asp Asn
145                 150                 155                 160
Ile Ser Met Lys Ala Lys Gly Pro Lys Asp Ser Glu His Pro Gln Pro
                165                 170                 175
Val Thr Thr Gln Ile Glu Glu Ser Val Asn Thr Ala Leu Asn Lys Asn
            180                 185                 190
Tyr Val Phe Asn Lys Ala Asp Tyr Gln Tyr Thr Leu Thr Asn Pro Ser
        195                 200                 205
Leu Gly Lys Ile Val Gly Gly Ile Leu Tyr Pro Asn Ala Thr Gly Ser
    210                 215                 220
Thr Thr Val Lys Ile Ser Asp Lys Ser Gly Lys Ile Ile Lys Glu Val
225                 230                 235                 240
Pro Leu Ser Val Thr Ala Ser Thr Glu Asp Lys Phe Thr Lys Leu Leu
                245                 250                 255
Asp Lys Trp Asn Asp Val Thr Ile Gly Asn His Val Tyr Asp Thr Asn
            260                 265                 270
Asp Ser Asn Met Gln Lys Ile Asn Gln Lys Leu Asp Glu Thr Asn Ala
        275                 280                 285
Lys Asn Ile Lys Thr Ile Lys Leu Asp Ser Asn His Thr Phe Leu Trp
    290                 295                 300
Lys Asp Leu Asp Asn Leu Asn Asn Ser Ala Gln Leu Thr Ala Thr Tyr
305                 310                 315                 320
Arg Arg Leu Glu Asp Leu Ala Lys Gln Ile Thr Asn Pro His Ser Thr
                325                 330                 335
Ile Tyr Lys Asn Glu Lys Ala Ile Arg Thr Val Lys Glu Ser Leu Ala
            340                 345                 350
Trp Leu His Gln Asn Phe Tyr Asn Val Asn Lys Asp Ile Glu Gly Ser
        355                 360                 365
Ala Asn Trp Trp Asp Phe Glu Ile Gly Val Pro Arg Ser Ile Thr Ala
    370                 375                 380
Thr Leu Ala Leu Met Asn Asn Tyr Phe Thr Asp Ala Glu Ile Lys Thr
385                 390                 395                 400
Tyr Thr Asp Pro Ile Glu His Phe Val Pro Asp Ala Gly Tyr Phe Arg
                405                 410                 415
Lys Thr Leu Asp Asn Pro Phe Lys Ala Leu Gly Gly Asn Leu Val Asp
            420                 425                 430
Met Gly Arg Val Lys Ile Ile Glu Gly Leu Leu Arg Lys Asp Asn Thr
        435                 440                 445
Ile Ile Glu Lys Thr Ser His Ser Leu Lys Asn Leu Phe Thr Thr Ala
    450                 455                 460
Thr Lys Ala Glu Gly Phe Tyr Ala Asp Gly Ser Tyr Ile Asp His Thr
465                 470                 475                 480
Asn Val Ala Tyr Thr Gly Ala Tyr Gly Asn Val Leu Ile Asp Gly Leu
                485                 490                 495
Thr Gln Leu Leu Pro Ile Ile Gln Glu Thr Asp Tyr Lys Ile Ser Asn
            500                 505                 510
Gln Glu Leu Asp Met Val Tyr Lys Trp Ile Asn Gln Ser Phe Leu Pro
        515                 520                 525
Leu Ile Val Lys Gly Glu Leu Met Asp Met Ser Arg Gly Arg Ser Ile
    530                 535                 540
Ser Arg Glu Ala Ala Ser Ser His Ala Ala Ala Val Glu Val Leu Arg
545                 550                 555                 560
Gly Phe Leu Arg Leu Ala Asn Met Ser Asn Glu Glu Arg Asn Leu Asp
                565                 570                 575
Leu Lys Ser Thr Ile Lys Thr Ile Ile Thr Ser Asn Lys Phe Tyr Asn
            580                 585                 590
Val Phe Asn Asn Leu Lys Ser Tyr Ser Asp Ile Ala Asn Met Asn Lys
        595                 600                 605
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Met Leu Asn Asp Ser Thr Val Ala Thr Lys Pro Leu Lys Ser Asn Leu
    610                 615                 620
Ser Thr Phe Asn Ser Met Asp Arg Leu Ala Tyr Tyr Asn Ala Glu Lys
625                 630                 635                 640
Asp Phe Gly Phe Ala Leu Ser Leu His Ser Lys Arg Thr Leu Asn Tyr
                645                 650                 655
Glu Gly Met Asn Asp Glu Asn Thr Arg Asp Trp Tyr Thr Gly Asp Gly
            660                 665                 670
Met Phe Tyr Leu Tyr Asn Ser Asp Gln Ser His Tyr Ser Asn His Phe
        675                 680                 685
Trp Pro Thr Val Asn Pro Tyr Lys Met Ala Gly Thr Thr Glu Lys Asp
    690                 695                 700
Ala Lys Arg Glu Asp Thr Thr Lys Glu Phe Met Ser Lys His Ser Lys
705                 710                 715                 720
Asp Ala Lys Glu Lys Thr Gly Gln Val Thr Gly Thr Ser Asp Phe Val
                725                 730                 735
Gly Ser Val Lys Leu Asn Asp His Phe Ala Leu Ala Ala Met Asp Phe
            740                 745                 750
Thr Asn Trp Asp Arg Thr Leu Thr Ala Gln Lys Gly Trp Val Ile Leu
        755                 760                 765
Asn Asp Lys Ile Val Phe Leu Gly Ser Asn Ile Lys Asn Thr Asn Gly
    770                 775                 780
Ile Gly Asn Val Ser Thr Thr Ile Asp Gln Arg Lys Asp Asp Ser Lys
785                 790                 795                 800
Thr Pro Tyr Thr Thr Tyr Val Asn Gly Lys Thr Ile Asp Leu Lys Gln
                805                 810                 815
Ala Ser Ser Gln Gln Phe Thr Asp Thr Lys Ser Val Phe Leu Glu Ser
            820                 825                 830
Lys Glu Pro Gly Arg Asn Ile Gly Tyr Ile Phe Phe Lys Asn Ser Thr
        835                 840                 845
Ile Asp Ile Glu Arg Lys Glu Gln Thr Gly Thr Trp Asn Ser Ile Asn
    850                 855                 860
Arg Thr Ser Lys Asn Thr Ser Ile Val Ser Asn Pro Phe Ile Thr Ile
865                 870                 875                 880
Ser Gln Lys His Asp Asn Lys Gly Asp Ser Tyr Gly Tyr Met Met Val
                885                 890                 895
Pro Asn Ile Asp Arg Thr Ser Phe Asp Lys Leu Ala Asn Ser Lys Glu
            900                 905                 910
Val Glu Leu Leu Glu Asn Ser Ser Lys Gln Gln Val Ile Tyr Asp Lys
        915                 920                 925
Asn Ser Gln Thr Trp Ala Val Ile Lys His Asp Asn Gln Glu Ser Leu
    930                 935                 940
Ile Asn Asn Gln Phe Lys Met Asn Lys Ala Gly Leu Tyr Leu Val Gln
945                 950                 955                 960
Lys Val Gly Asn Asp Tyr Gln Asn Val Tyr Tyr Gln Pro Gln Thr Met
                965                 970                 975
Thr Lys Thr Asp Gln Leu Ala Ile
            980
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<210> 74
<211> 807
<212> PRT
<213> Staphylococcus aureus

<220>
<223> Staphylococcus aureus subsp. aureus COL
hyaluronate lyase

<400> 74
Met Thr Tyr Arg Ile Lys Lys Trp Gln Lys Leu Ser Thr Ile Thr Leu
 1   5   10   15
Leu Met Ala Gly Val Ile Thr Leu Asn Gly Gly Glu Phe Arg Ser Val
            20   25   30
Asp Lys His Gln Ile Ala Val Ala Asp Thr Asn Val Gln Thr Pro Asp
        35   40   45
Tyr Glu Lys Leu Arg Asn Thr Trp Leu Asp Val Asn Tyr Gly Tyr Asp
    50   55   60
Lys Tyr Asp Glu Asn Asn Pro Asp Met Lys Lys Lys Phe Asp Ala Thr
65   70   75   80
Glu Lys Glu Ala Thr Asn Leu Leu Lys Glu Met Lys Thr Glu Ser Gly
                85   90   95
Arg Lys Tyr Leu Trp Ser Gly Ala Glu Thr Leu Glu Thr Asn Ser Ser
            100   105   110
His Met Thr Arg Thr Tyr Arg Asn Ile Glu Lys Ile Ala Glu Ala Met
        115   120   125
Arg Asn Pro Lys Thr Thr Leu Asn Thr Asp Glu Asn Lys Lys Lys Val
    130   135   140
Lys Asp Ala Leu Glu Trp Leu His Lys Asn Ala Tyr Gly Lys Glu Pro
145   150   155   160
Asp Lys Lys Val Lys Glu Leu Ser Glu Asn Phe Thr Lys Thr Thr Gly
                165   170   175
Lys Asn Thr Asn Leu Asn Trp Trp Asp Tyr Glu Ile Gly Thr Pro Lys
            180   185   190
Ser Leu Thr Asn Thr Leu Ile Leu Leu Asn Asp Gln Phe Ser Asn Glu
        195   200   205
Glu Lys Lys Lys Phe Thr Ala Pro Ile Lys Thr Phe Ala Pro Asp Ser
    210   215   220
Asp Lys Ile Leu Ser Ser Val Gly Lys Ala Glu Leu Ala Lys Gly Gly
225   230   235   240
Asn Leu Val Asp Ile Ser Lys Val Lys Leu Leu Glu Cys Ile Ile Glu
                245   250   255
Glu Asp Lys Asp Met Met Lys Lys Ser Ile Asp Ser Phe Asn Lys Val
            260   265   270
Phe Thr Tyr Val Gln Asp Ser Ala Thr Gly Lys Glu Arg Asn Gly Phe
        275   280   285
Tyr Lys Asp Gly Ser Tyr Ile Asp His Gln Asp Val Pro Tyr Thr Gly
    290   295   300
Ala Tyr Gly Val Val Leu Leu Glu Gly Ile Ser Gln Met Met Pro Met
305   310   315   320
Ile Lys Glu Thr Pro Phe Asn Asp Lys Thr Gln Asn Asp Thr Thr Leu
                325   330   335
Lys Ser Trp Ile Asp Asp Gly Phe Met Pro Leu Ile Tyr Lys Gly Glu
            340   345   350
Met Met Asp Leu Ser Arg Gly Arg Ala Ile Ser Arg Glu Asn Glu Thr
        355   360   365
Ser His Ser Ala Ser Ala Thr Val Met Lys Ser Leu Leu Arg Leu Ser
    370   375   380
Asp Ala Met Asp Asp Ser Thr Lys Ala Lys Tyr Lys Lys Ile Val Lys
385   390   395   400
Ser Ser Val Glu Ser Asp Ser Ser Tyr Lys Gln Asn Asp Tyr Leu Asn
                405   410   415
Ser Tyr Ser Asp Ile Asp Lys Met Lys Ser Leu Met Thr Asp Asn Ser
            420   425   430
Ile Ser Lys Asn Gly Leu Thr Gln Gln Leu Lys Ile Tyr Asn Asp Met

```
        435                 440                 445
Asp Arg Val Thr Tyr His Asn Lys Asp Leu Asp Phe Ala Phe Gly Leu
    450                 455                 460
Ser Met Thr Ser Lys Asn Val Ala Arg Tyr Glu Ser Ile Asn Gly Glu
465                 470                 475                 480
Asn Leu Lys Gly Trp His Thr Gly Ala Gly Met Ser Tyr Leu Tyr Asn
                485                 490                 495
Ser Asp Val Lys His Tyr His Asp Asn Phe Trp Val Thr Ala Asp Met
            500                 505                 510
Lys Arg Leu Ser Gly Thr Thr Thr Leu Asp Asn Glu Ile Leu Lys Asp
        515                 520                 525
Thr Asp Asp Lys Lys Ser Ser Lys Thr Phe Val Gly Gly Thr Lys Val
    530                 535                 540
Asp Asp Gln His Ala Ser Ile Gly Met Asp Phe Glu Asn Gln Asp Lys
545                 550                 555                 560
Thr Leu Thr Ala Lys Lys Ser Tyr Phe Ile Leu Asn Asp Lys Ile Val
                565                 570                 575
Phe Leu Gly Thr Gly Ile Lys Ser Thr Asp Ser Ser Lys Asn Pro Val
            580                 585                 590
Thr Thr Ile Glu Asn Arg Lys Ala Asn Gly Tyr Thr Leu Tyr Thr Asp
        595                 600                 605
Asp Lys Gln Thr Thr Asn Ser Asp Asn Gln Glu Asn Asn Ser Val Phe
    610                 615                 620
Leu Glu Ser Thr Asp Thr Lys Lys Asn Ile Gly Tyr His Phe Leu Asn
625                 630                 635                 640
Lys Pro Lys Ile Thr Val Lys Lys Glu Ser His Thr Gly Lys Trp Lys
                645                 650                 655
Glu Ile Asn Lys Ser Gln Lys Asp Thr Gln Lys Thr Asp Glu Tyr Tyr
            660                 665                 670
Glu Val Thr Gln Lys His Ser Asn Ser Asp Asn Lys Tyr Gly Tyr Val
        675                 680                 685
Leu Tyr Pro Gly Leu Ser Lys Asp Val Phe Lys Thr Lys Lys Asp Glu
    690                 695                 700
Val Thr Val Val Lys Gln Glu Asp Asp Phe His Val Val Lys Asp Asn
705                 710                 715                 720
Glu Ser Val Trp Ala Gly Val Asn Tyr Ser Asn Ser Thr Gln Thr Phe
                725                 730                 735
Asp Ile Asn Asn Thr Lys Val Glu Val Lys Ala Lys Gly Met Phe Ile
            740                 745                 750
Leu Lys Lys Lys Asp Asp Asn Thr Tyr Glu Cys Ser Phe Tyr Asn Pro
        755                 760                 765
Glu Ser Thr Asn Ser Ala Ser Asp Ile Glu Ser Lys Ile Ser Met Thr
    770                 775                 780
Gly Tyr Ser Ile Thr Asn Lys Asn Thr Ser Thr Ser Asn Glu Ser Gly
785                 790                 795                 800
Val His Phe Glu Leu Thr Lys
                805
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<210> 75
<211> 420
<212> PRT
<213> Staphylococcus aureus

<220>
<223> Staphylococcus aureus strain MRSA252 hyaluronate lyase 2

<400> 75
Met Thr Tyr Arg Met Lys Lys Trp Gln Lys Leu Ser Thr Ile Thr Leu
 1   5   10   15
Leu Met Ala Gly Val Ile Thr Leu Asn Gly Gly Glu Phe Arg Ser Ile
            20   25   30
Asp Lys His Gln Ile Ala Val Ala Asp Thr Asn Val Gln Thr Thr Asp
        35   40   45
Tyr Glu Lys Leu Arg Asn Ile Trp Leu Asp Val Asn Tyr Gly Tyr Asp
    50   55   60
Lys Tyr Asp Glu Asn Asn Pro Asp Met Lys Lys Lys Phe Glu Ala Thr
65   70   75   80
Glu Asn Glu Ala Glu Lys Leu Leu Lys Glu Met Lys Thr Glu Ser Asp
                85   90   95
Arg Lys Tyr Leu Trp Glu Ser Ser Lys Asp Leu Asp Thr Lys Ser Ala
            100   105   110
Asp Met Thr Arg Thr Tyr Arg Asn Ile Glu Lys Ile Ser Glu Ala Met
        115   120   125
Lys His Lys Asn Thr Lys Leu Lys Thr Asp Glu Asn Lys Thr Lys Val
    130   135   140
Lys Asp Ala Leu Glu Trp Leu His Lys Asn Ala Tyr Gly Lys Glu Pro
145   150   155   160
Asp Lys Lys Val Ala Asp Leu Thr Ser Asn Phe Lys Asn Lys Thr Ser
                165   170   175
Arg Asn Thr Asn Leu Asn Trp Trp Asp Tyr Glu Ile Gly Thr Pro Arg
            180   185   190
Ala Leu Thr Asn Thr Leu Ile Leu Leu Gln Glu Asp Phe Thr Asp Glu
        195   200   205
Glu Lys Lys Lys Tyr Thr Ala Pro Ile Lys Thr Phe Ala Pro Asp Ser
    210   215   220
Asp Lys Ile Leu Ser Ser Val Gly Lys Ser Glu Pro Ala Lys Gly Gly
225   230   235   240
Asn Leu Val Asp Ile Ser Lys Val Lys Leu Leu Glu Ser Ile Ile Glu
                245   250   255
Glu Asp Lys Asp Met Met Lys Lys Ser Ile Asp Ser Phe Asn Thr Val
            260   265   270
Phe Thr Tyr Ala Gln Asn Ser Ala Thr Gly Lys Glu Arg Asn Gly Phe
        275   280   285
Tyr Lys Asp Gly Ser Tyr Ile Asp His Gln Asp Val Pro Tyr Thr Gly
    290   295   300
Ala Tyr Gly Val Val Leu Leu Glu Gly Ile Ser Gln Met Met Pro Met
305   310   315   320
Ile Lys Glu Thr Pro Phe Asn Asp Ser Asn Gln Asn Asp Thr Thr Leu
                325   330   335
Lys Ser Trp Ile Asp Asp Gly Phe Met Pro Leu Ile Tyr Lys Gly Glu
            340   345   350
Met Met Asp Leu Ser Arg Gly Arg Ala Ile Ser Arg Glu Asn Glu Thr
        355   360   365
Ser His Ser Ala Ser Ala Thr Val Met Lys Ser Leu Leu Arg Leu Ser
    370   375   380
Asp Thr Met Asp Lys Ser Thr Lys Ala Lys Tyr Lys Lys Ile Val Lys
385   390   395   400
Thr Ser Val Glu Ser Asp Ser Ser Tyr Lys Gln Thr Asp Tyr Leu Ser
                405   410   415
Ser Tyr Ser Asp
            420

<210> 76
<211> 806
<212> PRT
<213> Staphylococcus aureus

<220>
<223> Staphylococcus aureus strain MRSA252 hyaluronate lyase 1

<400> 76
Met Thr Asn Lys Met Lys Lys Trp Gln Lys Leu Ser Thr Ile Thr Leu
 1   5   10   15
Leu Met Thr Gly Val Ile Ala Leu Asn Asn Gly Glu Phe Arg Asn Val
            20   25   30
Asp Lys His Gln Ile Ala Val Ala Asp Thr Asn Val Gln Thr Pro Asp
        35   40   45
Tyr Glu Lys Leu Lys Lys Thr Trp Leu Asp Val Asn Tyr Gly Tyr Asp
    50   55   60
Gln Tyr Asp Glu Asn Asn Gln Asp Met Lys Lys Lys Phe Asp Ala Lys
65   70   75   80
Glu Lys Glu Ala Lys Lys Leu Leu Asp Asp Met Lys Thr Asp Thr Asn
                85   90   95
Arg Thr Tyr Leu Trp Ser Gly Ala Glu Asn Leu Glu Thr Asn Ser Ser
            100   105   110
His Met Thr Lys Thr Tyr Arg Asn Ile Glu Lys Ile Ala Glu Ser Met
        115   120   125
Gln His Lys Asn Thr Val Leu Lys Thr Val Glu Asn Lys Leu Lys Ile
    130   135   140
Lys Glu Ala Leu Asp Trp Met His Lys Asn Val Tyr Gly Lys Asn Pro
145   150   155   160
Ser Gln Lys Val Glu Asp Leu Thr Lys Asn Arg Lys Gly Gln Thr Thr
                165   170   175
Pro Lys Asn Asn Ser Leu Asn Trp Trp Asp Tyr Glu Ile Gly Thr Pro
            180   185   190
Arg Ala Leu Thr Asn Thr Leu Leu Leu Met Asp Asp Met Leu Thr Lys
        195   200   205
Asp Glu Met Lys Asn Tyr Ser Lys Pro Ile Ser Thr Tyr Ala Pro Ser
    210   215   220
Ser Asp Lys Ile Leu Ser Ser Val Gly Glu Ser Glu Asp Ala Lys Gly
225   230   235   240
Gly Asn Leu Val Asp Ile Ser Lys Val Lys Leu Leu Glu Ser Val Ile
                245   250   255
Glu Glu Asp Val Asp Met Leu Lys Lys Ser Ile Asp Ser Phe Asn Lys
            260   265   270
Val Phe Thr Tyr Val Gln Asp Ser Ala Thr Gly Lys Gly Arg Asn Gly
        275   280   285
Phe Tyr Lys Asp Gly Ser Tyr Ile Asp His Gln Asp Val Pro Tyr Thr
    290   295   300
Gly Ala Tyr Gly Val Val Leu Leu Glu Gly Ile Ser Gln Met Met Pro
305   310   315   320
Met Ile Lys Glu Ser Pro Phe Lys Thr Thr Gln Asp Asn Ala Thr Leu
                325   330   335
Ser Asn Trp Ile Asp Glu Gly Phe Met Pro Leu Ile Tyr Lys Gly Glu
            340   345   350
Met Met Asp Leu Ser Arg Gly Arg Ala Ile Ser Arg Glu Asn Glu Thr
        355   360   365
Ser His Thr Ala Ser Ala Thr Val Met Lys Ser Leu Leu Arg Leu Asn

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    370                 375                 380
Asp Thr Met Asp Asp Ser Thr Lys Thr Arg Tyr Lys Gln Ile Val Lys
385                 390                 395                 400
Thr Ser Val Asn Ser Asp Ser Ser Tyr Asn Gln Asn Asn Tyr Leu Asn
                405                 410                 415
Ser Tyr Ser Asp Ile Ala Lys Met Lys Lys Leu Met Asn Asp Ser Thr
            420                 425                 430
Ile Ser Lys Asn Asp Leu Thr Gln Gln Leu Lys Ile Tyr Asn Asp Met
        435                 440                 445
Asp Arg Val Thr Tyr His Asn Lys Asp Leu Asp Phe Ala Phe Gly Leu
    450                 455                 460
Ser Met Thr Ser Lys Asn Ile Ala Arg Tyr Glu Asn Ile Asn Gly Glu
465                 470                 475                 480
Asn Leu Lys Gly Trp His Thr Gly Ala Gly Met Ser Tyr Leu Tyr Asn
                485                 490                 495
Ser Asp Val Lys His Tyr Arg Asp Asn Phe Trp Ala Thr Ala Asp Met
            500                 505                 510
Thr Cys Leu Pro Gly Thr Thr Thr Leu Asn Asp Met Pro Ser Thr Asn
        515                 520                 525
Thr Lys Asn Asp Lys Ser Phe Val Gly Gly Thr Lys Leu Asn Asn Lys
    530                 535                 540
Tyr Ala Ser Ile Gly Met Asp Phe Glu Asn Gln Asp Lys Thr Leu Thr
545                 550                 555                 560
Ala Lys Lys Ser Tyr Phe Ile Leu Asn Asp Lys Ile Val Phe Leu Gly
                565                 570                 575
Thr Gly Ile Lys Ser Thr Asp Ser Ser Lys Asn Pro Val Thr Ser Val
            580                 585                 590
Glu Asn Arg Lys Ala Asn Gly Tyr Lys Leu Phe Lys Asp Asp Ile Glu
        595                 600                 605
Ile Thr Thr Ser Asp Val Asn Ala Gln Glu Thr His Ser Val Phe Leu
    610                 615                 620
Glu Ser Asn Asp Thr Lys Lys Asn Ile Gly Tyr His Phe Leu Asp Lys
625                 630                 635                 640
Pro Lys Ile Thr Val Lys Lys Glu Ser His Thr Gly Lys Trp Ser Glu
                645                 650                 655
Ile Asn Lys Ser Gln Lys Lys Asp Asp Lys Lys Asp Glu Tyr Tyr Glu
            660                 665                 670
Val Thr Gln Thr His Asn Thr Ser Asp Ser Lys Tyr Ala Tyr Val Leu
        675                 680                 685
Tyr Pro Gly Leu Ser Lys Ser Asp Phe Lys Ser Lys Asn Asn Asn Val
    690                 695                 700
Ser Ile Val Lys Gln Asp Glu Asp Phe His Val Ile Lys Asp Asn Asp
705                 710                 715                 720
Gly Val Phe Ala Gly Val Asn Tyr Ser Asp Asn Thr Lys Ser Phe Asp
                725                 730                 735
Ile Asn Gly Ile Thr Val Glu Leu Lys Glu Lys Gly Met Phe Val Ile
            740                 745                 750
Lys Lys Lys Asp Asp Lys Ala Tyr Lys Cys Ser Phe Tyr Asn Pro Glu
        755                 760                 765
Thr Thr Asn Thr Ala Ser Asn Ile Glu Ser Lys Ile Phe Ile Lys Gly
    770                 775                 780
Tyr Thr Ile Thr Asn Lys Ser Val Ile Asn Ser Asn Asp Ala Gly Val
785                 790                 795                 800
Asn Phe Glu Leu Thr Lys
                805
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<210> 77

<211> 815
<212> PRT
<213> Staphylococcus aureus

<220>
<223> Staphylococcus aureus subsp. aureus MW2
hyaluronate lyase precursor

<400> 77
Met Thr Tyr Arg Ile Lys Lys Trp Gln Lys Leu Ser Thr Ile Thr Leu
1 5 10 15
Leu Met Ala Gly Val Ile Thr Leu Asn Gly Gly Glu Phe Arg Ser Ile
20 25 30
Asp Lys Tyr Gln Ile Ala Val Ala Asp Thr Asn Val Gln Thr Pro Asp
35 40 45
Tyr Glu Lys Leu Arg Asn Thr Trp Leu Asp Val Asn Tyr Gly Tyr Asp
50 55 60
Lys Tyr Asp Glu Lys Asn Asp Ala Met Lys Lys Lys Phe Glu Ala Thr
65 70 75 80
Glu Asn Glu Ala Lys Lys Leu Leu Ser Glu Met Lys Thr Glu Ser Asp
85 90 95
Arg Lys Tyr Leu Trp Glu Asn Ser Lys Asp Leu Asp Thr Lys Ser Ala
100 105 110
Asp Met Thr Arg Thr Tyr Arg Asn Ile Glu Lys Ile Ala Glu Ala Met
115 120 125
Lys His Lys Asp Thr Lys Leu Lys Ile Asp Glu Asn Lys Lys Lys Val
130 135 140
Lys Asp Ala Leu Glu Trp Leu His Lys Asn Ala Tyr Gly Lys Glu Pro
145 150 155 160
Asp Lys Lys Val Ala Asp Leu Thr Ser Asn Phe Lys Asn Lys Thr Ser
165 170 175
Arg Asn Thr Asn Leu Asn Trp Trp Asp Tyr Glu Ile Gly Thr Pro Arg
180 185 190
Ala Leu Thr Asn Thr Leu Ile Leu Leu Asn Asp Gln Phe Ser Asn Asp
195 200 205
Glu Lys Lys Lys Tyr Thr Ala Pro Ile Lys Thr Phe Ala Pro Glu Ser
210 215 220
Asp Lys Ile Leu Ser Ser Val Gly Gln Pro Glu Gln Ala Lys Gly Gly
225 230 235 240
Asn Leu Val Asp Ile Ala Lys Val Lys Leu Leu Glu Ser Ile Ile Glu
245 250 255
Glu Asp Lys Asp Ile Thr Lys Asn Ser Ile Asp Ala Phe Asn Lys Val
260 265 270
Phe Thr Tyr Val Gln Ser Asn Ala Thr Gly Lys Glu Arg Asn Gly Phe
275 280 285
Tyr Lys Asp Gly Ser Tyr Ile Asp His Gln Asp Val Pro Tyr Thr Gly
290 295 300
Ala Tyr Gly Val Val Leu Leu Glu Gly Ile Ser Gln Met Met Pro Met
305 310 315 320
Ile Lys Glu Thr Pro Phe Asn Asp Lys Thr Gln Asn Asp Thr Thr Leu
325 330 335
Lys Ser Trp Ile Asp Asp Gly Phe Met Pro Leu Ile Tyr Lys Gly Glu
340 345 350
Met Met Asp Leu Ser Arg Gly Arg Ala Ile Ser Arg Glu Asn Glu Thr
355 360 365
Ser His Thr Ala Ser Ala Thr Val Met Lys Ser Leu Leu Arg Leu Ser
370 375 380

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Asp Ala Met Asp Asp Ser Thr Lys Ala Lys Tyr Lys Gln Ile Val Lys
385                 390                 395                 400
Thr Ser Val Lys Ser Asp Ser Ser Tyr Gly Gln Asn Asp Thr Leu Ser
                405                 410                 415
Ser Tyr Ser Asp Ile Ser Lys Met Lys Ser Leu Met Glu Asp Ser Thr
            420                 425                 430
Ile Ser Thr Asn Gly Leu Thr Gln Gln Leu Lys Ile Tyr Asn Asp Met
        435                 440                 445
Asp Arg Val Thr Tyr His Asn Lys Asp Leu Asp Phe Ala Phe Gly Leu
    450                 455                 460
Ser Met Thr Ser Lys Asn Val Ala Arg Tyr Glu Ser Ile Asn Gly Glu
465                 470                 475                 480
Asn Leu Lys Gly Trp His Thr Gly Ala Gly Met Ser Tyr Leu Tyr Asn
                485                 490                 495
Ser Asp Val Lys His Tyr Arg Asp Asn Phe Trp Ala Thr Ala Asp Met
            500                 505                 510
Lys Arg Leu Ala Gly Thr Thr Thr Leu Glu Asn Glu Glu Pro Lys Gly
        515                 520                 525
Thr Asp Val Lys Lys Ser Ser Lys Thr Phe Val Gly Gly Thr Lys Phe
    530                 535                 540
Asp Asp Gln His Ala Ser Ile Gly Met Asp Phe Glu Asn Gln Asp Lys
545                 550                 555                 560
Thr Leu Thr Ala Lys Lys Ser Tyr Phe Ile Leu Asn Asp Lys Ile Val
                565                 570                 575
Phe Leu Gly Thr Gly Ile Lys Ser Thr Asp Ser Ser Lys Asn Pro Val
            580                 585                 590
Thr Thr Ile Glu Asn Arg Lys Ala Asn Gly Tyr Thr Leu Tyr Thr Asp
        595                 600                 605
Asp Lys Gln Thr Thr Ala Ser Asp Asn Gln Gly Thr Asn Ser Val Phe
    610                 615                 620
Leu Glu Ser Thr Asn Lys Pro Lys Asn Asn Ile Gly Tyr His Phe Leu
625                 630                 635                 640
Asn Glu Ser Lys Ile Thr Val Lys Lys Glu Ser His Thr Gly Lys Trp
                645                 650                 655
Ser Asp Ile Asn Lys Ser Gln Lys Gln Asp Ser Lys Thr Asn Gln Tyr
            660                 665                 670
Tyr Glu Val Thr Gln Lys His Ser Asn Thr Asp Ser Lys Tyr Ala Tyr
        675                 680                 685
Val Leu Tyr Pro Gly Leu Ser Lys Asp Asp Phe Asn Thr Lys Lys Asp
    690                 695                 700
Lys Val Thr Val Val Lys Gln Asp Asp Asp Phe His Val Val Lys Asp
705                 710                 715                 720
Asn Glu Ser Val Trp Ala Gly Val Asn Tyr Ser Asp Ser Thr Gln Thr
                725                 730                 735
Phe Ile Ile Asn Asn Thr Lys Val Glu Val Lys Ala Lys Gly Met Phe
            740                 745                 750
Ile Leu Lys Lys Lys Asp Asp Lys Thr Tyr Glu Cys Ser Phe Tyr Asn
        755                 760                 765
Pro Glu Ser Thr Asn Thr Ala Ser Asp Ile Glu Ser Lys Ile Ser Met
    770                 775                 780
Thr Gly Tyr Ser Ile Thr Asn Lys Asn Thr Ser Thr Ser Asn Glu Ser
785                 790                 795                 800
Gly Val Arg Phe Glu Leu Gln Gln Thr Leu Asn Lys Asp Asp Asn
                805                 810                 815
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<210> 78
<211> 807

<212> PRT
<213> Staphylococcus aureus

<220>
<223> Staphylococcus aureus subsp. aureus COL
hyaluronate lyase

<400> 78
Met Thr Tyr Arg Ile Lys Lys Trp Gln Lys Leu Ser Thr Ile Thr Leu
1 5 10 15
Leu Met Ala Gly Val Ile Thr Leu Asn Gly Gly Glu Phe Arg Ser Val
20 25 30
Asp Lys His Gln Ile Ala Val Ala Asp Thr Asn Val Gln Thr Pro Asp
35 40 45
Tyr Glu Lys Leu Arg Asn Thr Trp Leu Asp Val Asn Tyr Gly Tyr Asp
50 55 60
Lys Tyr Asp Glu Asn Asn Pro Asp Met Lys Lys Lys Phe Asp Ala Thr
65 70 75 80
Glu Lys Glu Ala Thr Asn Leu Leu Lys Glu Met Lys Thr Glu Ser Gly
85 90 95
Arg Lys Tyr Leu Trp Ser Gly Ala Glu Thr Leu Glu Thr Asn Ser Ser
100 105 110
His Met Thr Arg Thr Tyr Arg Asn Ile Glu Lys Ile Ala Glu Ala Met
115 120 125
Arg Asn Pro Lys Thr Thr Leu Asn Thr Asp Glu Asn Lys Lys Lys Val
130 135 140
Lys Asp Ala Leu Glu Trp Leu His Lys Asn Ala Tyr Gly Lys Glu Pro
145 150 155 160
Asp Lys Lys Val Lys Glu Leu Ser Glu Asn Phe Thr Lys Thr Thr Gly
165 170 175
Lys Asn Thr Asn Leu Asn Trp Trp Asp Tyr Glu Ile Gly Thr Pro Lys
180 185 190
Ser Leu Thr Asn Thr Leu Ile Leu Leu Asn Asp Gln Phe Ser Asn Glu
195 200 205
Glu Lys Lys Lys Phe Thr Ala Pro Ile Lys Thr Phe Ala Pro Asp Ser
210 215 220
Asp Lys Ile Leu Ser Ser Val Gly Lys Ala Glu Leu Ala Lys Gly Gly
225 230 235 240
Asn Leu Val Asp Ile Ser Lys Val Lys Leu Leu Glu Cys Ile Ile Glu
245 250 255
Glu Asp Lys Asp Met Met Lys Lys Ser Ile Asp Ser Phe Asn Lys Val
260 265 270
Phe Thr Tyr Val Gln Asp Ser Ala Thr Gly Lys Glu Arg Asn Gly Phe
275 280 285
Tyr Lys Asp Gly Ser Tyr Ile Asp His Gln Asp Val Pro Tyr Thr Gly
290 295 300
Ala Tyr Gly Val Val Leu Leu Glu Gly Ile Ser Gln Met Met Pro Met
305 310 315 320
Ile Lys Glu Thr Pro Phe Asn Asp Lys Thr Gln Asn Asp Thr Thr Leu
325 330 335
Lys Ser Trp Ile Asp Asp Gly Phe Met Pro Leu Ile Tyr Lys Gly Glu
340 345 350
Met Met Asp Leu Ser Arg Gly Arg Ala Ile Ser Arg Glu Asn Glu Thr
355 360 365
Ser His Ser Ala Ser Ala Thr Val Met Lys Ser Leu Leu Arg Leu Ser
370 375 380
Asp Ala Met Asp Asp Ser Thr Lys Ala Lys Tyr Lys Lys Ile Val Lys

385 390 395 400
Ser Ser Val Glu Ser Asp Ser Ser Tyr Lys Gln Asn Asp Tyr Leu Asn
405 410 415
Ser Tyr Ser Asp Ile Asp Lys Met Lys Ser Leu Met Thr Asp Asn Ser
420 425 430
Ile Ser Lys Asn Gly Leu Thr Gln Gln Leu Lys Ile Tyr Asn Asp Met
435 440 445
Asp Arg Val Thr Tyr His Asn Lys Asp Leu Asp Phe Ala Phe Gly Leu
450 455 460
Ser Met Thr Ser Lys Asn Val Ala Arg Tyr Glu Ser Ile Asn Gly Glu
465 470 475 480
Asn Leu Lys Gly Trp His Thr Gly Ala Gly Met Ser Tyr Leu Tyr Asn
485 490 495
Ser Asp Val Lys His Tyr His Asp Asn Phe Trp Val Thr Ala Asp Met
500 505 510
Lys Arg Leu Ser Gly Thr Thr Thr Leu Asp Asn Glu Ile Leu Lys Asp
515 520 525
Thr Asp Asp Lys Lys Ser Ser Lys Thr Phe Val Gly Gly Thr Lys Val
530 535 540
Asp Asp Gln His Ala Ser Ile Gly Met Asp Phe Glu Asn Gln Asp Lys
545 550 555 560
Thr Leu Thr Ala Lys Lys Ser Tyr Phe Ile Leu Asn Asp Lys Ile Val
565 570 575
Phe Leu Gly Thr Gly Ile Lys Ser Thr Asp Ser Ser Lys Asn Pro Val
580 585 590
Thr Thr Ile Glu Asn Arg Lys Ala Asn Gly Tyr Thr Leu Tyr Thr Asp
595 600 605
Asp Lys Gln Thr Thr Asn Ser Asp Asn Gln Glu Asn Asn Ser Val Phe
610 615 620
Leu Glu Ser Thr Asp Thr Lys Lys Asn Ile Gly Tyr His Phe Leu Asn
625 630 635 640
Lys Pro Lys Ile Thr Val Lys Lys Glu Ser His Thr Gly Lys Trp Lys
645 650 655
Glu Ile Asn Lys Ser Gln Lys Asp Thr Gln Lys Thr Asp Glu Tyr Tyr
660 665 670
Glu Val Thr Gln Lys His Ser Asn Ser Asp Asn Lys Tyr Gly Tyr Val
675 680 685
Leu Tyr Pro Gly Leu Ser Lys Asp Val Phe Lys Thr Lys Lys Asp Glu
690 695 700
Val Thr Val Val Lys Gln Glu Asp Asp Phe His Val Val Lys Asp Asn
705 710 715 720
Glu Ser Val Trp Ala Gly Val Asn Tyr Ser Asn Ser Thr Gln Thr Phe
725 730 735
Asp Ile Asn Asn Thr Lys Val Glu Val Lys Ala Lys Gly Met Phe Ile
740 745 750
Leu Lys Lys Lys Asp Asp Asn Thr Tyr Glu Cys Ser Phe Tyr Asn Pro
755 760 765
Glu Ser Thr Asn Ser Ala Ser Asp Ile Glu Ser Lys Ile Ser Met Thr
770 775 780
Gly Tyr Ser Ile Thr Asn Lys Asn Thr Ser Thr Ser Asn Glu Ser Gly
785 790 795 800
Val His Phe Glu Leu Thr Lys
805

<210> 79
<211> 809
<212> PRT

<213> Staphylococcus aureus

<220>
<223> Staphylococcus aureus RF122 hyaluronate lyase

<400> 79
Met Thr Tyr Arg Met Lys Lys Trp Gln Lys Leu Ser Thr Ile Thr Leu
 1   5   10   15
Leu Met Ala Gly Gly Ile Thr Phe Asn Asp Ser Glu Phe Arg Ser Val
            20   25   30
Asp Lys His Gln Ile Ala Val Ala Asp Thr Asn Val Gln Thr Pro Asn
        35   40   45
Tyr Glu Lys Leu Lys Asn Thr Trp Leu Asp Val Asn Tyr Gly Tyr Asp
    50   55   60
Lys Tyr Asp Glu Ser Asn Pro Asp Met Lys Lys Lys Phe Glu Ala Thr
65   70   75   80
Glu Lys Glu Ala Arg Lys Leu Leu Ser Glu Met Lys Thr Glu Ser Asp
                85   90   95
Arg Lys Tyr Leu Trp Glu Asn Ser Lys Asp Leu Asp Thr Lys Ser Ala
            100   105   110
Asp Met Thr Arg Thr Tyr Arg Asn Ile Glu Lys Ile Ala Glu Ala Met
        115   120   125
Lys His Pro Lys Thr Thr Leu Lys Asn Asp Glu Asn Lys Lys Lys Val
    130   135   140
Lys Asp Ala Leu Glu Trp Leu His Lys Asn Ala Tyr Gly Lys Glu Pro
145   150   155   160
Gly Lys Lys Val Ala Asp Leu Lys Thr Asn Phe Ser Lys Ser Ala Pro
                165   170   175
Gln Lys Asn Thr Asn Leu Asn Trp Trp Asp Tyr Glu Ile Gly Thr Pro
            180   185   190
Arg Ala Leu Thr Asn Thr Leu Ile Leu Leu Lys Glu Asp Phe Thr Asp
        195   200   205
Glu Glu Lys Lys Lys Tyr Thr Ala Pro Ile Lys Thr Phe Ala Pro Lys
    210   215   220
Ser Asp Glu Ile Leu Ser Ser Val Gly Lys Ala Glu Pro Ala Lys Gly
225   230   235   240
Gly Asn Leu Val Asp Ile Ser Lys Val Lys Leu Leu Glu Ser Ile Ile
                245   250   255
Glu Glu Asp Lys Asp Met Met Lys Asn Ser Ile Asp Ser Phe Asn Lys
            260   265   270
Val Phe Thr Tyr Val Gln Asp Ser Ala Thr Asp Lys Glu Arg Asn Gly
        275   280   285
Phe Tyr Lys Asp Gly Ser Tyr Ile Asp His Lys Asp Val Pro Tyr Thr
    290   295   300
Gly Ala Tyr Gly Val Val Leu Leu Glu Gly Ile Ser Gln Met Met Pro
305   310   315   320
Met Ile Lys Glu Thr Pro Phe Asn Asp Lys Thr Gln Asn Asn Thr Thr
                325   330   335
Leu Thr Ser Trp Ile Asp Asp Gly Phe Met Pro Leu Ile Tyr Lys Gly
            340   345   350
Glu Met Met Asp Leu Ser Arg Gly Arg Ala Ile Ser Arg Glu Asn Glu
        355   360   365
Thr Ser His Ser Ala Ser Ala Thr Val Met Lys Ser Leu Leu Arg Leu
    370   375   380
Ser Asp Ala Met Asp Glu Ser Thr Lys Ala Lys Tyr Lys Gln Ile Val
385   390   395   400
Lys Asn Ser Val Lys Ser Asp Ser Ser Tyr Gly Gln Asn Asp Thr Leu

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                405                 410                 415
Ser Ser Tyr Ser Asp Ile Asp Lys Met Lys Ser Leu Met Thr Asp Ser
            420                 425                 430
Thr Ile Ser Thr Asn Gly Leu Thr Gln Gln Leu Lys Ile Tyr Asn Ala
        435                 440                 445
Met Asp Arg Val Thr Tyr His Asn Lys Asp Leu Asp Phe Ala Phe Gly
    450                 455                 460
Leu Ser Met Thr Ser Lys Asn Val Ala Arg Tyr Glu Asn Ile Asn Gly
465                 470                 475                 480
Glu Asn Leu Lys Gly Trp His Thr Gly Ala Gly Met Ser Tyr Leu Tyr
                485                 490                 495
Asn Ser Asp Val Arg His Tyr Arg Asp Asn Phe Trp Ala Thr Ala Asp
            500                 505                 510
Met Lys Arg Leu Ala Asp Thr Thr Thr Leu Glu Asn Glu Glu Pro Lys
        515                 520                 525
Gly Thr Asp Val Lys Lys Ser Ser Lys Thr Phe Val Gly Gly Thr Lys
    530                 535                 540
Phe Asp Asp Gln His Ala Ser Ile Gly Met Asp Phe Glu Asn Gln Asp
545                 550                 555                 560
Lys Thr Leu Thr Ala Lys Lys Ser Tyr Phe Ile Leu Asn Asp Lys Ile
                565                 570                 575
Val Phe Leu Gly Thr Gly Ile Lys Thr Thr Asp Ser Ser Lys Asn Pro
            580                 585                 590
Val Thr Thr Ile Glu Asn Arg Lys Ala His Gly Tyr Thr Leu Tyr Thr
        595                 600                 605
Asp Asp Lys Gln Thr Thr Asn Ser Asn Asn Gln Glu Thr Asn Ser Val
    610                 615                 620
Phe Leu Glu Ser Thr Asn Ser Thr Gln Asn Asn Ile Gly Tyr His Phe
625                 630                 635                 640
Leu Asn Lys Ser Lys Ile Thr Val Lys Lys Glu Ser His Thr Gly Lys
                645                 650                 655
Trp Ser Asp Ile Asn Lys Ser Gln Lys Asp Thr Gln Lys Thr Asp Glu
            660                 665                 670
Tyr Tyr Glu Val Thr Gln Lys His Ser Asn Thr Asp Asp Lys Tyr Ala
        675                 680                 685
Tyr Val Leu Tyr Pro Gly Ile Thr Lys Asp Asn Phe Lys Ser Lys Ala
    690                 695                 700
Ser Gln Val Thr Val Val Lys Gln Asp Asp Asp Phe His Val Val Lys
705                 710                 715                 720
Asp Asn Glu Ser Val Trp Ala Gly Val Asn Tyr Ser Asp Ser Thr Gln
                725                 730                 735
Thr Phe Asp Ile Asn Gly Thr Lys Val Glu Val Lys Ala Lys Gly Met
            740                 745                 750
Phe Ile Leu Lys Lys Lys Asp Asp Asn Thr Tyr Glu Cys Ser Phe Tyr
        755                 760                 765
Asn Pro Glu Ser Thr Asn Ser Ala Ser Asp Ile Glu Ser Lys Ile Ser
    770                 775                 780
Met Thr Gly Tyr Ser Ile Thr Asn Lys Asn Thr Ser Asn Thr Asn Glu
785                 790                 795                 800
Ser Gly Val Arg Phe Glu Leu Thr Lys
                805
```

<210> 80
<211> 807
<212> PRT
<213> Staphylococcus aureus

<220>
<223> Staphylococcus aureus RF122 hyaluronate lyase
precursor

<400> 80
Met Thr Tyr Lys Met Lys Lys Trp Gln Lys Leu Ser Thr Ile Thr Leu
 1   5   10   15
Leu Met Ala Gly Val Ile Thr Leu Asn Asn Gly Glu Phe Arg Asn Val
            20   25   30
Asp Lys His Gln Ile Ala Val Ala Asp Thr Asn Val Gln Thr Pro Asp
        35   40   45
Tyr Glu Lys Leu Lys Lys Thr Trp Leu Asp Val Asn Tyr Gly Asn Asp
    50   55   60
Gln Tyr Asp Glu Asn Asn Gln Asp Met Lys Lys Lys Phe Asp Ala Lys
65   70   75   80
Glu Asn Glu Ala Lys Lys Leu Leu Glu Asp Met Lys Thr Asp Thr Asn
                85   90   95
Arg Thr Tyr Leu Trp Ser Gly Ala Glu Asn Leu Glu Thr Asn Ser Ser
            100   105   110
His Met Thr Lys Thr Tyr Arg Asn Ile Glu Lys Ile Ala Glu Ala Met
        115   120   125
Arg His Lys Asn Thr Ser Leu Lys Thr Asp Glu Asn Lys Leu Lys Ile
    130   135   140
Lys Asp Ala Ile Lys Trp Leu His His Asn Val Tyr Gly Lys Asp Pro
145   150   155   160
Asp Lys Lys Val Ala Asp Leu Thr Thr Asn Arg Lys Glu Lys Asp Ser
                165   170   175
Ser Lys Lys Asn Asn Ser Leu Asn Trp Trp Asp Tyr Glu Ile Gly Thr
            180   185   190
Pro Arg Ala Leu Thr Asn Thr Leu Leu Leu Met Asp Asn Met Leu Thr
        195   200   205
Lys Asp Glu Met Lys Asn Tyr Ser Lys Pro Ile Ser Ile Tyr Ser Pro
    210   215   220
Ser Ser Tyr Lys Ile Leu Ser Ser Val Gly Glu Ser Glu Asp Ala Lys
225   230   235   240
Gly Gly Asn Leu Val Asp Ile Ala Lys Val Lys Phe Leu Glu Ser Val
                245   250   255
Ile Glu Glu Asp Val Asp Met Met Lys Lys Ser Ile Asp Ser Phe Asn
            260   265   270
Lys Val Phe Thr Tyr Val Gln Asp Ser Ala Thr Gly Lys Ala Arg Asn
        275   280   285
Gly Phe Tyr Lys Asp Gly Ser Tyr Ile Asp His Gln Asp Val Pro Tyr
    290   295   300
Thr Gly Ala Tyr Gly Val Val Leu Leu Glu Gly Ile Ser Gln Met Met
305   310   315   320
Pro Met Ile Lys Glu Ser Pro Phe Lys His Thr Gln Asp Lys Ala Thr
                325   330   335
Leu Ser Asn Trp Ile Asp Glu Gly Phe Met Pro Leu Ile Tyr Lys Gly
            340   345   350
Glu Met Met Asp Leu Ser Arg Gly Arg Ala Ile Ser Arg Glu Asn Glu
        355   360   365
Thr Ser His Thr Ala Ser Ala Thr Val Met Lys Ser Leu Leu Arg Leu
    370   375   380
Ser Asp Thr Met Asp Glu Ser Thr Lys Thr Lys Tyr Lys Gln Ile Val
385   390   395   400
Lys Thr Ser Val Lys Ser Asp Ser Ser Tyr Asp Ser Asn Asp Thr Leu
                405   410   415

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Asn Ser Tyr Ser Asp Ile Asp Lys Met Lys Lys Leu Met Asn Asp Ser
            420                 425                 430
Thr Ile Ser Lys Asn Asp Leu Thr Gln Gln Leu Lys Ile Tyr Asn Asp
        435                 440                 445
Met Asp Arg Val Thr Tyr His Asn Lys Glu Leu Asp Phe Ala Phe Gly
    450                 455                 460
Leu Ser Met Thr Ser Lys Asn Ile Ala Arg Tyr Glu Asn Ile Asn Gly
465                 470                 475                 480
Glu Asn Leu Lys Gly Trp His Thr Gly Ala Gly Met Ser Tyr Leu Tyr
                485                 490                 495
Asn Ser Asp Val Lys His Tyr Arg Asp Asn Phe Trp Ala Thr Ala Asp
            500                 505                 510
Met Thr Arg Leu Pro Gly Thr Thr Thr Leu Asn Asp Met Pro Ser Thr
        515                 520                 525
Asn Thr Lys Asn Asp Lys Ser Phe Val Gly Gly Thr Lys Leu Asn Asn
    530                 535                 540
Lys Tyr Ala Ser Ile Gly Met Asp Phe Glu Asn Gln Asp Lys Thr Leu
545                 550                 555                 560
Thr Ala Lys Lys Ser Tyr Phe Ile Leu Asn Asp Lys Ile Val Phe Ile
                565                 570                 575
Gly Thr Gly Ile Lys Ser Thr Asp Ser Ser Lys Asn Pro Val Thr Ser
            580                 585                 590
Val Glu Asn Arg Lys Ala Asn Gly Tyr Lys Leu Phe Lys Gly Asp Ile
        595                 600                 605
Glu Ile Thr Thr Ser Asp Val Asn Ala Gln Glu Thr His Ser Val Phe
    610                 615                 620
Leu Glu Ser Asn Asp Thr Lys Lys Asn Ile Gly Tyr His Phe Leu Asp
625                 630                 635                 640
Lys Pro Lys Ile Thr Val Lys Lys Glu Ser His Thr Gly Lys Trp Ser
                645                 650                 655
Glu Ile Asn Lys Ser Gln Lys Thr Asp Asp Lys Lys Asp Glu Tyr Tyr
            660                 665                 670
Glu Val Thr Gln Thr His Asn Thr Ser Asp Ser Lys Tyr Ala Tyr Val
        675                 680                 685
Leu Tyr Pro Gly Leu Ser Lys Ser Asp Phe Lys Ser Lys Asn Asn Asn
    690                 695                 700
Val Ser Ile Val Lys Gln Asp Glu Asp Phe His Val Ile Lys Asp Asn
705                 710                 715                 720
Asp Gly Val Phe Ala Gly Val Asn Tyr Ser Asp Ser Thr Lys Ser Phe
                725                 730                 735
Asp Ile Asn Gly Thr Ile Val Glu Leu Lys Glu Lys Gly Met Phe Val
            740                 745                 750
Ile Lys Lys Lys Asp Asp Asn Thr Tyr Glu Cys Ser Phe Tyr Asn Pro
        755                 760                 765
Thr Ser Thr Asn Ser Thr Ser Asn Lys Glu Ser Lys Ile Ser Val Thr
    770                 775                 780
Gly Tyr Thr Ile Thr Asn Gln Ser Val Ser Asn Phe Lys Glu Ser Asp
785                 790                 795                 800
Ile His Phe Glu Leu Thr Lys
                805
```

<210> 81
<211> 807
<212> PRT
<213> Staphylococcus aureus

<220>

<223> Staphylococcus aureus subsp. aureus USA300_TCH1516
hyaluronate lyase

<400> 81

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Met Thr Tyr Arg Ile Lys Lys Trp Gln Lys Leu Ser Thr Ile Thr Leu
 1               5                  10                  15
Leu Met Ala Gly Val Ile Thr Leu Asn Gly Gly Glu Phe Arg Ser Val
            20                  25                  30
Asp Lys His Gln Ile Ala Val Ala Asp Thr Asn Val Gln Thr Pro Asp
        35                  40                  45
Tyr Glu Lys Leu Arg Asn Thr Trp Leu Asp Val Asn Tyr Gly Tyr Asp
    50                  55                  60
Lys Tyr Asp Glu Asn Asn Pro Asp Met Lys Lys Lys Phe Asp Ala Thr
65                  70                  75                  80
Glu Lys Glu Ala Thr Asn Leu Leu Lys Glu Met Lys Thr Glu Ser Gly
                85                  90                  95
Arg Lys Tyr Leu Trp Ser Gly Ala Glu Thr Leu Glu Thr Asn Ser Ser
            100                 105                 110
His Met Thr Arg Thr Tyr Arg Asn Ile Glu Lys Ile Ala Glu Ala Met
        115                 120                 125
Arg Asn Pro Lys Thr Thr Leu Asn Thr Asp Glu Asn Lys Lys Lys Val
    130                 135                 140
Lys Asp Ala Leu Glu Trp Leu His Lys Asn Ala Tyr Gly Lys Glu Pro
145                 150                 155                 160
Asp Lys Lys Val Lys Glu Leu Ser Glu Asn Phe Thr Lys Thr Thr Gly
                165                 170                 175
Lys Asn Thr Asn Leu Asn Trp Trp Asp Tyr Glu Ile Gly Thr Pro Lys
            180                 185                 190
Ser Leu Thr Asn Thr Leu Ile Leu Leu Asn Asp Gln Phe Ser Asn Glu
        195                 200                 205
Glu Lys Lys Lys Phe Thr Ala Pro Ile Lys Thr Phe Ala Pro Asp Ser
    210                 215                 220
Asp Lys Ile Leu Ser Ser Val Gly Lys Ala Glu Leu Ala Lys Gly Gly
225                 230                 235                 240
Asn Leu Val Asp Ile Ser Lys Val Lys Leu Leu Glu Cys Ile Ile Glu
                245                 250                 255
Glu Asp Lys Asp Met Met Lys Lys Ser Ile Asp Ser Phe Asn Lys Val
            260                 265                 270
Phe Thr Tyr Val Gln Asp Ser Ala Thr Gly Lys Glu Arg Asn Gly Phe
        275                 280                 285
Tyr Lys Asp Gly Ser Tyr Ile Asp His Gln Asp Val Pro Tyr Thr Gly
    290                 295                 300
Ala Tyr Gly Val Val Leu Leu Glu Gly Ile Ser Gln Met Met Pro Met
305                 310                 315                 320
Ile Lys Glu Thr Pro Phe Asn Asp Lys Thr Gln Asn Asp Thr Thr Leu
                325                 330                 335
Lys Ser Trp Ile Asp Asp Gly Phe Met Pro Leu Ile Tyr Lys Gly Glu
            340                 345                 350
Met Met Asp Leu Ser Arg Gly Arg Ala Ile Ser Arg Glu Asn Glu Thr
        355                 360                 365
Ser His Ser Ala Ser Ala Thr Val Met Lys Ser Leu Leu Arg Leu Ser
    370                 375                 380
Asp Ala Met Asp Asp Ser Thr Lys Ala Lys Tyr Lys Lys Ile Val Lys
385                 390                 395                 400
Ser Ser Val Glu Ser Asp Ser Ser Tyr Lys Gln Asn Asp Tyr Leu Asn
                405                 410                 415
Ser Tyr Ser Asp Ile Asp Lys Met Lys Ser Leu Met Thr Asp Asn Ser
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            420                 425                 430
Ile Ser Lys Asn Gly Leu Thr Gln Gln Leu Lys Ile Tyr Asn Asp Met
        435                 440                 445
Asp Arg Val Thr Tyr His Asn Lys Asp Leu Asp Phe Ala Phe Gly Leu
    450                 455                 460
Ser Met Thr Ser Lys Asn Val Ala Arg Tyr Glu Ser Ile Asn Gly Glu
465                 470                 475                 480
Asn Leu Lys Gly Trp His Thr Gly Ala Gly Met Ser Tyr Leu Tyr Asn
                485                 490                 495
Ser Asp Val Lys His Tyr His Asp Asn Phe Trp Val Thr Ala Asp Met
            500                 505                 510
Lys Arg Leu Ser Gly Thr Thr Thr Leu Asp Asn Glu Ile Leu Lys Asp
        515                 520                 525
Thr Asp Asp Lys Lys Ser Ser Lys Thr Phe Val Gly Gly Thr Lys Val
    530                 535                 540
Asp Asp Gln His Ala Ser Ile Gly Met Asp Phe Glu Asn Gln Asp Lys
545                 550                 555                 560
Thr Leu Thr Ala Lys Lys Ser Tyr Phe Ile Leu Asn Asp Lys Ile Val
                565                 570                 575
Phe Leu Gly Thr Gly Ile Lys Ser Thr Asp Ser Ser Lys Asn Pro Val
            580                 585                 590
Thr Thr Ile Glu Asn Arg Lys Ala Asn Gly Tyr Thr Leu Tyr Thr Asp
        595                 600                 605
Asp Lys Gln Thr Thr Asn Ser Asp Asn Gln Glu Asn Asn Ser Val Phe
    610                 615                 620
Leu Glu Ser Thr Asp Thr Lys Lys Asn Ile Gly Tyr His Phe Leu Asn
625                 630                 635                 640
Lys Pro Lys Ile Thr Val Lys Lys Glu Ser His Thr Gly Lys Trp Lys
                645                 650                 655
Glu Ile Asn Lys Ser Gln Lys Asp Thr Gln Lys Thr Asp Glu Tyr Tyr
            660                 665                 670
Glu Val Thr Gln Lys His Ser Asn Ser Asp Asn Lys Tyr Gly Tyr Val
        675                 680                 685
Leu Tyr Pro Gly Leu Ser Lys Asp Val Phe Lys Thr Lys Lys Asp Glu
    690                 695                 700
Val Thr Val Val Lys Gln Glu Asp Asp Phe His Val Val Lys Asp Asn
705                 710                 715                 720
Glu Ser Val Trp Ala Gly Val Asn Tyr Ser Asn Ser Thr Gln Thr Phe
                725                 730                 735
Asp Ile Asn Asn Thr Lys Val Glu Val Lys Ala Lys Gly Met Phe Ile
            740                 745                 750
Leu Lys Lys Lys Asp Asp Asn Thr Tyr Glu Cys Ser Phe Tyr Asn Pro
        755                 760                 765
Glu Ser Thr Asn Ser Ala Ser Asp Ile Glu Ser Lys Ile Ser Met Thr
    770                 775                 780
Gly Tyr Ser Ile Thr Asn Lys Asn Thr Ser Thr Ser Asn Glu Ser Gly
785                 790                 795                 800
Val His Phe Glu Leu Thr Lys
                805
```

<210> 82
<211> 1066
<212> PRT
<213> Streptococcus pneumoniae

<220>
<223> Streptococcus pneumoniae hyaluronidase

<400> 82
Met Gln Thr Lys Thr Lys Lys Leu Ile Val Ser Leu Ser Ser Leu Val
 1   5   10   15
Leu Ser Gly Phe Leu Leu Asn His Tyr Met Thr Ile Gly Ala Glu Glu
            20   25   30
Thr Thr Thr Asn Thr Ile Gln Gln Ser Gln Lys Glu Val Gln Tyr Gln
        35   40   45
Gln Arg Asp Thr Lys Asn Leu Val Glu Asn Gly Asp Phe Gly Gln Thr
    50   55   60
Glu Asp Gly Ser Ser Pro Trp Thr Gly Ser Lys Ala Gln Gly Trp Ser
65   70   75   80
Ala Trp Val Asp Gln Lys Asn Ser Ala Asp Ala Ser Thr Arg Val Ile
                85   90   95
Glu Ala Lys Asp Gly Ala Ile Thr Ile Ser Ser His Glu Lys Leu Arg
            100   105   110
Ala Ala Leu His Arg Met Val Pro Ile Glu Ala Lys Lys Lys Tyr Lys
        115   120   125
Leu Arg Phe Lys Ile Lys Thr Asp Asn Lys Ile Gly Ile Ala Lys Val
    130   135   140
Arg Ile Ile Glu Glu Ser Gly Lys Asp Lys Arg Leu Trp Asn Ser Ala
145   150   155   160
Thr Thr Ser Gly Thr Lys Asp Trp Gln Thr Ile Glu Ala Asp Tyr Ser
                165   170   175
Pro Thr Leu Asp Val Asp Lys Ile Lys Leu Glu Leu Phe Tyr Glu Thr
            180   185   190
Gly Thr Gly Thr Val Ser Phe Lys Asp Ile Glu Leu Val Glu Val Ala
        195   200   205
Asp Gln Leu Ser Glu Asp Ser Gln Thr Asp Lys Gln Leu Glu Glu Lys
    210   215   220
Ile Asp Leu Pro Ile Gly Lys Lys His Val Phe Ser Leu Ala Asp Tyr
225   230   235   240
Thr Tyr Lys Val Glu Asn Pro Asp Val Ala Ser Val Lys Asn Gly Ile
                245   250   255
Leu Glu Pro Leu Lys Glu Gly Thr Thr Asn Val Ile Val Ser Lys Asp
            260   265   270
Gly Lys Glu Val Lys Lys Ile Pro Leu Lys Ile Leu Ala Ser Val Lys
        275   280   285
Asp Ala Tyr Thr Asp Arg Leu Asp Asp Trp Asn Gly Ile Ile Ala Gly
    290   295   300
Asn Gln Tyr Tyr Asp Ser Lys Asn Glu Gln Met Ala Lys Leu Asn Gln
305   310   315   320
Glu Leu Glu Gly Lys Val Ala Asp Ser Leu Ser Ser Ile Ser Ser Gln
                325   330   335
Ala Asp Arg Thr Tyr Leu Trp Glu Lys Phe Ser Asn Tyr Lys Thr Ser
            340   345   350
Ala Asn Leu Thr Ala Thr Tyr Arg Lys Leu Glu Glu Met Ala Lys Gln
        355   360   365
Val Thr Asn Pro Ser Ser Arg Tyr Tyr Gln Asp Glu Thr Val Val Arg
    370   375   380
Thr Val Arg Asp Ser Met Glu Trp Met His Lys His Val Tyr Asn Ser
385   390   395   400
Glu Lys Ser Ile Val Gly Asn Trp Trp Asp Tyr Glu Ile Gly Thr Pro
                405   410   415
Arg Ala Ile Asn Asn Thr Leu Ser Leu Met Lys Glu Tyr Phe Ser Asp
            420   425   430
Glu Glu Ile Lys Lys Tyr Thr Asp Val Ile Glu Lys Phe Val Pro Asp

```
        435                 440                 445
Pro Glu His Phe Arg Lys Thr Thr Asp Asn Pro Phe Lys Ala Leu Gly
    450                 455                 460
Gly Asn Leu Val Asp Met Gly Arg Val Lys Val Ile Ala Gly Leu Leu
465                 470                 475                 480
Arg Lys Asp Asp Gln Glu Ile Ser Ser Thr Ile Arg Ser Ile Glu Gln
                485                 490                 495
Val Phe Lys Leu Val Asp Gln Gly Glu Gly Phe Tyr Gln Asp Gly Ser
            500                 505                 510
Tyr Ile Asp His Thr Asn Val Ala Tyr Thr Gly Ala Tyr Gly Asn Val
        515                 520                 525
Leu Ile Asp Gly Leu Ser Gln Leu Leu Pro Val Ile Gln Lys Thr Lys
    530                 535                 540
Asn Pro Ile Asp Lys Asp Lys Met Gln Thr Met Tyr His Trp Ile Asp
545                 550                 555                 560
Lys Ser Phe Ala Pro Leu Leu Val Asn Gly Glu Leu Met Asp Met Ser
                565                 570                 575
Arg Gly Arg Ser Ile Ser Arg Ala Asn Ser Glu Gly His Val Ala Ala
            580                 585                 590
Val Glu Val Leu Arg Gly Ile His Arg Ile Ala Asp Met Ser Glu Gly
        595                 600                 605
Glu Thr Lys Gln Cys Leu Gln Ser Leu Val Lys Thr Ile Val Gln Ser
    610                 615                 620
Asp Ser Tyr Tyr Asp Val Phe Lys Asn Leu Lys Thr Tyr Lys Asp Ile
625                 630                 635                 640
Ser Leu Met Gln Ser Leu Leu Ser Asp Ala Gly Val Ala Ser Val Pro
                645                 650                 655
Arg Pro Ser Tyr Leu Ser Ala Phe Asn Lys Met Asp Lys Thr Ala Met
            660                 665                 670
Tyr Asn Ala Glu Lys Gly Phe Gly Phe Gly Leu Ser Leu Phe Ser Ser
        675                 680                 685
Arg Thr Leu Asn Tyr Glu His Met Asn Lys Glu Asn Lys Arg Gly Trp
    690                 695                 700
Tyr Thr Ser Asp Gly Met Phe Tyr Leu Tyr Asn Gly Asp Leu Ser His
705                 710                 715                 720
Tyr Ser Asp Gly Tyr Trp Pro Thr Val Asn Pro Tyr Lys Met Pro Gly
                725                 730                 735
Thr Thr Glu Thr Asp Ala Lys Arg Ala Asp Ser Asp Thr Gly Lys Val
            740                 745                 750
Leu Pro Ser Ala Phe Val Gly Thr Ser Lys Leu Asp Asp Ala Asn Ala
        755                 760                 765
Thr Ala Thr Met Asp Phe Thr Asn Trp Asn Gln Thr Leu Thr Ala His
    770                 775                 780
Lys Ser Trp Phe Met Leu Lys Asp Lys Ile Ala Phe Leu Gly Ser Asn
785                 790                 795                 800
Ile Gln Asn Thr Ser Thr Asp Thr Ala Ala Thr Thr Ile Asp Gln Arg
                805                 810                 815
Lys Leu Glu Ser Gly Asn Pro Tyr Lys Val Tyr Val Asn Asp Lys Glu
            820                 825                 830
Ala Ser Leu Thr Glu Gln Glu Lys Asp Tyr Pro Glu Thr Gln Ser Val
        835                 840                 845
Phe Leu Glu Ser Phe Asp Ser Lys Lys Asn Ile Gly Tyr Phe Phe Phe
    850                 855                 860
Lys Lys Ser Ser Ile Ser Met Ser Lys Ala Leu Gln Lys Gly Ala Trp
865                 870                 875                 880
Lys Asp Ile Asn Glu Gly Gln Ser Asp Lys Glu Val Glu Asn Glu Phe
                885                 890                 895
Leu Thr Ile Ser Gln Ala His Lys Gln Asn Arg Asp Ser Tyr Gly Tyr
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            900                 905                 910
Met Leu Ile Pro Asn Val Asp Arg Ala Thr Phe Asn Gln Met Ile Lys
        915                 920                 925
Glu Leu Glu Ser Ser Leu Ile Glu Asn Asn Glu Thr Leu Gln Ser Val
    930                 935                 940
Tyr Asp Ala Lys Gln Gly Val Trp Gly Ile Val Lys Tyr Asp Asp Ser
945                 950                 955                 960
Val Ser Thr Ile Ser Asn Gln Phe Gln Val Leu Lys Arg Gly Val Tyr
                965                 970                 975
Thr Ile Arg Lys Glu Gly Asp Glu Tyr Lys Ile Ala Tyr Tyr Asn Pro
            980                 985                 990
Glu Thr Gln Glu Ser Ala Pro Asp Gln Glu Val Phe Lys Lys Leu Glu
        995                 1000                1005
Gln Ala Ala Gln Pro Gln Val Gln Asn Ser Lys Glu Lys Glu Lys Ser
    1010                1015                1020
Glu Glu Glu Lys Asn His Ser Asp Gln Lys Asn Leu Pro Gln Thr Gly
1025                1030                1035                1040
Glu Gly Gln Ser Ile Leu Ala Ser Leu Gly Phe Leu Leu Leu Gly Ala
                1045                1050                1055
Phe Tyr Leu Phe Arg Arg Gly Lys Asn Asn
            1060                1065


<210> 83
<211> 1078
<212> PRT
<213> Streptococcus pneumoniae

<220>
<223> Streptococcus pneumoniae strain ATCC BAA-255 / R6
      hyaluronate lyase


<400> 83
Met Ile Leu Gln Tyr Val Tyr Trp Ser Val Tyr Met Gln Thr Lys Thr
 1               5                  10                  15
Lys Lys Leu Ile Val Ser Leu Ser Ser Leu Val Leu Ser Gly Phe Leu
            20                  25                  30
Leu Asn His Tyr Met Thr Val Gly Ala Glu Glu Thr Thr Thr Asn Thr
        35                  40                  45
Ile Gln Gln Ser Gln Lys Glu Val Gln Tyr Gln Gln Arg Asp Thr Lys
    50                  55                  60
Asn Leu Val Glu Asn Gly Asp Phe Gly Gln Thr Glu Asp Gly Ser Ser
65                  70                  75                  80
Pro Trp Thr Gly Ser Lys Ala Gln Gly Trp Ser Ala Trp Val Asp Gln
                85                  90                  95
Lys Asn Ser Ser Ala Asp Ala Ser Thr Arg Val Ile Glu Ala Lys Asp
            100                 105                 110
Gly Ala Ile Thr Ile Ser Ser Pro Glu Lys Leu Arg Ala Ala Val His
        115                 120                 125
Arg Met Val Pro Ile Glu Ala Lys Lys Lys Tyr Lys Leu Arg Phe Lys
    130                 135                 140
Ile Lys Thr Asp Asn Lys Val Gly Ile Ala Lys Val Arg Ile Ile Glu
145                 150                 155                 160
Glu Ser Gly Lys Asp Lys Arg Leu Trp Asn Ser Ala Thr Thr Ser Gly
                165                 170                 175
Thr Lys Asp Trp Gln Thr Ile Glu Ala Asp Tyr Ser Pro Thr Leu Asp
            180                 185                 190
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Val Asp Lys Ile Lys Leu Glu Leu Phe Tyr Glu Thr Gly Thr Gly Thr
        195                 200                 205
Val Ser Phe Lys Asp Ile Glu Leu Val Glu Val Ala Asp Gln Pro Ser
    210                 215                 220
Glu Asp Ser Gln Thr Asp Lys Gln Leu Glu Glu Lys Ile Asp Leu Pro
225                 230                 235                 240
Ile Gly Lys Lys His Val Phe Ser Leu Ala Asp Tyr Thr Tyr Lys Val
                245                 250                 255
Glu Asn Pro Asp Val Ala Ser Val Lys Asn Gly Ile Leu Glu Pro Leu
            260                 265                 270
Lys Glu Gly Thr Thr Asn Val Ile Val Ser Lys Asp Gly Lys Glu Val
        275                 280                 285
Lys Lys Ile Pro Leu Lys Ile Leu Ala Ser Val Lys Asp Thr Tyr Thr
    290                 295                 300
Asp Arg Leu Asp Asp Trp Asn Gly Ile Ile Ala Gly Asn Gln Tyr Tyr
305                 310                 315                 320
Asp Ser Lys Asn Glu Gln Met Ala Lys Leu Asn Gln Glu Leu Glu Gly
                325                 330                 335
Lys Val Ala Asp Ser Leu Ser Ser Ile Ser Ser Gln Ala Asp Arg Ile
            340                 345                 350
Tyr Leu Trp Glu Lys Phe Ser Asn Tyr Lys Thr Ser Ala Asn Leu Thr
        355                 360                 365
Ala Thr Tyr Arg Lys Leu Glu Glu Met Ala Lys Gln Val Thr Asn Pro
    370                 375                 380
Ser Ser Arg Tyr Tyr Gln Asp Glu Thr Val Val Arg Thr Val Arg Asp
385                 390                 395                 400
Ser Met Glu Trp Met His Lys His Val Tyr Asn Ser Glu Lys Ser Ile
                405                 410                 415
Val Gly Asn Trp Trp Asp Tyr Glu Ile Gly Thr Pro Arg Ala Ile Asn
            420                 425                 430
Asn Thr Leu Ser Leu Met Lys Glu Tyr Phe Ser Asp Glu Glu Ile Lys
        435                 440                 445
Lys Tyr Thr Asp Val Ile Glu Lys Phe Val Pro Asp Pro Glu His Phe
    450                 455                 460
Arg Lys Thr Thr Asp Asn Pro Phe Lys Ala Leu Gly Gly Asn Leu Val
465                 470                 475                 480
Asp Met Gly Arg Val Lys Val Ile Ala Gly Leu Leu Arg Lys Asp Asp
                485                 490                 495
Gln Glu Ile Ser Ser Thr Ile Arg Ser Ile Glu Gln Val Phe Lys Leu
            500                 505                 510
Val Asp Gln Gly Glu Gly Phe Tyr Gln Asp Gly Ser Tyr Ile Asp His
        515                 520                 525
Thr Asn Val Ala Tyr Thr Gly Ala Tyr Gly Asn Val Leu Ile Asp Gly
    530                 535                 540
Leu Ser Gln Leu Leu Pro Val Ile Gln Lys Thr Lys Asn Pro Ile Asp
545                 550                 555                 560
Lys Asp Lys Met Gln Thr Met Tyr His Trp Ile Asp Lys Ser Phe Ala
                565                 570                 575
Pro Leu Leu Val Asn Gly Glu Leu Met Asp Met Ser Arg Gly Arg Ser
            580                 585                 590
Ile Ser Arg Ala Asn Ser Glu Gly His Val Ala Ala Val Glu Val Leu
        595                 600                 605
Arg Gly Ile His Arg Ile Ala Asp Met Ser Glu Gly Glu Thr Lys Gln
    610                 615                 620
Arg Leu Gln Ser Leu Val Lys Thr Ile Val Gln Ser Asp Ser Tyr Tyr
625                 630                 635                 640
Asp Val Phe Lys Asn Leu Lys Thr Tyr Lys Asp Ile Ser Leu Met Gln
                645                 650                 655
```

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Ser Leu Leu Ser Asp Ala Gly Val Ala Ser Val Pro Arg Thr Ser Tyr
            660                 665                 670
Leu Ser Ala Phe Asn Lys Met Asp Lys Thr Ala Met Tyr Asn Ala Glu
        675                 680                 685
Lys Gly Phe Gly Phe Gly Leu Ser Leu Phe Ser Ser Arg Thr Leu Asn
    690                 695                 700
Tyr Glu His Met Asn Lys Glu Asn Lys Arg Gly Trp Tyr Thr Ser Asp
705                 710                 715                 720
Gly Met Phe Tyr Leu Tyr Asn Gly Asp Leu Ser His Tyr Ser Asp Gly
                725                 730                 735
Tyr Trp Pro Thr Val Asn Pro Tyr Lys Met Pro Gly Thr Thr Glu Thr
            740                 745                 750
Asp Ala Lys Arg Ala Asp Ser Asp Thr Gly Lys Val Leu Pro Ser Ala
        755                 760                 765
Phe Val Gly Thr Ser Lys Leu Asp Asp Ala Asn Ala Thr Ala Thr Met
    770                 775                 780
Asp Phe Thr Asn Trp Asn Gln Thr Leu Thr Ala His Lys Ser Trp Phe
785                 790                 795                 800
Met Leu Lys Asp Lys Ile Ala Phe Leu Gly Ser Asn Ile Gln Asn Thr
                805                 810                 815
Ser Thr Asp Thr Ala Ala Thr Thr Ile Asp Gln Arg Lys Leu Glu Ser
            820                 825                 830
Ser Asn Pro Tyr Lys Val Tyr Val Asn Asp Lys Glu Ala Ser Leu Thr
        835                 840                 845
Glu Gln Glu Lys Asp Tyr Pro Glu Thr Gln Ser Val Phe Leu Glu Ser
    850                 855                 860
Ser Asp Ser Lys Lys Asn Ile Gly Tyr Phe Phe Phe Lys Lys Ser Ser
865                 870                 875                 880
Ile Ser Met Ser Lys Ala Leu Gln Lys Gly Ala Trp Lys Asp Ile Asn
                885                 890                 895
Glu Gly Gln Ser Asp Lys Glu Val Glu Asn Glu Phe Leu Thr Ile Ser
            900                 905                 910
Gln Ala His Lys Gln Asn Gly Asp Ser Tyr Gly Tyr Met Leu Ile Pro
        915                 920                 925
Asn Val Asp Arg Ala Thr Phe Asn Gln Met Ile Lys Glu Leu Glu Ser
    930                 935                 940
Ser Leu Ile Glu Asn Asn Glu Thr Leu Gln Ser Val Tyr Asp Ala Lys
945                 950                 955                 960
Gln Gly Val Trp Gly Ile Val Lys Tyr Asp Asp Ser Val Ser Thr Ile
                965                 970                 975
Ser Asn Gln Phe Gln Val Leu Lys Arg Gly Val Tyr Thr Ile Arg Lys
            980                 985                 990
Glu Gly Asp Glu Tyr Lys Ile Ala Tyr Tyr Asn Pro Glu Thr Gln Glu
        995                 1000                1005
Ser Ala Pro Asp Gln Glu Val Phe Lys Lys Leu Glu Gln Ala Ala Gln
    1010                1015                1020
Pro Gln Val Gln Asn Ser Lys Glu Lys Glu Lys Ser Glu Glu Glu Lys
1025                1030                1035                1040
Asn His Ser Asp Gln Lys Asn Leu Pro Gln Thr Gly Glu Gly Gln Ser
                1045                1050                1055
Ile Leu Ala Ser Leu Gly Phe Leu Leu Leu Gly Ala Phe Tyr Leu Phe
            1060                1065                1070
Arg Arg Gly Lys Asn Asn
        1075
```

<210> 84
<211> 1067

<212> PRT
<213> Streptococcus pneumoniae

<220>
<223> Streptococcus pneumoniae serotype 2, strain D39 /
NCTC 7466 hyaluronate lyase

<400> 84
Met Gln Thr Lys Thr Lys Lys Leu Ile Val Ser Leu Ser Ser Leu Val
1 5 10 15
Leu Ser Gly Phe Leu Leu Asn His Tyr Met Thr Val Gly Ala Glu Glu
20 25 30
Thr Thr Thr Asn Thr Ile Gln Gln Ser Gln Lys Glu Val Gln Tyr Gln
35 40 45
Gln Arg Asp Thr Lys Asn Leu Val Glu Asn Gly Asp Phe Gly Gln Thr
50 55 60
Glu Asp Gly Ser Ser Pro Trp Thr Gly Ser Lys Ala Gln Gly Trp Ser
65 70 75 80
Ala Trp Val Asp Gln Lys Asn Ser Ser Ala Asp Ala Ser Thr Arg Val
85 90 95
Ile Glu Ala Lys Asp Gly Ala Ile Thr Ile Ser Ser Pro Glu Lys Leu
100 105 110
Arg Ala Ala Val His Arg Met Val Pro Ile Glu Ala Lys Lys Lys Tyr
115 120 125
Lys Leu Arg Phe Lys Ile Lys Thr Asp Asn Lys Val Gly Ile Ala Lys
130 135 140
Val Arg Ile Ile Glu Glu Ser Gly Lys Asp Lys Arg Leu Trp Asn Ser
145 150 155 160
Ala Thr Thr Ser Gly Thr Lys Asp Trp Gln Thr Ile Glu Ala Asp Tyr
165 170 175
Ser Pro Thr Leu Asp Val Asp Lys Ile Lys Leu Glu Leu Phe Tyr Glu
180 185 190
Thr Gly Thr Gly Thr Val Ser Phe Lys Asp Ile Glu Leu Val Glu Val
195 200 205
Ala Asp Gln Pro Ser Glu Asp Ser Gln Thr Asp Lys Gln Leu Glu Glu
210 215 220
Lys Ile Asp Leu Pro Ile Gly Lys Lys His Val Phe Ser Leu Ala Asp
225 230 235 240
Tyr Thr Tyr Lys Val Glu Asn Pro Asp Val Ala Ser Val Lys Asn Gly
245 250 255
Ile Leu Glu Pro Leu Lys Glu Gly Thr Thr Asn Val Ile Val Ser Lys
260 265 270
Asp Gly Lys Glu Val Lys Lys Ile Pro Leu Lys Ile Leu Ala Ser Val
275 280 285
Lys Asp Thr Tyr Thr Asp Arg Leu Asp Asp Trp Asn Gly Ile Ile Ala
290 295 300
Gly Asn Gln Tyr Tyr Asp Ser Lys Asn Glu Gln Met Ala Lys Leu Asn
305 310 315 320
Gln Glu Leu Glu Gly Lys Val Ala Asp Ser Leu Ser Ser Ile Ser Ser
325 330 335
Gln Ala Asp Arg Ile Tyr Leu Trp Glu Lys Phe Ser Asn Tyr Lys Thr
340 345 350
Ser Ala Asn Leu Thr Ala Thr Tyr Arg Lys Leu Glu Glu Met Ala Lys
355 360 365
Gln Val Thr Asn Pro Ser Ser Arg Tyr Tyr Gln Asp Glu Thr Val Val
370 375 380
Arg Thr Val Arg Asp Ser Met Glu Trp Met His Lys His Val Tyr Asn

385 390 395 400
Ser Glu Lys Ser Ile Val Gly Asn Trp Trp Asp Tyr Glu Ile Gly Thr
405 410 415
Pro Arg Ala Ile Asn Asn Thr Leu Ser Leu Met Lys Glu Tyr Phe Ser
420 425 430
Asp Glu Glu Ile Lys Lys Tyr Thr Asp Val Ile Glu Lys Phe Val Pro
435 440 445
Asp Pro Glu His Phe Arg Lys Thr Thr Asp Asn Pro Phe Lys Ala Leu
450 455 460
Gly Gly Asn Leu Val Asp Met Gly Arg Val Lys Val Ile Ala Gly Leu
465 470 475 480
Leu Arg Lys Asp Asp Gln Glu Ile Ser Ser Thr Ile Arg Ser Ile Glu
485 490 495
Gln Val Phe Lys Leu Val Asp Gln Gly Glu Gly Phe Tyr Gln Asp Gly
500 505 510
Ser Tyr Ile Asp His Thr Asn Val Ala Tyr Thr Gly Ala Tyr Gly Asn
515 520 525
Val Leu Ile Asp Gly Leu Ser Gln Leu Leu Pro Val Ile Gln Lys Thr
530 535 540
Lys Asn Pro Ile Asp Lys Asp Lys Met Gln Thr Met Tyr His Trp Ile
545 550 555 560
Asp Lys Ser Phe Ala Pro Leu Leu Val Asn Gly Glu Leu Met Asp Met
565 570 575
Ser Arg Gly Arg Ser Ile Ser Arg Ala Asn Ser Glu Gly His Val Ala
580 585 590
Ala Val Glu Val Leu Arg Gly Ile His Arg Ile Ala Asp Met Ser Glu
595 600 605
Gly Glu Thr Lys Gln Arg Leu Gln Ser Leu Val Lys Thr Ile Val Gln
610 615 620
Ser Asp Ser Tyr Tyr Asp Val Phe Lys Asn Leu Lys Thr Tyr Lys Asp
625 630 635 640
Ile Ser Leu Met Gln Ser Leu Leu Ser Asp Ala Gly Val Ala Ser Val
645 650 655
Pro Arg Thr Ser Tyr Leu Ser Ala Phe Asn Lys Met Asp Lys Thr Ala
660 665 670
Met Tyr Asn Ala Glu Lys Gly Phe Gly Phe Gly Leu Ser Leu Phe Ser
675 680 685
Ser Arg Thr Leu Asn Tyr Glu His Met Asn Lys Glu Asn Lys Arg Gly
690 695 700
Trp Tyr Thr Ser Asp Gly Met Phe Tyr Leu Tyr Asn Gly Asp Leu Ser
705 710 715 720
His Tyr Ser Asp Gly Tyr Trp Pro Thr Val Asn Pro Tyr Lys Met Pro
725 730 735
Gly Thr Thr Glu Thr Asp Ala Lys Arg Ala Asp Ser Asp Thr Gly Lys
740 745 750
Val Leu Pro Ser Ala Phe Val Gly Thr Ser Lys Leu Asp Asp Ala Asn
755 760 765
Ala Thr Ala Thr Met Asp Phe Thr Asn Trp Asn Gln Thr Leu Thr Ala
770 775 780
His Lys Ser Trp Phe Met Leu Lys Asp Lys Ile Ala Phe Leu Gly Ser
785 790 795 800
Asn Ile Gln Asn Thr Ser Thr Asp Thr Ala Ala Thr Thr Ile Asp Gln
805 810 815
Arg Lys Leu Glu Ser Ser Asn Pro Tyr Lys Val Tyr Val Asn Asp Lys
820 825 830
Glu Ala Ser Leu Thr Glu Gln Glu Lys Asp Tyr Pro Glu Thr Gln Ser
835 840 845
Val Phe Leu Glu Ser Ser Asp Ser Lys Lys Asn Ile Gly Tyr Phe Phe

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    850                 855                 860
Phe Lys Lys Ser Ser Ile Ser Met Ser Lys Ala Leu Gln Lys Gly Ala
865                 870                 875                 880
Trp Lys Asp Ile Asn Glu Gly Gln Ser Asp Lys Glu Val Glu Asn Glu
                885                 890                 895
Phe Leu Thr Ile Ser Gln Ala His Lys Gln Asn Gly Asp Ser Tyr Gly
            900                 905                 910
Tyr Met Leu Ile Pro Asn Val Asp Arg Ala Thr Phe Asn Gln Met Ile
        915                 920                 925
Lys Glu Leu Glu Ser Ser Leu Ile Glu Asn Asn Glu Thr Leu Gln Ser
    930                 935                 940
Val Tyr Asp Ala Lys Gln Gly Val Trp Gly Ile Val Lys Tyr Asp Asp
945                 950                 955                 960
Ser Val Ser Thr Ile Ser Asn Gln Phe Gln Val Leu Lys Arg Gly Val
                965                 970                 975
Tyr Thr Ile Arg Lys Glu Gly Asp Glu Tyr Lys Ile Ala Tyr Tyr Asn
            980                 985                 990
Pro Glu Thr Gln Glu Ser Ala Pro Asp Gln Glu Val Phe Lys Lys Leu
        995                 1000                1005
Glu Gln Ala Ala Gln Pro Gln Val Gln Asn Ser Lys Glu Lys Glu Lys
    1010                1015                1020
Ser Glu Glu Glu Lys Asn His Ser Asp Gln Lys Asn Leu Pro Gln Thr
1025                1030                1035                1040
Gly Glu Gly Gln Ser Ile Leu Ala Ser Leu Gly Phe Leu Leu Leu Gly
                1045                1050                1055
Ala Phe Tyr Leu Phe Arg Arg Gly Lys Asn Asn
            1060                1065


<210> 85
<211> 805
<212> PRT
<213> Streptococcus pyogenes

<220>
<223> Streptococcus pyogenes serotype M1, strain GAS
      extracellular hyaluronate lyase


<400> 85
Met Asn Thr Tyr Phe Cys Thr His His Lys Gln Leu Leu Leu Tyr Ser
 1               5                  10                  15
Asn Leu Phe Leu Ser Phe Ala Met Met Gly Gln Gly Thr Ala Ile Tyr
            20                  25                  30
Ala Asp Thr Leu Thr Ser Asn Ser Glu Pro Asn Asn Thr Tyr Phe Gln
        35                  40                  45
Thr Gln Thr Leu Thr Thr Thr Asp Ser Glu Lys Lys Val Val Gln Pro
    50                  55                  60
Gln Gln Lys Asp Tyr Tyr Thr Glu Leu Leu Asp Gln Trp Asn Ser Ile
65                  70                  75                  80
Ile Ala Gly Asn Asp Ala Tyr Asp Lys Thr Asn Pro Asp Met Val Thr
                85                  90                  95
Phe His Asn Lys Ala Glu Lys Asp Ala Gln Asn Ile Ile Lys Ser Tyr
            100                 105                 110
Gln Gly Pro Asp His Glu Asn Arg Thr Tyr Leu Trp Glu His Ala Lys
        115                 120                 125
Asp Tyr Ser Ala Ser Ala Asn Ile Thr Lys Thr Tyr Arg Asn Ile Glu
    130                 135                 140
```

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Lys Ile Ala Lys Gln Ile Thr Asn Pro Glu Ser Cys Tyr Tyr Gln Asp
145                 150                 155                 160
Ser Lys Ala Ile Ala Ile Val Lys Asp Gly Met Ala Phe Met Tyr Glu
                165                 170                 175
His Ala Tyr Asn Leu Asp Arg Glu Asn His Gln Thr Thr Gly Lys Glu
            180                 185                 190
Asn Lys Glu Asn Trp Trp Val Tyr Glu Ile Gly Thr Pro Arg Ala Ile
        195                 200                 205
Asn Asn Thr Leu Ser Leu Met Tyr Pro Tyr Phe Thr Gln Glu Glu Ile
    210                 215                 220
Leu Lys Tyr Thr Ala Pro Ile Glu Lys Phe Val Pro Asp Pro Thr Arg
225                 230                 235                 240
Phe Arg Val Arg Ala Ala Asn Phe Ser Pro Phe Glu Ala Asn Ser Gly
                245                 250                 255
Asn Leu Ile Asp Met Gly Arg Val Lys Leu Ile Ser Gly Ile Leu Arg
            260                 265                 270
Lys Asp Asp Leu Glu Ile Ser Asp Thr Ile Lys Ala Ile Glu Lys Val
        275                 280                 285
Phe Thr Leu Val Asp Glu Gly Asn Gly Phe Tyr Gln Asp Gly Ser Leu
    290                 295                 300
Ile Asp His Val Val Thr Asn Ala Gln Ser Pro Leu Tyr Lys Lys Gly
305                 310                 315                 320
Ile Ala Tyr Thr Gly Ala Tyr Gly Asn Val Leu Ile Asp Gly Leu Ser
                325                 330                 335
Gln Leu Ile Pro Ile Ile Gln Lys Thr Lys Ser Pro Ile Lys Ala Asp
            340                 345                 350
Lys Met Ala Thr Ile Tyr His Trp Ile Asn His Ser Phe Phe Pro Ile
        355                 360                 365
Ile Val Arg Gly Glu Met Met Asp Met Thr Arg Gly Arg Ser Ile Ser
    370                 375                 380
Arg Phe Asn Ala Gln Ser His Val Ala Gly Ile Glu Ala Leu Arg Ala
385                 390                 395                 400
Ile Leu Arg Ile Ala Asp Met Ser Glu Glu Pro His Arg Leu Ala Leu
                405                 410                 415
Lys Thr Arg Ile Lys Thr Leu Val Thr Gln Gly Asn Ala Phe Tyr Asn
            420                 425                 430
Val Tyr Asp Asn Leu Lys Thr Tyr His Asp Ile Lys Leu Met Lys Glu
        435                 440                 445
Leu Leu Ser Asp Thr Ser Val Pro Val Gln Lys Leu Asp Ser Tyr Val
    450                 455                 460
Ala Ser Phe Asn Ser Met Asp Lys Leu Ala Leu Tyr Asn Asn Lys His
465                 470                 475                 480
Asp Phe Ala Phe Gly Leu Ser Met Phe Ser Asn Arg Thr Gln Asn Tyr
                485                 490                 495
Glu Ala Met Asn Asn Glu Asn Leu His Gly Trp Phe Thr Ser Asp Gly
            500                 505                 510
Met Phe Tyr Leu Tyr Asn Asn Asp Leu Gly His Tyr Ser Glu Asn Tyr
        515                 520                 525
Trp Ala Thr Val Asn Pro Tyr Arg Leu Pro Gly Thr Thr Glu Thr Glu
    530                 535                 540
Gln Lys Pro Leu Glu Gly Thr Pro Glu Asn Ile Lys Thr Asn Tyr Gln
545                 550                 555                 560
Gln Val Gly Met Thr Gly Leu Ser Asp Asp Ala Phe Val Ala Ser Lys
                565                 570                 575
Lys Leu Asn Asn Thr Ser Ala Leu Ala Ala Met Thr Phe Thr Asn Trp
            580                 585                 590
Asn Lys Ser Leu Thr Leu Asn Lys Gly Trp Phe Ile Leu Gly Asn Lys
        595                 600                 605
```

```
Ile Ile Phe Val Gly Ser Asn Ile Lys Asn Gln Ser Ser His Lys Ala
    610                 615                 620
Tyr Thr Thr Ile Glu Gln Arg Lys Glu Asn Gln Lys Tyr Pro Tyr Cys
625                 630                 635                 640
Ser Tyr Val Asn Asn Gln Pro Val Asp Leu Asn Asn Gln Leu Val Asp
                645                 650                 655
Phe Thr Asn Thr Lys Ser Ile Phe Leu Glu Ser Asp Asp Pro Ala Gln
            660                 665                 670
Asn Ile Gly Tyr Tyr Phe Phe Lys Pro Thr Thr Leu Ser Ile Ser Lys
        675                 680                 685
Ala Leu Gln Thr Gly Lys Trp Gln Asn Ile Lys Ala Asp Asp Lys Ser
    690                 695                 700
Pro Glu Ala Ile Lys Glu Val Ser Asn Thr Phe Ile Thr Ile Met Gln
705                 710                 715                 720
Asn His Thr Gln Asp Gly Asp Arg Tyr Ala Tyr Met Met Leu Pro Asn
                725                 730                 735
Met Thr Arg Gln Glu Phe Glu Thr Tyr Ile Ser Lys Leu Asp Ile Asp
            740                 745                 750
Leu Leu Glu Asn Asn Asp Lys Leu Ala Ala Val Tyr Asp His Asp Ser
        755                 760                 765
Gln Gln Met His Val Ile His Tyr Gly Lys Lys Ala Thr Met Phe Ser
    770                 775                 780
Asn His Asn Leu Ser His Gln Gly Phe Tyr Ser Phe Pro His Pro Val
785                 790                 795                 800
Arg Gln Asn Gln Gln
                805
```

<210> 86
<211> 780
<212> PRT
<213> Streptococcus pyogenes

<220>
<223> Streptococcus pyogenes serotype M2, strain MGAS10270 hyaluronate lyase precursor

<400> 86

```
Met Val Tyr Phe Tyr Leu Val Asn Gln Ser Thr Phe Ile Ile Ser Phe
 1               5                  10                  15
Leu Tyr Trp Arg Asn Val Ser Val Asn Thr Tyr Phe Cys Thr His His
            20                  25                  30
Lys Gln Leu Leu Leu Tyr Ser Asn Leu Phe Leu Ser Phe Ala Met Ile
        35                  40                  45
Gly Gln Gly Thr Ala Ile Tyr Ala Asp Thr Leu Thr Ser Asn Ser Glu
    50                  55                  60
Pro Asn Asn Thr Tyr Phe Gln Thr Gln Thr Leu Thr Thr Thr Asp Ser
65                  70                  75                  80
Glu Lys Lys Val Val Gln Pro Gln Gln Lys Asp Tyr Tyr Thr Glu Leu
                85                  90                  95
Leu Asp Gln Trp Asn Ser Ile Ile Ala Gly Asn Asp Ala Tyr Asp Lys
            100                 105                 110
Thr Asn Pro Asp Met Val Thr Phe His Asn Lys Ala Glu Lys Asp Ala
        115                 120                 125
Gln Asn Ile Ile Lys Ser Tyr Gln Gly Pro Asp His Glu Asn Arg Thr
    130                 135                 140
Tyr Leu Trp Glu His Ala Lys Asp Tyr Ser Ala Ser Thr Asn Ile Thr
```

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145                 150                 155                 160
Lys Thr Tyr Arg Asn Ile Glu Lys Ile Ala Lys Gln Ile Thr Asn Pro
                165                 170                 175
Glu Ser Cys Tyr Tyr Gln Asp Ser Lys Ala Ile Ala Ile Val Lys Asp
            180                 185                 190
Gly Met Ala Phe Met Tyr Glu His Ala Tyr Asn Leu Asn Arg Glu Asn
        195                 200                 205
His Gln Thr Thr Gly Lys Glu Asn Lys Glu Asn Trp Trp Val Tyr Glu
    210                 215                 220
Ile Gly Thr Pro Arg Ala Ile Asn Asn Thr Leu Ser Leu Met Tyr Pro
225                 230                 235                 240
Tyr Phe Thr Gln Glu Glu Ile Leu Lys Tyr Thr Ala Pro Ile Glu Lys
                245                 250                 255
Phe Val Pro Asp Pro Thr Arg Phe Arg Val Arg Ala Ala Asn Phe Ser
            260                 265                 270
Pro Phe Glu Ala Asn Ser Gly Asn Leu Ile Asp Met Gly Arg Val Lys
        275                 280                 285
Leu Ile Ser Gly Ile Leu Arg Lys Asp Asp Leu Glu Ile Ser Asp Thr
    290                 295                 300
Ile Lys Ala Ile Glu Lys Val Phe Thr Leu Val Asp Glu Gly Asn Gly
305                 310                 315                 320
Phe Tyr Gln Asp Gly Ser Leu Ile Asp His Val Val Thr Asn Thr Gln
                325                 330                 335
Ser Pro Leu Tyr Lys Lys Gly Ile Ala Tyr Thr Gly Ala Tyr Gly Asn
            340                 345                 350
Val Leu Ile Asp Gly Leu Ser Gln Leu Ile Pro Ile Ile Gln Lys Thr
        355                 360                 365
Lys Ser Pro Ile Glu Ala Asp Lys Met Ala Thr Ile Tyr His Trp Ile
    370                 375                 380
Asn His Ser Phe Phe Pro Ile Ile Val Arg Gly Glu Met Met Asp Met
385                 390                 395                 400
Thr Arg Gly Arg Ser Ile Ser Arg Phe Asn Ala Gln Ser His Val Ala
                405                 410                 415
Gly Ile Glu Ala Leu Arg Ala Ile Leu Arg Ile Ala Asp Met Ser Glu
            420                 425                 430
Glu Pro His Arg Leu Glu Leu Lys Thr Arg Ile Lys Thr Leu Val Thr
        435                 440                 445
Gln Gly Asn Ala Phe Tyr Asn Val Tyr Asp Asn Leu Lys Thr Tyr His
    450                 455                 460
Asp Ile Lys Leu Met Lys Glu Leu Leu Ser Asp Thr Ser Val Pro Val
465                 470                 475                 480
Gln Lys Leu Asp Ser Tyr Val Ala Ser Phe Asn Ser Met Asp Lys Leu
                485                 490                 495
Ala Leu Tyr Asn Asn Lys His Asp Phe Ala Phe Gly Leu Ser Met Phe
            500                 505                 510
Ser Asn Arg Thr Gln Asn Tyr Glu Ala Met Asn Asn Glu Asn Leu His
        515                 520                 525
Gly Trp Phe Thr Ser Asp Gly Met Phe Tyr Leu Tyr Asn Asn Asp Leu
    530                 535                 540
Gly His Tyr Ser Glu Asn Tyr Trp Ala Thr Val Asn Pro Tyr Arg Leu
545                 550                 555                 560
Pro Gly Thr Thr Glu Thr Glu Gln Lys Pro Leu Glu Gly Thr Pro Glu
                565                 570                 575
Asn Ile Lys Thr Asn Tyr Gln Gln Val Gly Met Thr Ser Leu Ser Asp
            580                 585                 590
Asp Ala Phe Val Ala Ser Lys Lys Leu Asn Asn Thr Ser Ala Leu Ala
        595                 600                 605
Ala Met Thr Phe Thr Asn Trp Asn Lys Ser Leu Thr Leu Asn Lys Gly
```

```
    610                 615                 620
Trp Phe Ile Leu Gly Asn Lys Ile Ile Phe Val Gly Ser Asn Ile Lys
625                 630                 635                 640
Asn Gln Ser Ser His Lys Ala Tyr Thr Thr Ile Glu Gln Arg Lys Glu
                645                 650                 655
Asn Gln Lys His Pro Tyr Cys Ser Tyr Val Asn Asn Gln Pro Val Asp
            660                 665                 670
Leu Asn Asn Gln Leu Val Asp Phe Thr Asn Thr Lys Ser Ile Phe Leu
        675                 680                 685
Glu Ser Asp Asp Pro Ala Gln Asn Ile Gly Tyr Tyr Phe Phe Lys Pro
    690                 695                 700
Arg Thr Leu Ser Ile Ser Lys Ala Leu Gln Thr Gly Lys Trp Gln Asn
705                 710                 715                 720
Ile Lys Ala Asp Asp Lys Ser Pro Glu Ala Ile Lys Glu Val Ser Asn
                725                 730                 735
Thr Phe Ile Thr Ile Met Gln Asn His Thr Gln Glu Gly Asp Arg Tyr
            740                 745                 750
Ala Tyr Met Met Leu Pro Asn Met Thr Arg Gln Glu Phe Glu Thr Tyr
        755                 760                 765
Ile Ser Lys Leu Asp Ile Asp Leu Leu Glu Asn Asn
    770                 775                 780


<210> 87
<211> 868
<212> PRT
<213> Streptococcus pyogenes

<220>
<223> Streptococcus pyogenes serotype M4, strain
      MGAS10750 hyaluronate lyase precursor


<400> 87
Met Asn Thr Tyr Phe Cys Thr His His Lys Gln Leu Leu Leu Tyr Ser
 1               5                  10                  15
Asn Leu Phe Leu Ser Phe Ala Met Met Gly Gln Gly Thr Ala Ile Tyr
            20                  25                  30
Ala Asp Thr Leu Thr Ser Asn Ser Lys Pro Asn Asn Thr Tyr Phe Gln
        35                  40                  45
Thr Gln Thr Leu Thr Thr Thr Asp Ser Glu Lys Lys Val Val Gln Pro
    50                  55                  60
Gln Gln Lys Asp Tyr Tyr Thr Glu Leu Leu Asp Gln Trp Asn Ser Ile
65                  70                  75                  80
Ile Ala Gly Asn Asp Ala Tyr Asp Lys Thr Asn Pro Asp Met Val Thr
                85                  90                  95
Phe His Asn Lys Ala Glu Lys Asp Ala Gln Asn Ile Ile Lys Ser Tyr
            100                 105                 110
Gln Glu Pro Asp His Glu Asn Arg Thr Tyr Leu Trp Glu His Ala Lys
        115                 120                 125
Asp Tyr Ser Ala Ser Ala Asn Ile Thr Lys Thr Tyr Arg Asn Ile Glu
    130                 135                 140
Lys Ile Ala Lys Gln Ile Thr Asn Pro Glu Ser Cys Tyr Tyr Gln Asp
145                 150                 155                 160
Ser Lys Ala Ile Ala Ile Val Lys Asp Gly Met Ala Phe Met Tyr Glu
                165                 170                 175
His Ala Tyr Asn Leu Asp Arg Glu Asn His Gln Thr Thr Gly Lys Glu
            180                 185                 190
```

```
Asn Lys Glu Asn Trp Trp Asp Tyr Glu Ile Gly Thr Pro Arg Ala Ile
        195                 200                 205
Asn Asn Thr Leu Ser Leu Met Tyr Pro Tyr Phe Thr Gln Glu Glu Ile
    210                 215                 220
Leu Lys Tyr Thr Ala Pro Ile Glu Lys Phe Val Pro Asp Pro Thr Arg
225                 230                 235                 240
Phe Arg Val Arg Ala Ala Asn Phe Pro Pro Phe Glu Ala Asn Ser Gly
                245                 250                 255
Asn Leu Ile Asp Met Gly Arg Val Lys Leu Ile Ser Gly Ile Leu Arg
            260                 265                 270
Lys Asp Asp Leu Glu Ile Ser Asp Thr Ile Lys Ala Ile Glu Lys Val
        275                 280                 285
Phe Thr Leu Val Asp Glu Gly Asn Gly Phe Tyr Gln Asp Gly Ser Leu
    290                 295                 300
Ile Asp His Val Val Thr Asn Ala Gln Ser Pro Leu Tyr Lys Lys Gly
305                 310                 315                 320
Ile Ala Tyr Thr Gly Ala Tyr Gly Asn Val Leu Ile Asp Gly Leu Ser
                325                 330                 335
Gln Leu Ile Pro Ile Ile Gln Lys Thr Lys Ser Pro Ile Glu Ala Asp
            340                 345                 350
Lys Met Ala Thr Ile Tyr His Trp Ile Asn His Ser Phe Phe Pro Ile
        355                 360                 365
Ile Val Arg Gly Glu Met Met Asp Met Thr Arg Gly Arg Ser Ile Ser
    370                 375                 380
Arg Phe Asn Ala Gln Ser His Val Ala Gly Ile Glu Ala Leu Arg Ala
385                 390                 395                 400
Ile Leu Arg Ile Ala Asp Met Ser Glu Glu Pro His Arg Leu Ala Leu
                405                 410                 415
Lys Thr Arg Ile Lys Thr Leu Val Thr Gln Gly Asn Val Phe Tyr Asn
            420                 425                 430
Val Tyr Asp Asn Leu Lys Thr Tyr His Asp Ile Lys Leu Met Lys Glu
        435                 440                 445
Leu Leu Ser Asp Thr Ser Val Pro Val Gln Lys Leu Asp Ser Tyr Val
    450                 455                 460
Ala Ser Phe Asn Ser Met Asp Lys Leu Ala Leu Tyr Asn Asn Lys His
465                 470                 475                 480
Asp Phe Ala Phe Gly Leu Ser Met Phe Ser Asn Arg Thr Gln Asn Tyr
                485                 490                 495
Glu Ala Met Asn Asn Glu Asn Leu His Gly Trp Phe Thr Ser Asp Gly
            500                 505                 510
Met Phe Tyr Leu Tyr Asn Asn Asp Leu Gly His Tyr Ser Glu Asn Tyr
        515                 520                 525
Trp Ala Thr Val Asn Pro Tyr Arg Leu Pro Gly Thr Thr Glu Thr Glu
    530                 535                 540
Gln Lys Pro Leu Glu Gly Thr Pro Glu Asn Ile Lys Thr Asn Tyr Gln
545                 550                 555                 560
Gln Val Gly Met Thr Ser Leu Ser Asp Asp Ala Phe Val Ala Ser Lys
                565                 570                 575
Lys Leu Asn Asn Thr Ser Ala Leu Ala Ala Met Thr Phe Thr Asn Trp
            580                 585                 590
Asn Lys Ser Leu Thr Leu Asn Lys Gly Trp Phe Ile Leu Gly Asn Lys
        595                 600                 605
Ile Ile Phe Val Gly Ser Asn Ile Lys Asn Gln Ser Ser His Lys Ala
    610                 615                 620
Tyr Thr Thr Ile Glu Gln Arg Lys Glu Asn Gln Lys His Pro Tyr Cys
625                 630                 635                 640
Ser Tyr Val Asn Asn Gln Pro Val Asp Leu Asn Asn Gln Leu Val Asp
                645                 650                 655
```

```
Phe Thr Asn Thr Lys Ser Ile Phe Leu Glu Ser Asp Asp Pro Ala Gln
            660                 665                 670
Asn Ile Gly Tyr Tyr Phe Phe Lys Pro Thr Thr Leu Ser Ile Ser Lys
        675                 680                 685
Ala Leu Gln Thr Gly Lys Trp Gln Asn Ile Lys Ala Asp Asp Lys Ser
    690                 695                 700
Pro Glu Ala Ile Lys Glu Val Ser Asn Thr Phe Ile Thr Ile Met Gln
705                 710                 715                 720
Asn His Thr Gln Asp Gly Asp Arg Tyr Ala Tyr Met Met Leu Pro Asn
                725                 730                 735
Met Thr Arg Gln Glu Phe Glu Thr Tyr Ile Ser Lys Leu Asp Ile Asp
            740                 745                 750
Leu Leu Glu Asn Asn Asp Lys Leu Ala Ala Val Tyr Asp His Asp Ser
        755                 760                 765
Gln Gln Met His Val Ile His Tyr Glu Lys Lys Ala Thr Thr Phe Ser
    770                 775                 780
Asn His Asn Leu Ser His Gln Gly Phe Tyr Ser Phe Pro His Pro Val
785                 790                 795                 800
Lys Gln Asn Gln Gln Gln Lys Leu Ala His Gln Gly Ile Ala Ala Lys
                805                 810                 815
Asn Asn Ala Leu Asn Ser His Lys Ile Pro His Lys Arg Gln Arg Arg
            820                 825                 830
Leu Pro Arg Thr Gly Tyr Gln Ser Ser Ser Leu Glu Phe Leu Gly Gly
        835                 840                 845
Ala Leu Val Ala Ser Phe Asn His Ile Thr Lys Pro Phe Arg Lys Lys
    850                 855                 860
Asp Leu Arg Ile
865
```

<210> 88
<211> 828
<212> PRT
<213> Streptococcus pyogenes

<220>
<223> Streptococcus pyogenes serotype M6, strain MGAS10394 hyaluronate lyase precursor

<400> 88

```
Met Val Tyr Phe Tyr Leu Val Asp Gln Phe Thr Phe Ile Ile Ser Phe
 1               5                  10                  15
Leu Tyr Trp Arg Asn Leu Ser Val Asn Thr Tyr Phe Cys Thr His His
            20                  25                  30
Lys Gln Leu Leu Leu Tyr Ser Asn Leu Phe Leu Ser Phe Ala Met Met
        35                  40                  45
Gly Gln Gly Thr Ala Ile Tyr Ala Asp Thr Leu Thr Ser Asn Ser Glu
    50                  55                  60
Pro Asn Asn Thr Tyr Phe Gln Thr Gln Thr Leu Thr Thr Thr Asp Ser
65                  70                  75                  80
Glu Lys Lys Val Val Gln Pro Gln Gln Lys Asp Tyr Tyr Thr Glu Leu
                85                  90                  95
Leu Asp Gln Trp Asn Ser Ile Ile Ala Gly Asn Asp Ala Tyr Asp Lys
            100                 105                 110
Thr Asn Pro Asp Met Val Thr Phe His Asn Lys Ala Glu Lys Asp Ala
        115                 120                 125
Gln Asn Ile Ile Lys Ser Tyr Gln Gly Pro Asp His Glu Asn Arg Thr
```

```
    130                 135                 140
Tyr Leu Trp Glu His Ala Lys Asp Tyr Ser Ala Ser Thr Asn Ile Thr
145                 150                 155                 160
Lys Thr Tyr Arg Asn Ile Glu Lys Ile Ala Lys Gln Ile Thr Asn Pro
                165                 170                 175
Glu Ser Cys Tyr Tyr Gln Asp Ser Lys Ala Ile Ala Ile Val Lys Asp
            180                 185                 190
Gly Met Ala Phe Met Tyr Glu His Ala Tyr Asn Leu Asp Arg Glu Asn
        195                 200                 205
His Gln Thr Thr Gly Lys Glu Asn Lys Glu Asn Trp Trp Val Tyr Glu
    210                 215                 220
Ile Gly Thr Pro Arg Ala Ile Asn Asn Thr Leu Ser Leu Met Tyr Pro
225                 230                 235                 240
Tyr Phe Thr Gln Glu Glu Ile Leu Lys Tyr Thr Ala Pro Ile Glu Lys
                245                 250                 255
Phe Val Pro Asp Pro Thr Arg Phe Arg Val Arg Ala Ala Asn Phe Ser
            260                 265                 270
Pro Phe Glu Ala Asn Ser Gly Asn Leu Ile Asp Met Gly Arg Val Lys
        275                 280                 285
Leu Ile Ser Gly Ile Leu Arg Lys Asp Asp Leu Glu Ile Ser Asp Thr
    290                 295                 300
Ile Lys Ala Ile Glu Lys Val Phe Thr Leu Val Asp Glu Gly Asn Gly
305                 310                 315                 320
Phe Tyr Gln Asp Gly Ser Leu Ile Asp His Val Val Thr Asn Ala Gln
                325                 330                 335
Ser Pro Leu Tyr Lys Lys Gly Ile Ala Tyr Thr Gly Ala Tyr Gly Asn
            340                 345                 350
Val Leu Ile Asp Gly Leu Ser Gln Leu Ile Pro Ile Ile Gln Lys Thr
        355                 360                 365
Lys Ser Pro Ile Glu Ala Asp Lys Met Ala Thr Ile Tyr His Trp Ile
    370                 375                 380
Asn His Ser Phe Phe Pro Ile Ile Val Arg Gly Glu Met Met Asp Met
385                 390                 395                 400
Thr Arg Gly Arg Ser Ile Ser Arg Phe Asn Ala Gln Ser His Val Ala
                405                 410                 415
Gly Ile Glu Ala Leu Arg Ala Ile Leu Arg Ile Ala Asp Met Ser Glu
            420                 425                 430
Glu Pro His Arg Leu Ala Leu Lys Thr Arg Ile Lys Thr Leu Val Thr
        435                 440                 445
Gln Gly Asn Ala Phe Tyr Asn Val Tyr Asp Asn Leu Lys Thr Tyr His
    450                 455                 460
Asp Ile Lys Leu Met Lys Glu Leu Leu Ser Asp Thr Phe Val Pro Val
465                 470                 475                 480
Gln Lys Leu Asp Ser Tyr Val Ala Ser Phe Asn Ser Met Asp Lys Leu
                485                 490                 495
Ala Leu Tyr Asn Asn Lys His Asp Phe Ala Phe Gly Leu Ser Met Phe
            500                 505                 510
Ser Asn Arg Thr Gln Asn Tyr Glu Ala Met Asn Asn Glu Asn Leu His
        515                 520                 525
Gly Trp Phe Thr Ser Asp Gly Met Phe Tyr Leu Tyr Asn Asn Asp Leu
    530                 535                 540
Gly His Tyr Ser Glu Asn Tyr Trp Ala Thr Val Asn Pro Tyr Arg Leu
545                 550                 555                 560
Pro Gly Thr Thr Glu Thr Glu Gln Lys Pro Leu Glu Gly Thr Pro Glu
                565                 570                 575
Asn Ile Lys Thr Asp Tyr Gln Gln Val Gly Met Thr Ser Leu Ser Asp
            580                 585                 590
Asp Ala Phe Val Ala Ser Lys Lys Leu Asn Asn Thr Ser Ala Leu Ala
```

```
        595                 600                 605
Ala Met Thr Phe Thr Asn Trp Asn Lys Ser Leu Thr Leu Asn Lys Gly
    610                 615                 620
Trp Phe Ile Leu Gly Asn Lys Ile Ile Phe Val Gly Ser Asn Ile Lys
625                 630                 635                 640
Asn Gln Ser Ser His Lys Ala Tyr Thr Thr Ile Glu Gln Arg Lys Glu
                645                 650                 655
Asn Gln Lys His Pro Tyr Cys Ser Tyr Val Asn Asn Gln Pro Val Asp
            660                 665                 670
Leu Asn Asn Gln Leu Val Asp Phe Thr Asn Thr Lys Ser Ile Phe Leu
        675                 680                 685
Glu Ser Asp Asp Pro Ala Gln Asn Ile Gly Tyr Tyr Phe Phe Lys Pro
    690                 695                 700
Thr Thr Leu Ser Ile Ser Lys Ala Leu Gln Thr Gly Lys Trp Gln Asn
705                 710                 715                 720
Ile Lys Ala Asp Asp Lys Ser Pro Glu Ala Ile Lys Glu Val Ser Asn
                725                 730                 735
Thr Phe Ile Thr Ile Met Gln Asn His Thr Gln Asp Gly Asp Arg Tyr
            740                 745                 750
Ala Tyr Met Met Leu Pro Asn Met Thr Arg Gln Glu Phe Glu Thr Tyr
        755                 760                 765
Ile Ser Lys Leu Asp Ile Asp Leu Leu Glu Asn Asn Asp Lys Leu Ala
    770                 775                 780
Ala Val Tyr Asp His Asp Ser Gln Gln Met His Val Ile His Tyr Glu
785                 790                 795                 800
Lys Lys Ala Thr Met Phe Ser Asn His Asn Leu Ser His Gln Gly Phe
                805                 810                 815
Tyr Ser Phe Pro His Pro Val Lys Gln Asn Gln Gln
            820                 825
```

<210> 89
<211> 556
<212> PRT
<213> Streptococcus pyogenes

<220>
<223> Staphylococcus aureus subsp. aureus strain MRSA252
hyaluronan lyase 2

```
<400> 89
Met Val Tyr Phe Tyr Leu Val Asn Gln Ser Thr Phe Ile Ile Ser Phe
 1               5                  10                  15
Leu Tyr Trp Arg Asn Leu Ser Val Asn Thr Tyr Phe Cys Thr His His
            20                  25                  30
Lys Gln Leu Leu Leu Tyr Ser Asn Leu Phe Leu Ser Phe Ala Met Met
        35                  40                  45
Gly Gln Gly Thr Ala Ile Tyr Ala Asp Thr Leu Thr Ser Asn Ser Glu
    50                  55                  60
Pro Asn Asn Thr Tyr Phe Gln Thr Gln Thr Leu Thr Thr Thr Asp Ser
65                  70                  75                  80
Glu Lys Lys Val Val Gln Pro Gln Gln Lys Asp Tyr Tyr Thr Glu Leu
                85                  90                  95
Leu Asp Gln Trp Asn Ser Ile Ile Ala Gly Asn Asp Ala Tyr Asp Lys
            100                 105                 110
Thr Asn Pro Asp Met Val Thr Phe His Asn Lys Ala Glu Lys Asp Ala
```

```
        115                 120                 125
Gln Asn Ile Ile Lys Ser Tyr Gln Gly Pro Asp His Glu Asn Arg Thr
    130                 135                 140
Tyr Leu Gly Asn Met Gln Arg Ile Ile Pro Leu Leu Leu Ile Ser Arg
145                 150                 155                 160
Lys Leu Thr Ala Ile Leu Lys Lys Ile Ser Lys Met Lys Ser Leu Met
                165                 170                 175
Glu Asp Ser Thr Ile Ser Thr Asn Gly Leu Thr Gln Gln Leu Lys Ile
            180                 185                 190
Tyr Asn Asp Met Asp Arg Val Thr Tyr His Asn Lys Gly Leu Asp Phe
        195                 200                 205
Ala Phe Gly Leu Ser Met Thr Ser Lys Asn Val Ala Arg Tyr Glu Ser
    210                 215                 220
Ile Asn Gly Glu Asn Leu Lys Gly Trp His Thr Gly Ala Gly Met Ser
225                 230                 235                 240
Tyr Leu Tyr Asn Ser Asp Val Lys His Tyr Arg Asp Asn Phe Trp Ala
                245                 250                 255
Thr Ala Asp Met Lys Arg Leu Ala Gly Thr Thr Thr Leu Asp Asn Glu
            260                 265                 270
Glu Pro Lys Ser Thr Asp Val Lys Lys Ser Ser Lys Thr Phe Val Gly
        275                 280                 285
Gly Thr Lys Phe Asp Asp Gln His Ala Ser Ile Gly Met Asp Phe Glu
    290                 295                 300
Asn Gln Asp Lys Thr Leu Thr Ala Lys Lys Ser Tyr Phe Ile Leu Asn
305                 310                 315                 320
Asp Lys Ile Val Phe Leu Gly Thr Gly Ile Lys Ser Thr Asp Ser Ser
                325                 330                 335
Lys Asn Pro Val Thr Thr Ile Glu Asn Arg Lys Ala Asn Asp Tyr Lys
            340                 345                 350
Leu Tyr Lys Asp Asp Thr Gln Thr Thr Asn Ser Asp Asn Gln Glu Thr
        355                 360                 365
Asn Ser Leu Phe Leu Glu Ser Thr Asn Ser Thr Gln Asn Asn Ile Gly
    370                 375                 380
Tyr His Phe Leu Asn Glu Ser Lys Ile Thr Val Lys Lys Glu Ser His
385                 390                 395                 400
Thr Gly Lys Trp Ser Asp Ile Asn Lys Ser Gln Lys Asp Ile Gln Lys
                405                 410                 415
Thr Asp Glu Tyr Tyr Glu Val Thr Gln Lys His Ser Asn Thr Asp Ser
            420                 425                 430
Lys Tyr Ala Tyr Val Leu Tyr Pro Gly Leu Ser Lys Asp Val Phe Lys
        435                 440                 445
Ser Lys Ala Ser Lys Val Thr Val Val Lys Gln Glu Asp Asp Phe His
    450                 455                 460
Val Val Lys Asp Asn Glu Ser Val Trp Ala Gly Ile Asn Tyr Ser Asp
465                 470                 475                 480
Ser Ala Lys Thr Phe Glu Ile Asn Asn Thr Lys Val Glu Val Lys Ala
                485                 490                 495
Lys Gly Met Phe Ile Leu Thr Lys Lys Asp Asp Asn Thr Tyr Glu Cys
            500                 505                 510
Ser Phe Tyr Asn Pro Glu Ser Thr Asn Ser Val Ser Asp Ile Glu Ser
        515                 520                 525
Lys Ile Ser Met Thr Gly Tyr Ser Ile Ile Asn Lys Asn Thr Ser Thr
    530                 535                 540
Ser Asn Glu Ser Gly Val Arg Phe Glu Leu Thr Lys
545                 550                 555
```

<210> 90

<211> 635
<212> PRT
<213> Streptococcus pyogenes

<220>
<223> Streptococcus pyogenes strain MGAS9429 hyaluronate
lyase precursor

<400> 90
Met Ala Phe Met Tyr Glu His Ala Tyr Asn Leu Asn Arg Glu Asn His
1 5 10 15
Gln Thr Thr Gly Lys Glu Asn Lys Glu Asn Trp Trp Val Tyr Glu Ile
20 25 30
Gly Thr Pro Arg Ala Ile Asn Asn Thr Leu Ser Leu Met Tyr Pro Tyr
35 40 45
Phe Thr Gln Glu Glu Ile Leu Lys Tyr Thr Ala Pro Ile Glu Lys Phe
50 55 60
Val Pro Asp Pro Thr Arg Phe Arg Val Arg Ala Ala Asn Phe Ser Pro
65 70 75 80
Phe Glu Ala Ser Ser Gly Asn Leu Ile Asp Met Gly Arg Val Lys Leu
85 90 95
Ile Ser Gly Ile Leu Arg Lys Asp Asp Leu Glu Ile Ser Asp Thr Ile
100 105 110
Lys Ala Ile Glu Lys Val Phe Thr Leu Val Asp Glu Gly Asn Gly Phe
115 120 125
Tyr Gln Asp Gly Ser Leu Ile Asp His Val Val Thr Asn Ala Gln Ser
130 135 140
Pro Leu Tyr Lys Lys Gly Ile Ala Tyr Thr Gly Ala Tyr Gly Asn Val
145 150 155 160
Leu Ile Asp Gly Leu Ser Gln Leu Ile Pro Ile Ile Gln Lys Thr Lys
165 170 175
Ser Pro Ile Glu Ala Asp Lys Met Ala Thr Ile Tyr His Trp Ile Asn
180 185 190
His Ser Phe Phe Pro Ile Ile Val Arg Gly Glu Met Met Asp Met Thr
195 200 205
Arg Gly Arg Ser Ile Ser Arg Phe Asn Ala Gln Ser His Val Ala Gly
210 215 220
Ile Glu Ala Leu Arg Ala Ile Leu Arg Ile Ala Asp Met Ser Glu Glu
225 230 235 240
Pro His Arg Leu Ala Leu Lys Thr Arg Ile Lys Thr Leu Val Thr Gln
245 250 255
Gly Asn Ala Phe Tyr Asn Val Tyr Asp Asn Leu Lys Thr Tyr His Asp
260 265 270
Ile Lys Leu Met Lys Glu Leu Leu Ser Asp Thr Ser Val Pro Val Gln
275 280 285
Lys Leu Asp Ser Tyr Val Ala Ser Phe Asn Ser Met Asp Lys Leu Ala
290 295 300
Leu Tyr Asn Asn Lys His Asp Phe Ala Phe Gly Leu Ser Met Phe Ser
305 310 315 320
Asn Arg Thr Gln Asn Tyr Glu Ala Met Asn Asn Glu Asn Leu His Gly
325 330 335
Trp Phe Thr Ser Asp Gly Met Phe Tyr Leu Tyr Asn Asn Asp Leu Gly
340 345 350
His Tyr Ser Glu Asn Tyr Trp Ala Thr Val Asn Pro Tyr Arg Leu Pro
355 360 365
Gly Thr Thr Glu Thr Glu Gln Lys Pro Leu Glu Gly Thr Pro Glu Asn
370 375 380

```
Ile Lys Thr Asn Tyr Gln Gln Val Gly Met Thr Ser Leu Ser Asp Asp
385                 390                 395                 400
Ala Phe Val Ala Ser Lys Lys Leu Asn Asn Thr Ser Ala Leu Ala Ala
                405                 410                 415
Met Thr Phe Thr Asn Trp Asn Lys Ser Leu Thr Leu Asn Lys Gly Trp
            420                 425                 430
Phe Ile Leu Gly Asn Lys Ile Ile Phe Val Gly Ser Asn Ile Lys Asn
        435                 440                 445
Gln Ser Ser His Lys Ala Tyr Thr Thr Ile Glu Gln Arg Lys Glu Asn
    450                 455                 460
Gln Lys His Pro Tyr Cys Ser Tyr Val Asn Asn Gln Pro Val Asp Leu
465                 470                 475                 480
Asn Asn Gln Leu Val Asp Phe Thr Asn Thr Lys Ser Ile Phe Leu Glu
                485                 490                 495
Ser Asp Asp Pro Ala Gln Asn Ile Gly Tyr Tyr Phe Phe Lys Pro Thr
            500                 505                 510
Thr Leu Ser Ile Ser Lys Ala Leu Gln Thr Gly Lys Trp Gln Asn Ile
        515                 520                 525
Lys Ala Asp Asp Lys Ser Pro Glu Ala Ile Lys Glu Val Ser Asn Thr
    530                 535                 540
Phe Ile Thr Ile Met Gln Asn His Thr Gln Asp Gly Asp Arg Tyr Ala
545                 550                 555                 560
Tyr Met Met Leu Pro Asn Met Thr Arg Gln Glu Phe Glu Thr Tyr Ile
                565                 570                 575
Ser Lys Leu Asp Ile Asp Leu Leu Glu Asn Asn Asp Lys Leu Ala Ala
            580                 585                 590
Val Tyr Asp His Asp Ser Gln Gln Met His Val Ile His Tyr Glu Lys
        595                 600                 605
Lys Ala Thr Met Phe Ser Asn His Asn Leu Ser His Gln Gly Phe Tyr
    610                 615                 620
Ser Phe Pro His Pro Val Lys Gln Asn Gln Gln
625                 630                 635


<210> 91
<211> 828
<212> PRT
<213> Streptococcus pyogenes

<220>
<223> Streptococcus pyogenes serotype M12, strain
      MGAS9429 hyaluronate lyase precursor


<400> 91
Met Val Tyr Phe Tyr Leu Val Asn Gln Ser Thr Phe Ile Ile Ser Phe
 1                5                  10                  15
Leu Tyr Trp Arg Asn Leu Ser Val Asn Thr Tyr Phe Cys Thr His His
            20                  25                  30
Lys Gln Leu Leu Leu Tyr Ser Asn Leu Phe Leu Ser Phe Ala Met Met
        35                  40                  45
Gly Gln Gly Thr Ala Ile Tyr Ala Asp Thr Leu Thr Ser Asn Ser Glu
    50                  55                  60
Pro Asn Asn Thr Tyr Phe Gln Thr Gln Thr Leu Thr Thr Thr Asp Ser
65                  70                  75                  80
Glu Lys Lys Val Val Gln Pro Gln Gln Lys Asp Tyr Tyr Thr Glu Leu
                85                  90                  95
Leu Asp Gln Trp Asn Ser Ile Ile Ala Gly Asn Asp Ala Tyr Val Lys
```

```
            100                 105                 110
Thr Asn Pro Asp Met Val Thr Phe His Asn Lys Ala Glu Lys Asp Ala
        115                 120                 125
Gln Asn Ile Ile Lys Ser Tyr Gln Gly Pro Asp His Glu Asn Arg Thr
    130                 135                 140
Tyr Leu Trp Glu His Ala Lys Asp Tyr Ser Ala Ser Thr Asn Ile Thr
145                 150                 155                 160
Lys Thr Tyr Arg Asn Ile Glu Lys Ile Ala Lys Gln Ile Thr Asn Pro
                165                 170                 175
Glu Ser Cys Tyr Tyr Gln Asp Ser Lys Ala Ile Ala Ile Val Lys Asp
            180                 185                 190
Gly Met Ala Phe Met Tyr Glu His Ala Tyr Asn Leu Asn Arg Glu Asn
        195                 200                 205
His Gln Thr Thr Gly Lys Glu Asn Lys Glu Asn Trp Trp Val Tyr Glu
    210                 215                 220
Ile Gly Thr Pro Arg Ala Ile Asn Asn Thr Leu Ser Leu Met Tyr Pro
225                 230                 235                 240
Tyr Phe Thr Gln Glu Glu Ile Leu Lys Tyr Thr Ala Pro Ile Glu Lys
                245                 250                 255
Phe Val Pro Asp Pro Thr Arg Phe Arg Val Arg Ala Ala Asn Phe Ser
            260                 265                 270
Pro Phe Glu Ala Ser Ser Gly Asn Leu Ile Asp Met Gly Arg Val Lys
        275                 280                 285
Leu Ile Ser Gly Ile Leu Arg Lys Asp Asp Leu Glu Ile Ser Asp Thr
    290                 295                 300
Ile Lys Ala Ile Glu Lys Val Phe Thr Leu Val Asp Glu Gly Asn Gly
305                 310                 315                 320
Phe Tyr Gln Asp Gly Ser Leu Ile Asp His Val Val Thr Asn Ala Gln
                325                 330                 335
Ser Pro Leu Tyr Lys Lys Gly Ile Ala Tyr Thr Gly Ala Tyr Gly Asn
            340                 345                 350
Val Leu Ile Asp Gly Leu Ser Gln Leu Ile Pro Ile Ile Gln Lys Thr
        355                 360                 365
Lys Ser Pro Ile Glu Ala Asp Lys Met Ala Thr Ile Tyr His Trp Ile
    370                 375                 380
Asn His Ser Phe Phe Pro Ile Ile Val Arg Gly Glu Met Met Asp Met
385                 390                 395                 400
Thr Arg Gly Arg Ser Ile Ser Arg Phe Asn Ala Gln Ser His Val Ala
                405                 410                 415
Gly Ile Glu Ala Leu Arg Ala Ile Leu Arg Ile Ala Asp Met Ser Glu
            420                 425                 430
Glu Pro His Arg Leu Ala Leu Lys Thr Arg Ile Lys Thr Leu Val Thr
        435                 440                 445
Gln Gly Asn Ala Phe Tyr Asn Val Tyr Asp Asn Leu Lys Thr Tyr His
    450                 455                 460
Asp Ile Lys Leu Met Lys Glu Leu Leu Ser Asp Thr Ser Val Pro Val
465                 470                 475                 480
Gln Lys Leu Asp Ser Tyr Val Ala Ser Phe Asn Ser Met Asp Lys Leu
                485                 490                 495
Ala Leu Tyr Asn Asn Lys His Asp Phe Ala Phe Gly Leu Ser Met Phe
            500                 505                 510
Ser Asn Arg Thr Gln Asn Tyr Glu Ala Met Asn Asn Glu Asn Leu His
        515                 520                 525
Gly Trp Phe Thr Ser Asp Gly Met Phe Tyr Leu Tyr Asn Asn Asp Leu
    530                 535                 540
Gly His Tyr Ser Glu Asn Tyr Trp Ala Thr Val Asn Pro Tyr Arg Leu
545                 550                 555                 560
Pro Gly Thr Thr Glu Thr Glu Gln Lys Pro Leu Glu Gly Thr Pro Glu
```

```
                565                 570                 575
Asn Ile Lys Thr Asn Tyr Gln Gln Val Gly Met Thr Ser Leu Ser Asp
            580                 585                 590
Asp Ala Phe Val Ala Ser Lys Lys Leu Asn Asn Thr Ser Ala Leu Ala
        595                 600                 605
Ala Met Thr Phe Thr Asn Trp Asn Lys Ser Leu Thr Leu Asn Lys Gly
    610                 615                 620
Trp Phe Ile Leu Gly Asn Lys Ile Ile Phe Val Gly Ser Asn Ile Lys
625                 630                 635                 640
Asn Gln Ser Ser His Lys Ala Tyr Thr Thr Ile Glu Gln Arg Lys Glu
                645                 650                 655
Asn Gln Lys His Pro Tyr Cys Ser Tyr Val Asn Asn Gln Pro Val Asp
            660                 665                 670
Leu Asn Asn Gln Leu Val Asp Phe Thr Asn Thr Lys Ser Ile Phe Leu
        675                 680                 685
Glu Ser Asp Asp Pro Ala Gln Asn Ile Gly Tyr Tyr Phe Phe Lys Pro
    690                 695                 700
Thr Thr Leu Ser Ile Ser Lys Ala Leu Gln Thr Gly Lys Trp Gln Asn
705                 710                 715                 720
Ile Lys Ala Asp Asp Lys Ser Pro Glu Ala Ile Lys Glu Val Ser Asn
                725                 730                 735
Thr Phe Ile Thr Ile Met Gln Asn His Thr Gln Asp Gly Asp Arg Tyr
            740                 745                 750
Ala Tyr Met Met Leu Pro Asn Met Thr Arg Gln Glu Phe Glu Thr Tyr
        755                 760                 765
Ile Ser Lys Leu Asp Ile Asp Leu Leu Glu Asn Asn Asp Lys Leu Ala
    770                 775                 780
Ala Val Tyr Asp His Asp Ser Gln Gln Met His Val Ile His Tyr Glu
785                 790                 795                 800
Lys Lys Ala Thr Met Phe Ser Asn His Asn Leu Ser His Gln Gly Phe
                805                 810                 815
Tyr Ser Phe Pro His Pro Val Lys Gln Asn Gln Gln
            820                 825
```

<210> 92
<211> 828
<212> PRT
<213> Streptococcus pyogenes

<220>
<223> Streptococcus pyogenes serotype M28, strain MGAS6180

<400> 92

```
Met Val Tyr Phe Tyr Leu Val Asn Gln Phe Thr Phe Ile Ile Ser Phe
 1               5                  10                  15
Leu Tyr Arg Arg Asn Leu Ser Val Asn Thr Tyr Phe Cys Thr His His
            20                  25                  30
Lys Gln Leu Leu Leu Tyr Ser Asn Leu Phe Leu Ser Phe Ala Met Met
        35                  40                  45
Gly Gln Gly Thr Ala Ile Tyr Ala Asp Thr Leu Thr Ser Asn Ser Glu
    50                  55                  60
Pro Asn Asn Thr Tyr Phe Gln Thr Gln Met Leu Thr Thr Thr Asp Ser
65                  70                  75                  80
Glu Lys Lys Val Val Gln Pro Gln Gln Lys Asp Tyr Tyr Thr Glu Leu
                85                  90                  95
```

```
Leu Asp Gln Trp Asn Ser Ile Ile Ala Gly Asn Asp Ala Tyr Asp Lys
            100                 105                 110
Thr Asn Pro Asp Met Val Thr Phe His Asn Lys Ala Glu Lys Asp Ala
        115                 120                 125
Gln Asn Ile Ile Lys Ser Tyr Gln Gly Pro Asp His Glu Asn Arg Thr
    130                 135                 140
Tyr Leu Trp Glu His Ala Lys Asp Tyr Ser Ala Ser Ala Asn Ile Thr
145                 150                 155                 160
Lys Thr Tyr Arg Asn Ile Glu Lys Ile Ala Lys Gln Ile Thr Asn Pro
                165                 170                 175
Glu Ser Cys Tyr Tyr Gln Asp Ser Lys Ala Ile Ala Ile Val Lys Asp
            180                 185                 190
Gly Met Ala Phe Met Tyr Glu His Ala Tyr Asn Leu Asp Arg Glu Asn
        195                 200                 205
His Gln Thr Thr Gly Lys Glu Asn Lys Glu Asn Trp Trp Val Tyr Glu
    210                 215                 220
Ile Gly Thr Pro Arg Ala Ile Asn Asn Thr Leu Ser Leu Met Tyr Pro
225                 230                 235                 240
Tyr Phe Thr Gln Glu Glu Ile Leu Lys Tyr Thr Ala Pro Ile Glu Lys
                245                 250                 255
Phe Val Pro Asp Pro Thr Arg Phe Arg Val Arg Ala Ala Asn Phe Ser
            260                 265                 270
Pro Phe Glu Ala Asn Ser Gly Asn Leu Ile Asp Met Gly Arg Val Lys
        275                 280                 285
Leu Ile Ser Gly Ile Leu Arg Lys Asp Asp Leu Glu Ile Ser Asp Thr
    290                 295                 300
Ile Lys Ala Ile Glu Lys Val Phe Thr Leu Val Asp Glu Gly Asn Gly
305                 310                 315                 320
Phe Tyr Gln Asp Gly Ser Leu Ile Asp His Val Val Thr Asn Ala Gln
                325                 330                 335
Ser Pro Leu Tyr Lys Lys Gly Ile Ala Tyr Thr Gly Ala Tyr Gly Asn
            340                 345                 350
Val Leu Ile Asp Gly Leu Ser Gln Leu Ile Pro Ile Ile Gln Lys Thr
        355                 360                 365
Lys Ser Ser Ile Glu Ala Asp Lys Met Ala Thr Ile Tyr His Trp Ile
    370                 375                 380
Asn His Ser Phe Phe Pro Ile Ile Val Arg Gly Glu Met Met Asp Met
385                 390                 395                 400
Thr Arg Gly Arg Ser Ile Ser Arg Phe Asn Ala Gln Ser His Val Ala
                405                 410                 415
Gly Ile Glu Ala Leu Arg Ala Ile Leu Arg Ile Ala Asp Met Ser Glu
            420                 425                 430
Glu Pro His Arg Leu Ala Leu Lys Thr Arg Ile Lys Thr Leu Val Thr
        435                 440                 445
Gln Gly Asn Ala Phe Tyr Asn Val Tyr Asp Asn Leu Lys Thr Tyr His
    450                 455                 460
Asp Ile Lys Leu Met Lys Glu Leu Leu Ser Asp Thr Ser Val Pro Val
465                 470                 475                 480
Gln Lys Leu Asp Ser Tyr Val Ala Ser Phe Asn Ser Met Asp Lys Leu
                485                 490                 495
Ala Leu Tyr Asn Asn Lys His Asp Phe Ala Phe Gly Leu Ser Met Phe
            500                 505                 510
Ser Asn Arg Thr Gln Asn Tyr Glu Ala Met Asn Asn Glu Asn Leu His
        515                 520                 525
Gly Trp Phe Thr Ser Asp Gly Met Phe Tyr Leu Tyr Asn Asn Asp Leu
    530                 535                 540
Gly His Tyr Ser Glu Asn Tyr Trp Ala Thr Val Asn Pro Tyr Arg Leu
545                 550                 555                 560
```

```
Pro Gly Thr Thr Glu Thr Glu Gln Lys Pro Leu Glu Gly Thr Pro Glu
                565                 570                 575
Asn Ile Lys Thr Asn Tyr Gln Gln Val Gly Met Thr Ser Leu Ser Asp
            580                 585                 590
Asp Ala Phe Val Ala Ser Lys Lys Leu Asn Asn Thr Ser Ala Leu Ala
        595                 600                 605
Ala Met Thr Phe Thr Asn Trp Asn Lys Ser Leu Thr Leu Asn Lys Gly
    610                 615                 620
Trp Phe Ile Leu Gly Asn Lys Ile Ile Phe Val Gly Ser Asn Ile Lys
625                 630                 635                 640
Asn Gln Ser Ser His Lys Ala Tyr Thr Thr Ile Glu Gln Arg Lys Glu
                645                 650                 655
Asn Gln Lys His Pro Tyr His Ala Tyr Val Asn Asn Gln Pro Val Asp
            660                 665                 670
Leu Asn Asn Gln Leu Val Asp Phe Thr Asn Thr Lys Ser Ile Phe Leu
        675                 680                 685
Glu Ser Asp Asp Ser Ala Gln Asn Ile Gly Tyr Tyr Phe Phe Lys Pro
    690                 695                 700
Thr Thr Leu Ser Ile Ser Lys Ala Leu Gln Thr Gly Lys Trp Gln Asn
705                 710                 715                 720
Ile Lys Ala Asp Asp Lys Ser Pro Glu Ala Ile Lys Glu Val Ser Asn
                725                 730                 735
Thr Phe Ile Thr Ile Met Gln Asn His Thr Gln Asp Gly Asp Arg Tyr
            740                 745                 750
Ala Tyr Met Met Leu Pro Asn Met Thr Arg Gln Glu Phe Glu Thr Tyr
        755                 760                 765
Ile Ser Lys Leu Asp Ile Asp Leu Leu Glu Asn Asn Asp Lys Leu Ala
    770                 775                 780
Ala Val Tyr Asp His Asp Ser Gln Gln Met His Val Ile His Tyr Glu
785                 790                 795                 800
Lys Lys Ala Thr Met Phe Ser Asn His Asn Leu Ser His Gln Gly Phe
                805                 810                 815
Tyr Ser Phe Pro His Pro Val Lys Gln Asn Gln Gln
            820                 825


<210> 93
<211> 522
<212> PRT
<213> Streptococcus suis

<220>
<223> Streptococcus suis 05ZYH33 hyaluronidase


<400> 93
Met Gly Phe Phe Ile Ser Gln Ser Lys Gln His Tyr Gly Ile Arg Lys
 1               5                  10                  15
Tyr Lys Val Gly Val Cys Ser Ala Leu Ile Ala Leu Ser Ile Leu Gly
            20                  25                  30
Thr Arg Val Ala Ala Asn Gln Leu Pro Ser Thr Glu Thr Ala Ser Pro
        35                  40                  45
Gln Ser Ser Gln Leu Val Glu Thr Thr Pro Glu Thr Thr Glu Ala Val
    50                  55                  60
Asn Leu Thr Thr Glu Ala Val Met Thr Ser Glu Val Ser Ser Glu Val
65                  70                  75                  80
Ser Pro Val Thr Ser Thr Glu Thr Gln Pro Ser Ser Thr Ala Ala Glu
                85                  90                  95
```

```
Thr Leu Ala Ser Pro Gln Ala Val Gln Ala Thr Lys Glu Glu Glu Lys
            100                 105                 110
Asn Leu Val Ala Asn Gly Glu Phe Ala Ser Thr Thr Ala Ala Ser Gly
        115                 120                 125
Asn Trp Ala Asp Pro Ala Ala Thr Asn Trp Glu Thr Trp Ile Pro Ala
    130                 135                 140
Asn Val Lys Lys Glu Asn Gly Gln Val Arg Ile Asp Glu Gly Arg Leu
145                 150                 155                 160
His Ile Ser Ser Thr Ala Ser Tyr Arg Val Ala Val His Gln Thr Val
                165                 170                 175
Asp Val Asp Pro Asn Lys Arg Tyr Leu Phe Ser Tyr Asn Val Glu Thr
            180                 185                 190
Lys Asp Leu Lys Gly Ser Gly Val Arg Val Arg Leu Arg Ser Leu Thr
        195                 200                 205
Ala Glu Gly Lys Asp Leu Ser Pro Gln Glu Phe Ala Tyr Thr Pro Tyr
    210                 215                 220
Lys Asn Gly Ser Gln Ala Glu His Ile Glu Gln Ile Leu Thr Val Ser
225                 230                 235                 240
Pro Glu Thr Arg Lys Leu Lys Val Glu Leu Phe Phe Glu Asn Ser Val
                245                 250                 255
Gly Gln Ala Trp Leu Asp Asn Ile Ser Leu Val Glu Tyr Val Glu Lys
            260                 265                 270
Thr Pro Glu Thr Pro Glu Pro Ser Leu Glu Leu Val Gln Pro Glu Thr
        275                 280                 285
Gly Gln Ile Ser Leu Ala Ser Asn Lys Val Tyr Leu Pro Val Arg Pro
    290                 295                 300
Asp Leu Thr Tyr Arg Ile Ala Asp Ala Ala Val Ala Ile Val Glu Lys
305                 310                 315                 320
Asn Met Ile Arg Pro Leu Ala Ala Gly Lys Thr Gln Val Asp Val Tyr
                325                 330                 335
Asp Lys Asp Thr Lys Leu Ser Ser Phe Glu Leu Thr Val Thr Glu His
            340                 345                 350
Gln Ala Thr Val Phe Asp Thr Leu Arg Asn Asn Trp Glu Asp Ile Ser
        355                 360                 365
Leu Ala Asn Lys Arg Tyr Gln Ser Asn Asp Thr Gln Met Lys Ala Phe
    370                 375                 380
Leu Gly Arg Leu Asp Ala Gly Val Ala Ser Ser Leu Lys Lys Trp Val
385                 390                 395                 400
Glu Pro Thr Asn Gln Gly Lys Thr Ile Phe Asn Asp Ile Asp Phe Ser
                405                 410                 415
Lys Ser Ser His Leu Thr Thr Val Tyr Arg Arg Leu Glu Gln Met Ala
            420                 425                 430
Gln Val Val Glu Asn Pro Asp Ser Ala Tyr Tyr His Asp Arg Ser Leu
        435                 440                 445
Ile Asp Leu Val Arg Lys Gly Met Asn Trp Leu Tyr Thr Asn Val Tyr
    450                 455                 460
Asn Glu Asn Lys Ser Ile Asp Gly Asn Trp Trp Asp Tyr Glu Ile Gly
465                 470                 475                 480
Thr Pro Arg Ala Val Val Asn Thr Leu Ile Tyr Met His Pro Tyr Phe
                485                 490                 495
Ser Gln Glu Glu Ile Leu Thr Tyr Thr Lys Pro Ile Ser Lys Phe Val
            500                 505                 510
Pro Asp Pro Thr Thr Ile Ser Val Lys His
        515                 520
```

<210> 94
<211> 1164

<212> PRT
<213> Streptococcus suis

<220>
<223> Streptococcus suis hyaluronidase

<400> 94
Met Gly Phe Phe Ile Ser Gln Ser Lys Gln His Tyr Gly Ile Arg Lys
 1   5   10   15
Tyr Lys Val Gly Val Cys Ser Ala Leu Ile Ala Leu Ser Ile Leu Gly
            20   25   30
Thr Arg Val Ala Ala Asn Gln Leu Pro Ser Thr Glu Thr Ala Ser Pro
        35   40   45
Gln Ser Ser Gln Leu Val Glu Thr Thr Pro Glu Thr Thr Glu Ala Val
    50   55   60
Met Thr Ser Glu Val Ser Ser Glu Val Ser Pro Val Thr Ser Thr Glu
65   70   75   80
Thr Gln Pro Ser Ser Thr Thr Ala Glu Thr Leu Ala Ser Pro Gln Ala
                85   90   95
Val Gln Ala Thr Lys Glu Glu Lys Asn Leu Val Ala Asn Gly Glu Phe
            100   105   110
Ile Ser Thr Thr Ala Pro Ser Gly Asn Trp Lys Glu Leu Ala Ala Thr
        115   120   125
Asn Trp Glu Thr Trp Ile Pro Ala Asn Val Lys Lys Glu Asn Gly Gln
    130   135   140
Val Arg Ile Asp Glu Gly Arg Leu His Ile Ser Ser Thr Ala Ser Tyr
145   150   155   160
Arg Val Ala Val His Gln Thr Val Asp Val Asp Pro Asn Lys Arg Tyr
                165   170   175
Leu Phe Ser Tyr Asp Val Glu Thr Lys Asp Leu Lys Gly Ser Gly Val
            180   185   190
Arg Val Arg Leu Arg Ser Leu Thr Ala Glu Gly Lys Asp Leu Ser Pro
        195   200   205
Gln Glu Phe Ala Tyr Thr Pro Tyr Lys Asn Gly Ser Gln Ala Glu His
    210   215   220
Ile Glu Gln Ile Leu Thr Val Ser Pro Glu Thr Arg Lys Leu Lys Val
225   230   235   240
Glu Leu Phe Phe Glu Asn Ser Val Gly Gln Ala Trp Leu Asp Asn Ile
                245   250   255
Ser Leu Val Glu Tyr Val Glu Lys Thr Pro Glu Thr Pro Glu Gln Ser
            260   265   270
Pro Glu Leu Val Gln Pro Glu Thr Gly Gln Ile Ser Leu Ala Ser Asn
        275   280   285
Lys Val Tyr Leu Pro Val Arg Pro Asp Leu Thr Tyr Arg Ile Ala Asp
    290   295   300
Ala Ala Val Ala Thr Val Glu Lys Asn Met Ile Arg Pro Leu Ala Ala
305   310   315   320
Gly Lys Thr Gln Val Asp Val Tyr Asp Lys Asp Thr Lys Leu Ser Ser
                325   330   335
Phe Glu Leu Ile Val Thr Glu His Gln Ala Thr Val Phe Asp Thr Leu
            340   345   350
Arg Asn Asn Trp Glu Asp Ile Ser Leu Ala Asn Lys Arg Tyr Gln Ser
        355   360   365
Asn Asp Ala Gln Met Lys Ala Phe Leu Gly Arg Leu Asp Ala Gly Val
    370   375   380
Ala Ser Ser Leu Glu Lys Trp Val Glu Pro Thr Glu Gln Ser Lys Thr
385   390   395   400

```
Ile Phe Asn Asp Ile Asp Phe Ser Lys Ser Ser His Leu Thr Thr Val
                405                 410                 415
Tyr Arg Arg Leu Glu Gln Met Ala Gln Val Val Glu Asn Pro Asp Ser
            420                 425                 430
Ala Tyr Tyr His Asp Arg Ser Leu Ile Asp Leu Val Arg Lys Gly Met
        435                 440                 445
Asn Trp Leu Tyr Ala Asn Val Tyr Asn Glu Asn Lys Ser Ile Asp Gly
    450                 455                 460
Asn Trp Trp Asp Tyr Glu Ile Gly Thr Ser Arg Ala Val Val Asn Thr
465                 470                 475                 480
Leu Ile Tyr Met His Pro Tyr Phe Ser Gln Glu Glu Ile Leu Thr Tyr
                485                 490                 495
Thr Lys Pro Ile Ser Lys Phe Val Pro Asp Pro Thr Thr Ile Arg Lys
            500                 505                 510
Thr Leu Thr Asn Pro Val Pro Ala Val Gly Gly Asn Gln Thr Asp Leu
        515                 520                 525
Ser Lys Val Ala Ile Leu Glu Gly Ala Leu Arg Glu Asp Ala Asp Arg
    530                 535                 540
Val Arg Ala Gly Ala Gln Gly Leu Thr Thr Ile Met Lys Phe Val Asp
545                 550                 555                 560
Lys Gly Glu Gly Phe Tyr Arg Asp Gly Ser Phe Ile Asp His Thr Asn
                565                 570                 575
Val Ala Tyr Thr Gly Ala Tyr Gly Asn Val Leu Ile Glu Gly Phe Ser
            580                 585                 590
Gln Leu Leu Pro Val Ile Gln Pro Thr Glu Phe Ala Leu Lys Glu Glu
        595                 600                 605
Gln Thr Asn Ile Leu Tyr Glu Trp Ile Glu Lys Ala Phe Met Pro Ile
    610                 615                 620
Leu Val Arg Gly Glu Leu Met Asp Met Thr Arg Gly Arg Ser Ile Ser
625                 630                 635                 640
Arg Ala Thr Gly Glu Ser His Val Gln Ala Met Glu Ile Leu Arg Ser
                645                 650                 655
Leu Val Arg Ile Ala Glu Ser Ala Gln Pro Glu Gln Lys Thr Lys Leu
            660                 665                 670
Leu Ser Phe Val Lys Ala Gln Leu Thr Ser Asp Thr Phe Tyr Asp Ser
        675                 680                 685
Tyr Arg Ser Leu Lys Ser Tyr Lys Asp Ile Asp Leu Val Asn Lys Leu
    690                 695                 700
Leu Ala Asp Asn Gln Ile Pro Ala Glu Val Asp Lys Asp Tyr Ile Ala
705                 710                 715                 720
Ala Phe Asn Asn Met Asp Lys Phe Val Tyr Arg Ser Ala Gln Glu Gly
                725                 730                 735
Phe Thr Phe Ala Leu Ser Met Tyr Ser Ser Arg Thr Gln Asn Tyr Glu
            740                 745                 750
Asp Met Asn Asn Glu Asn Arg Lys Gly Trp Tyr Thr Ala Asp Gly Met
        755                 760                 765
Val Tyr Leu Tyr Asn Asp Asp Leu Ser His Tyr Ser Asn His Tyr Trp
    770                 775                 780
Ala Thr Val Asp Pro Tyr Arg Leu Pro Gly Thr Thr Thr Thr Lys Asp
785                 790                 795                 800
Lys Arg Glu Asp Gly Ser Gly Glu Val Thr Leu Ala Ser Asp Phe Val
                805                 810                 815
Gly Ala Ser Gln Leu Gly Asn Arg Leu Ala Thr Ile Ala Met Asp Phe
            820                 825                 830
Asn Asn Trp Asn Asn Ser Leu Thr Ala Arg Lys Ala Trp Ile Val Leu
        835                 840                 845
Gly Asn Lys Ile Val Phe Leu Gly Thr Asp Ile Gln His Gln Ser Ala
    850                 855                 860
```

Gln Gly Ala Glu Thr Thr Ile Glu Asn Arg Lys Leu Leu Thr Gly Glu
865 870 875 880
Lys Tyr Ser Tyr Tyr Ile Asn Gly Gln Pro Val Asp Leu Ser Lys Glu
885 890 895
Val Val Thr Asp Lys Thr Gln Ser Phe Tyr Met Thr Asn Gly Lys Asp
900 905 910
Asn Gln Ser Ile Gly Tyr Val Phe Leu Asn Gln Leu Pro Thr His Ala
915 920 925
Lys Leu Asp Gln Arg Thr Gly Lys Trp Ser Asp Ile Asn Tyr Asn Gln
930 935 940
Ser Lys Glu Glu Val Ser Asn Ser Phe Val Ser Leu Trp His Glu His
945 950 955 960
Ala Gln Thr Ser Ser Asn Tyr Ala Tyr Val Leu Val Pro Asn Gln Ser
965 970 975
Met Glu Lys Val Asn Gln Ala Ala Ala Ser Val Lys Leu Leu His Gln
980 985 990
Asp Arg Asp Leu Gln Val Val Tyr Asp Gln Glu Gln Asn Val Trp Gly
995 1000 1005
Val Val Lys Tyr Thr Asp Thr Ala Tyr Lys Leu Thr Asp Asp Ile Thr
1010 1015 1020
Leu Thr Asp Ala Gly Leu Tyr Thr Ile Gln Lys Val Glu Gly Gly Tyr
1025 1030 1035 1040
Arg Ile Ala Phe Tyr Asn Pro Ser Thr Arg Thr Val Lys Asn Gly Ile
1045 1050 1055
Glu Leu Thr Lys Ala Gly Ser Ser Leu Thr Val Glu Met Glu Pro Thr
1060 1065 1070
Ala Ala Tyr Pro Ser Thr Val Trp Lys Val Thr Met Pro Glu Gly Ser
1075 1080 1085
Asp Lys Gln Thr Gly Ser Val Glu Lys Thr Glu Lys Glu Glu Lys Gln
1090 1095 1100
Leu Lys Glu Asn Gln Pro Ser Ser Glu Val Lys Gln Val Val His His
1105 1110 1115 1120
Ala Ala Glu Lys Thr Lys Pro Ser Lys Pro Arg Leu Pro Gln Thr Gly
1125 1130 1135
Glu Glu Ala Ser Leu Gly Leu Gly Phe Leu Gly Leu Leu Thr Leu Gly
1140 1145 1150
Ala Val Val Asp Phe Lys Cys Arg Arg Ser His Ser
1155 1160

<210> 95
<211> 1164
<212> PRT
<213> Streptococcus suis

<220>
<223> Streptococcus suis ST3 hyaluronidase

<400> 95
Met Gly Phe Phe Ile Ser Gln Ser Lys Gln His Tyr Gly Ile Arg Lys
1 5 10 15
Tyr Lys Val Gly Val Cys Ser Ala Leu Ile Ala Leu Ser Ile Leu Gly
20 25 30
Thr Arg Val Ala Ala Asn Gln Leu Pro Ser Thr Glu Thr Ala Ser Pro
35 40 45
Gln Ser Ser Gln Leu Val Glu Thr Thr Pro Glu Thr Thr Glu Ala Val
50 55 60

```
Met Thr Ser Glu Val Ser Ser Glu Val Ser Pro Val Thr Ser Thr Glu
65                  70                  75                  80
Thr Gln Pro Ser Ser Thr Thr Ala Glu Thr Leu Ala Ser Pro Gln Ala
                85                  90                  95
Val Gln Ala Thr Lys Glu Glu Lys Asn Leu Val Ala Asn Gly Glu Phe
            100                 105                 110
Ile Ser Thr Thr Ala Pro Ser Gly Asn Trp Lys Glu Leu Ala Ala Thr
        115                 120                 125
Asn Trp Glu Thr Trp Ile Pro Ala Asn Val Lys Lys Glu Asn Gly Gln
    130                 135                 140
Val Arg Ile Asp Glu Gly Arg Leu His Ile Ser Ser Thr Ala Ser Tyr
145                 150                 155                 160
Arg Val Ala Val His Gln Thr Val Asp Val Asp Pro Asn Lys Arg Tyr
                165                 170                 175
Leu Phe Ser Tyr Asp Val Glu Thr Lys Asp Leu Lys Gly Ser Gly Val
            180                 185                 190
Arg Val Arg Leu Arg Ser Leu Thr Ala Glu Gly Lys Asp Leu Ser Pro
        195                 200                 205
Gln Glu Phe Ala Tyr Thr Pro Tyr Lys Asn Gly Ser Gln Ala Glu His
    210                 215                 220
Ile Glu Gln Ile Leu Thr Val Ser Pro Glu Thr Arg Lys Leu Lys Val
225                 230                 235                 240
Glu Leu Phe Phe Glu Asn Ser Val Gly Gln Ala Trp Leu Asp Asn Ile
                245                 250                 255
Ser Leu Val Glu Tyr Val Glu Lys Thr Pro Glu Thr Pro Glu Gln Ser
            260                 265                 270
Pro Glu Leu Val Gln Pro Glu Thr Gly Gln Ile Ser Leu Ala Ser Asn
        275                 280                 285
Lys Val Tyr Leu Pro Val Arg Pro Asp Leu Thr Tyr Arg Ile Ala Asp
    290                 295                 300
Ala Ala Val Ala Thr Val Glu Lys Asn Met Ile Arg Pro Leu Ala Ala
305                 310                 315                 320
Gly Lys Thr Gln Val Asp Val Tyr Asp Lys Asp Thr Lys Leu Ser Ser
                325                 330                 335
Phe Glu Leu Ile Val Thr Glu His Gln Ala Thr Val Phe Asp Thr Leu
            340                 345                 350
Arg Asn Asn Trp Glu Asp Ile Ser Leu Ala Asn Lys Arg Tyr Gln Ser
        355                 360                 365
Asn Asp Ala Gln Met Lys Ala Phe Leu Gly Arg Leu Asp Ala Gly Val
    370                 375                 380
Ala Ser Ser Leu Glu Lys Trp Val Glu Pro Thr Glu Gln Ser Lys Thr
385                 390                 395                 400
Ile Phe Asn Asp Ile Asp Phe Ser Lys Ser Ser His Leu Thr Thr Val
                405                 410                 415
Tyr Arg Arg Leu Glu Gln Met Ala Gln Val Val Glu Asn Pro Asp Ser
            420                 425                 430
Ala Tyr Tyr His Asp Arg Ser Leu Ile Asp Leu Val Arg Lys Gly Met
        435                 440                 445
Asn Trp Leu Tyr Thr Asn Val Tyr Asn Glu Asn Lys Ser Ile Asp Gly
    450                 455                 460
Asn Trp Trp Asp Tyr Glu Ile Gly Thr Pro Arg Ala Val Val Asn Thr
465                 470                 475                 480
Leu Ile Tyr Met His Pro Tyr Phe Ser Gln Glu Glu Ile Leu Thr Tyr
                485                 490                 495
Thr Lys Pro Ile Ser Lys Phe Val Pro Asp Pro Thr Thr Ile Arg Lys
            500                 505                 510
Thr Leu Thr Asn Pro Val Pro Ala Val Gly Gly Asn Gln Thr Asp Leu
        515                 520                 525
```

```
Ser Lys Val Ala Ile Leu Glu Gly Ala Leu Arg Glu Asp Ala Asp Arg
    530                 535                 540
Val Arg Ala Gly Ala Gln Gly Leu Thr Thr Ile Met Lys Phe Val Asp
545                 550                 555                 560
Lys Gly Glu Gly Phe Tyr Arg Asp Gly Ser Phe Ile Asp His Thr Asn
                565                 570                 575
Val Ala Tyr Thr Gly Ala Tyr Gly Asn Val Leu Ile Glu Gly Phe Ser
            580                 585                 590
Gln Leu Leu Pro Val Ile Gln Pro Thr Glu Phe Ala Leu Lys Glu Glu
        595                 600                 605
Gln Thr Asn Ile Leu Tyr Glu Trp Ile Glu Lys Ala Phe Met Pro Ile
    610                 615                 620
Leu Val Arg Gly Glu Leu Met Asp Met Thr Arg Gly Arg Ser Ile Ser
625                 630                 635                 640
Arg Ala Thr Gly Glu Ser His Val Gln Ala Met Glu Ile Leu Arg Ser
                645                 650                 655
Leu Val Arg Ile Ala Glu Ser Ala Gln Pro Glu Gln Lys Thr Lys Leu
            660                 665                 670
Leu Ser Phe Val Lys Ala Gln Leu Thr Ser Asp Thr Phe Tyr Asp Ser
        675                 680                 685
Tyr Arg Ser Leu Lys Ser Tyr Lys Asp Ile Asp Leu Val Asn Lys Leu
    690                 695                 700
Leu Ala Asp Asn Gln Ile Pro Ala Glu Val Asp Lys Asp Tyr Ile Ala
705                 710                 715                 720
Ala Phe Asn Asn Met Asp Lys Phe Val Tyr Arg Ser Ala Gln Glu Gly
                725                 730                 735
Phe Thr Phe Ala Leu Ser Met Tyr Ser Ser Arg Thr Gln Asn Tyr Glu
            740                 745                 750
Asp Met Asn Asn Glu Asn Arg Lys Gly Trp Tyr Thr Ala Asp Gly Met
        755                 760                 765
Val Tyr Leu Tyr Asn Asp Asp Leu Ser His Tyr Ser Asn His Tyr Trp
    770                 775                 780
Ala Thr Val Asp Pro Tyr Arg Leu Pro Gly Thr Thr Thr Thr Lys Asp
785                 790                 795                 800
Lys Arg Glu Asp Gly Ser Gly Glu Val Thr Leu Ala Ser Asp Phe Val
                805                 810                 815
Gly Ala Ser Gln Leu Gly Asn Arg Leu Ala Thr Ile Ala Met Asp Phe
            820                 825                 830
Asn Asn Trp Asn Asn Ser Leu Thr Ala Arg Lys Ala Trp Ile Val Leu
        835                 840                 845
Gly Asn Lys Ile Val Phe Leu Gly Thr Asp Ile Gln His Gln Ser Ala
    850                 855                 860
Gln Gly Ala Glu Thr Thr Ile Glu Asn Arg Lys Leu Leu Thr Gly Glu
865                 870                 875                 880
Lys Tyr Ser Tyr Tyr Ile Asn Gly Gln Pro Val Asp Leu Ser Lys Glu
                885                 890                 895
Val Val Thr Asp Lys Thr Gln Ser Phe Tyr Met Thr Asn Gly Lys Asp
            900                 905                 910
Asn Gln Ser Ile Gly Tyr Val Phe Leu Asn Gln Leu Pro Thr His Ala
        915                 920                 925
Lys Leu Asp Gln Arg Thr Gly Lys Trp Ser Asp Ile Asn Tyr Asn Gln
    930                 935                 940
Ser Lys Glu Glu Val Ser Asn Ser Phe Val Ser Leu Trp His Glu His
945                 950                 955                 960
Ala Gln Thr Ser Ser Asn Tyr Ala Tyr Val Leu Val Pro Asn Gln Ser
                965                 970                 975
Met Glu Lys Val Asn Gln Ala Ala Ala Ser Val Lys Leu Leu His Gln
            980                 985                 990
```

```
Asp Arg Asp Leu Gln Val Val Tyr Asp Gln Glu Gln Asn Val Trp Gly
        995                 1000                1005
Val Val Lys Tyr Thr Asp Thr Ala Tyr Lys Leu Thr Asp Asp Ile Thr
    1010                1015                1020
Leu Thr Asp Ala Gly Leu Tyr Thr Ile Gln Lys Val Glu Gly Gly Tyr
1025                1030                1035                1040
Arg Ile Ala Phe Tyr Asn Pro Ser Thr Arg Thr Val Lys Asn Gly Ile
                1045                1050                1055
Glu Leu Thr Lys Ala Gly Ser Ser Leu Thr Val Glu Met Glu Pro Thr
            1060                1065                1070
Ala Ala Tyr Pro Ser Thr Val Trp Lys Val Thr Met Pro Glu Gly Ser
        1075                1080                1085
Asp Lys Gln Thr Gly Ser Val Glu Lys Thr Glu Lys Glu Glu Lys Gln
    1090                1095                1100
Leu Lys Glu Asn Gln Pro Ser Ser Glu Val Lys Gln Val Val His His
1105                1110                1115                1120
Ala Ala Glu Lys Thr Lys Pro Ser Lys Pro Arg Leu Pro Gln Thr Gly
                1125                1130                1135
Glu Glu Ala Ser Leu Gly Leu Gly Phe Leu Gly Leu Leu Thr Leu Gly
            1140                1145                1150
Ala Val Val Asp Phe Lys Cys Arg Arg Ser His Ser
        1155                1160


<210> 96
<211> 802
<212> PRT
<213> Vibrio fischeri

<220>
<223> Vibrio fischeri strain ATCC 700601/ES114
      hyaluronate lyase precursor


<400> 96
Met Tyr Met Ile Lys Lys His Arg Leu Asn Thr Ile Ala Leu Ser Met
 1               5                  10                  15
Leu Phe Leu Phe Thr Gly Asn Ala Tyr Ala Ala Lys Asn Thr Gln Thr
            20                  25                  30
Pro Gln Tyr Leu Pro Ser Asp Phe Glu Gln Val Arg Glu Asn Trp Ala
        35                  40                  45
Glu Asn Tyr Leu Gly Asp Pro Ala Ile Thr Phe Asp Gln Thr Leu Lys
    50                  55                  60
Asn Met Val Thr Ser Thr Asn Ser Ser Ala Gln Lys His Trp Asp Ser
65                  70                  75                  80
Met Thr Pro Gln Pro Asn Ala Ser Gly Ile Trp Asp Asp Leu Pro Leu
                85                  90                  95
Ile Asp Lys Asp Thr Thr Leu Gly Pro Asn Ile Arg Asn Ser Tyr Gln
            100                 105                 110
Arg Leu Phe Thr Met Ala Lys Ala Tyr Arg Leu Arg Asp Gly Asn Leu
        115                 120                 125
Glu Asn Asn Gln Leu Met Leu Asn Asp Ile Met Thr Ala Met Asn Tyr
    130                 135                 140
Ile Asn Gln Asn Phe Tyr Phe Val Asn Gln Leu Glu Tyr Gly Asn Trp
145                 150                 155                 160
Trp Gln Trp Glu Leu Ala Ile Pro Lys Asp Ile His Asn Ile Leu Val
                165                 170                 175
Leu Leu Phe Asp Asp Ile Lys Asp Asn Tyr Gln Thr Ile Ile Thr Asn
```

```
            180                 185                 190
His Leu Asn Ala Thr Arg Tyr Phe Thr Pro Asp Pro Thr His Leu Gly
        195                 200                 205
Val Ser Pro Gly Ala Ala Glu Ser Thr Asn Pro Asn Tyr Arg Glu Ser
    210                 215                 220
Thr Gly Gly Asn Arg Thr Asp Asn Ala Gln Val Val Leu Ile Arg Gly
225                 230                 235                 240
Met Leu Glu Asn Asn Ser Glu Glu Ile Ser Gln Ala Ile Ala Ala Leu
                245                 250                 255
Pro Ala Val Ile Glu Tyr Val Ser Glu Gly Asp Gly Tyr Tyr Thr Asp
            260                 265                 270
Gly Ser Phe Leu Gln His Ser Asp Ile Ala Tyr Asn Gly Thr Tyr Gly
        275                 280                 285
Asn Val Leu Leu Gly Gly Leu Gly Ile Gln Met Asn Ala Val Ala Gly
    290                 295                 300
Ser Pro Trp Ser Met Asp Asn Gln Thr Ile Ser Asn Val Tyr Asn Ile
305                 310                 315                 320
Ile Asn Gln Ser Tyr Glu Pro Leu Leu Tyr Lys Gly Ala Met Met Asp
                325                 330                 335
Met Val Asn Gly Arg Ser Ile Ser Arg Ser Ala Glu Gln Asn His Asp
            340                 345                 350
Val Gly Leu Asn Ile Val Asn Ser Met Leu Phe Tyr Thr Asn Gly Pro
        355                 360                 365
Asp Ser Asp Lys Asn Lys Gln Leu Ser Ser Leu Ile Lys Thr Gln Ile
    370                 375                 380
Thr Asp Asp Thr Tyr Gln Asn Phe Phe Asp Lys Ile Tyr Tyr Val Ser
385                 390                 395                 400
Thr Tyr Gln Ala Ala Gln His Ile Val Asn Asp Pro Thr Val Ser Leu
                405                 410                 415
Lys Asp Pro Leu Ile Gly Asn Phe Ser Tyr Pro Ser Met Asp Arg Ile
            420                 425                 430
Val His Arg Arg Thr Asp Trp Ala Phe Ala Leu Ala Met His Ser Tyr
        435                 440                 445
Arg Ile Gly Asn Tyr Glu Cys Met Asn Gly Glu Asn Leu Lys Gly Trp
    450                 455                 460
Phe Thr Gly Asp Gly Met Ile Tyr Leu Tyr Asn Asp Gln Leu Asp His
465                 470                 475                 480
Tyr Thr Gly Tyr Trp Pro Thr Val Asn Ala Ser Arg Met Pro Gly Thr
                485                 490                 495
Thr Val Asp Ser Gln Ile Met Ala Asp Cys Ser Gly Glu Arg Val Gly
            500                 505                 510
Gly Asn Val Asn Thr Asn Met Gln Trp Val Gly Ser Thr Ser Leu Asn
        515                 520                 525
Asn Tyr Gly Ile Ala Gly Met Gln Phe Tyr Asn Trp Ser Asp Thr Leu
    530                 535                 540
Ser Ala Tyr Lys Ser Trp Phe Met Phe Asp Asn Glu Val Val Met Leu
545                 550                 555                 560
Gly Ser Asn Ile Lys Asp Gln Ser Asn Ala Asn Asn Ile Thr Thr Ile
                565                 570                 575
Glu Asn Arg Lys Arg Leu Ala Glu Thr Lys Leu Phe Ile Asp Gly Thr
            580                 585                 590
Glu Gln Ala Ala Leu Pro Tyr Gln Gly Ala Pro Ala Thr Phe Ser Ile
        595                 600                 605
Arg Asn Lys Thr Leu Ala Asn Ser Asp Leu Ser Tyr Val Met Leu Thr
    610                 615                 620
Pro Lys Thr Ile Ser Ile Ser Gln Asn Asp Val Asp Gly Asn Trp Ser
625                 630                 635                 640
Asp Ile Gly Asn Ser Lys Gly Asp Val Ser Asp Ser Tyr Leu Gln Ala
```

```
                645                 650                 655
Thr Leu Thr Gln Val Asp Gln Ala Asp Tyr Gln Tyr Ala Leu Leu Pro
            660                 665                 670
Asn Gln Asn Asn Asp Thr Val Gln Asn Tyr Ala Gln His Pro Asp Val
        675                 680                 685
Thr Val Leu Arg Gln Asp Glu Gln Ala His Ala Val Gln Glu Asn Thr
    690                 695                 700
Leu Asn Ile Ile Ala Ala Asn Asn Trp Lys Asn Asn Pro Val Asn Ile
705                 710                 715                 720
Thr Asp Thr Ile Thr Leu Asn Ser Met Met Gly Phe Met Ile Lys Glu
                725                 730                 735
Glu Ser Ser Asn Thr Phe Thr Val Ala Val Ser Glu Pro Ile Gln Thr
            740                 745                 750
Ile Asp Ser Val Asn Phe Thr Phe Asp Lys Gln Gly Ile Val Ile Lys
        755                 760                 765
Glu Asp Ile Glu Asn Arg Val Val Leu Asn Gly Thr Thr Leu Thr Ile
    770                 775                 780
Asn Thr Ser Gly Leu Gln Gly Gln Ser Tyr Ser Phe Gln Val Thr Ile
785                 790                 795                 800
Gln Asp
```

<210> 97
<211> 517
<212> PRT
<213> Synechococcus sp.

<220>
<223> Synechococcus sp. RCC307 neutral invertase-like protein

<400> 97

```
Met Gly Ala Pro Ala Ile Pro Lys Val Pro Arg Ser Pro Ser Lys Ser
 1                5                  10                  15
Glu His Thr Thr Arg Pro Asn Ser Gly Glu Ser Glu Val Val Arg Gln
            20                  25                  30
Ala Glu Glu Leu Phe Glu Gln Thr Leu Val Asn Val Arg Gly Gln Leu
        35                  40                  45
Ala Gly Ala Val Ala Ala Leu Glu Ser Ser Val His Asp Ser Glu Leu
    50                  55                  60
Asn Tyr Gly Glu Ile Phe Leu Arg Asp Asn Val Pro Val Met Val Tyr
65                  70                  75                  80
Leu Leu Leu Arg Gly Arg Phe Glu Ile Val Arg His Phe Leu Asp Leu
                85                  90                  95
Cys Leu Glu Leu Gln Ser Arg Ser Tyr Arg Thr Arg Gly Val Phe Pro
            100                 105                 110
Thr Ser Phe Val Glu Glu Asp Asp Lys Ile Leu Ala Asp Tyr Gly Gln
        115                 120                 125
Arg Ser Ile Gly Arg Ile Thr Ser Val Asp Ala Ser Leu Trp Trp Pro
    130                 135                 140
Val Leu Cys Trp Met Tyr Val Arg Ala Ser Gly Asp Thr Ser Tyr Gly
145                 150                 155                 160
Thr Ser Pro Lys Val Gln Arg Ala Val Gln Leu Leu Leu Asp Leu Val
                165                 170                 175
Leu Gln Pro Ser Phe Tyr Glu Pro Pro Val Leu Phe Val Pro Asp Cys
            180                 185                 190
```

```
Ala Phe Met Ile Asp Arg Pro Met Asp Val Trp Gly Ala Pro Leu Glu
        195                 200                 205
Val Glu Val Leu Leu Phe Gly Cys Leu Lys Ser Cys Cys Gln Leu Met
    210                 215                 220
Ser Leu Val Glu Gly Gly Gly His Gly Gly Pro Leu Ile Gln Gln Arg
225                 230                 235                 240
Leu Glu Leu Thr Arg Thr Trp Met Arg Asp Leu Arg Val Tyr Leu Leu
                245                 250                 255
Asn His Tyr Trp Val Thr Ser Lys Thr Met Gln Val Leu Arg Arg Arg
            260                 265                 270
Pro Thr Glu Gln Tyr Gly Asp Tyr Gln Ser Arg Asn Glu Phe Asn Val
        275                 280                 285
Gln Pro Glu Val Ile Pro His Trp Leu Gln Glu Trp Leu Asp Asp Arg
    290                 295                 300
Gly Gly Tyr Leu Ile Gly Asn Met Arg Thr Gly Arg Pro Asp Phe Arg
305                 310                 315                 320
Phe Tyr Ser Leu Gly Asn Ala Leu Gly Ser Leu Phe Gly Leu Leu Thr
                325                 330                 335
Gly Pro Gln Gln Leu Ala Leu Phe Arg Leu Val Ile His Asn Arg Gln
            340                 345                 350
His Leu Met Ala Glu Met Pro Met Arg Ile Cys His Pro Pro Met Asp
        355                 360                 365
Gln Asp Glu Trp Ile Thr Asn Thr Gly Met Asp Pro Lys Asn Trp Pro
    370                 375                 380
Trp Ser Tyr His Asn Gly Gly His Trp Pro Ser Leu Leu Trp Pro Met
385                 390                 395                 400
Ala Ala Ala Val Leu Met His Gln Arg Leu Tyr Pro Asn Asp Asp Leu
                405                 410                 415
Leu Leu Leu Gly Gln Thr Arg Thr Met Leu Glu Glu Cys Tyr Trp Gln
            420                 425                 430
Gln Leu Asn Gln Leu Pro Arg Gln Gln Trp Ala Glu Tyr Phe Asp Gly
        435                 440                 445
Pro Thr Gly Thr Trp Val Gly Gln Gln Ala Arg Ile Asn Gln Thr Trp
    450                 455                 460
Thr Ile Val Gly Phe Leu Leu Leu His His Leu Met Arg Lys Ala Pro
465                 470                 475                 480
Gln Asp Val Lys Leu Leu Asp Leu Asp Asp Val Gly Pro Leu Arg Leu
                485                 490                 495
Ser Phe Gln Asp Gln His Glu Lys Ser Ser Thr Asp Glu Arg Lys Ser
            500                 505                 510
Phe Leu Lys Asn Tyr
        515
```

<210> 98
<211> 1021
<212> PRT
<213> Proteus vulgaris

<220>
<223> Proteus vulgaris chondroitin-sulfate-ABC endolyase

<400> 98

```
Met Pro Ile Phe Arg Phe Thr Ala Leu Ala Met Thr Leu Gly Leu Leu
 1               5                  10                  15
Ser Ala Pro Tyr Asn Ala Met Ala Ala Thr Ser Asn Pro Ala Phe Asp
            20                  25                  30
```

```
Pro Lys Asn Leu Met Gln Ser Glu Ile Tyr His Phe Ala Gln Asn Asn
        35                  40                  45
Pro Leu Ala Asp Phe Ser Ser Asp Lys Asn Ser Ile Leu Thr Leu Ser
    50                  55                  60
Asp Lys Arg Ser Ile Met Gly Asn Gln Ser Leu Leu Trp Lys Trp Lys
65                  70                  75                  80
Gly Gly Ser Ser Phe Thr Leu His Lys Lys Leu Ile Val Pro Thr Asp
                85                  90                  95
Lys Glu Ala Ser Lys Ala Trp Gly Arg Ser Ser Thr Pro Val Phe Ser
            100                 105                 110
Phe Trp Leu Tyr Asn Glu Lys Pro Ile Asp Gly Tyr Leu Thr Ile Asp
        115                 120                 125
Phe Gly Glu Lys Leu Ile Ser Thr Ser Glu Ala Gln Ala Gly Phe Lys
    130                 135                 140
Val Lys Leu Asp Phe Thr Gly Trp Arg Ala Val Gly Val Ser Leu Asn
145                 150                 155                 160
Asn Asp Leu Glu Asn Arg Glu Met Thr Leu Asn Ala Thr Asn Thr Ser
                165                 170                 175
Ser Asp Gly Thr Gln Asp Ser Ile Gly Arg Ser Leu Gly Ala Lys Val
            180                 185                 190
Asp Ser Ile Arg Phe Lys Ala Pro Ser Asn Val Ser Gln Gly Glu Ile
        195                 200                 205
Tyr Ile Asp Arg Ile Met Phe Ser Val Asp Asp Ala Arg Tyr Gln Trp
    210                 215                 220
Ser Asp Tyr Gln Val Lys Thr Arg Leu Ser Glu Pro Glu Ile Gln Phe
225                 230                 235                 240
His Asn Val Lys Pro Gln Leu Pro Val Thr Pro Glu Asn Leu Ala Ala
                245                 250                 255
Ile Asp Leu Ile Arg Gln Arg Leu Ile Asn Glu Phe Val Gly Gly Glu
            260                 265                 270
Lys Glu Thr Asn Leu Ala Leu Glu Glu Asn Ile Ser Lys Leu Lys Ser
        275                 280                 285
Asp Phe Asp Ala Leu Asn Ile His Thr Leu Ala Asn Gly Gly Thr Gln
    290                 295                 300
Gly Arg His Leu Ile Thr Asp Lys Gln Ile Ile Ile Tyr Gln Pro Glu
305                 310                 315                 320
Asn Leu Asn Ser Gln Asp Lys Gln Leu Phe Asp Asn Tyr Val Ile Leu
                325                 330                 335
Gly Asn Tyr Thr Thr Leu Met Phe Asn Ile Ser Arg Ala Tyr Val Leu
            340                 345                 350
Glu Lys Asp Pro Thr Gln Lys Ala Gln Leu Lys Gln Met Tyr Leu Leu
        355                 360                 365
Met Thr Lys His Leu Leu Asp Gln Gly Phe Val Lys Gly Ser Ala Leu
    370                 375                 380
Val Thr Thr His His Trp Gly Tyr Ser Ser Arg Trp Trp Tyr Ile Ser
385                 390                 395                 400
Thr Leu Leu Met Ser Asp Ala Leu Lys Glu Ala Asn Leu Gln Thr Gln
                405                 410                 415
Val Tyr Asp Ser Leu Leu Trp Tyr Ser Arg Glu Phe Lys Ser Ser Phe
            420                 425                 430
Asp Met Lys Val Ser Ala Asp Ser Ser Asp Leu Asp Tyr Phe Asn Thr
        435                 440                 445
Leu Ser Arg Gln His Leu Ala Leu Leu Leu Leu Glu Pro Asp Asp Gln
    450                 455                 460
Lys Arg Ile Asn Leu Val Asn Thr Phe Ser His Tyr Ile Thr Gly Ala
465                 470                 475                 480
Leu Thr Gln Val Pro Pro Gly Gly Lys Asp Gly Leu Arg Pro Asp Gly
                485                 490                 495
```

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Thr Ala Trp Arg His Glu Gly Asn Tyr Pro Gly Tyr Ser Phe Pro Ala
            500                 505                 510
Phe Lys Asn Ala Ser Gln Leu Ile Tyr Leu Leu Arg Asp Thr Pro Phe
        515                 520                 525
Ser Val Gly Glu Ser Gly Trp Asn Asn Leu Lys Lys Ala Met Val Ser
    530                 535                 540
Ala Trp Ile Tyr Ser Asn Pro Glu Val Gly Leu Pro Leu Ala Gly Arg
545                 550                 555                 560
His Pro Phe Asn Ser Pro Ser Leu Lys Ser Val Ala Gln Gly Tyr Tyr
                565                 570                 575
Trp Leu Ala Met Ser Ala Lys Ser Ser Pro Asp Lys Thr Leu Ala Ser
            580                 585                 590
Ile Tyr Leu Ala Ile Ser Asp Lys Thr Gln Asn Glu Ser Thr Ala Ile
        595                 600                 605
Phe Gly Glu Thr Ile Thr Pro Ala Ser Leu Pro Gln Gly Phe Tyr Ala
    610                 615                 620
Phe Asn Gly Gly Ala Phe Gly Ile His Arg Trp Gln Asp Lys Met Val
625                 630                 635                 640
Thr Leu Lys Ala Tyr Asn Thr Asn Val Trp Ser Ser Glu Ile Tyr Asn
                645                 650                 655
Lys Asp Asn Arg Tyr Gly Arg Tyr Gln Ser His Gly Val Ala Gln Ile
            660                 665                 670
Val Ser Asn Gly Ser Gln Leu Ser Gln Gly Tyr Gln Gln Glu Gly Trp
        675                 680                 685
Asp Trp Asn Arg Met Glu Gly Ala Thr Thr Ile His Leu Pro Leu Lys
    690                 695                 700
Asp Leu Asp Ser Pro Lys Pro His Thr Leu Met Gln Arg Gly Glu Arg
705                 710                 715                 720
Gly Phe Ser Gly Thr Ser Ser Leu Glu Gly Gln Tyr Gly Met Met Ala
                725                 730                 735
Phe Asn Leu Ile Tyr Pro Ala Asn Leu Glu Arg Phe Asp Pro Asn Phe
            740                 745                 750
Thr Ala Lys Lys Ser Val Leu Ala Ala Asp Asn His Leu Ile Phe Ile
        755                 760                 765
Gly Ser Asn Ile Asn Ser Ser Asp Lys Asn Lys Asn Val Glu Thr Thr
    770                 775                 780
Leu Phe Gln His Ala Ile Thr Pro Thr Leu Asn Thr Leu Trp Ile Asn
785                 790                 795                 800
Gly Gln Lys Ile Glu Asn Met Pro Tyr Gln Thr Thr Leu Gln Gln Gly
                805                 810                 815
Asp Trp Leu Ile Asp Ser Asn Gly Asn Gly Tyr Leu Ile Thr Gln Ala
            820                 825                 830
Glu Lys Val Asn Val Ser Arg Gln His Gln Val Ser Ala Glu Asn Lys
        835                 840                 845
Asn Arg Gln Pro Thr Glu Gly Asn Phe Ser Ser Ala Trp Ile Asp His
    850                 855                 860
Ser Thr Arg Pro Lys Asp Ala Ser Tyr Glu Tyr Met Val Phe Leu Asp
865                 870                 875                 880
Ala Thr Pro Glu Lys Met Gly Glu Met Ala Gln Lys Phe Arg Glu Asn
                885                 890                 895
Asn Gly Leu Tyr Gln Val Leu Arg Lys Asp Lys Asp Val His Ile Ile
            900                 905                 910
Leu Asp Lys Leu Ser Asn Val Thr Gly Tyr Ala Phe Tyr Gln Pro Ala
        915                 920                 925
Ser Ile Glu Asp Lys Trp Ile Lys Lys Val Asn Lys Pro Ala Ile Val
    930                 935                 940
Met Thr His Arg Gln Lys Asp Thr Leu Ile Val Ser Ala Val Thr Pro
945                 950                 955                 960
```

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Asp Leu Asn Met Thr Arg Gln Lys Ala Ala Thr Pro Val Thr Ile Asn
                965                 970                 975
Val Thr Ile Asn Gly Lys Trp Gln Ser Ala Asp Lys Asn Ser Glu Val
            980                 985                 990
Lys Tyr Gln Val Ser Gly Asp Asn Thr Glu Leu Thr Phe Thr Ser Tyr
        995                 1000                1005
Phe Gly Ile Pro Gln Glu Ile Lys Leu Ser Pro Leu Pro
    1010                1015                1020


<210> 99
<211> 684
<212> PRT
<213> Pedobacter heparinus

<220>
<223> Pedobacter heparinus DSM 2366 chondroitin AC lyase


<400> 99
Pro Ala Leu Leu Ile Ala Gln Gln Thr Gly Thr Ala Glu Leu Ile Met
 1               5                  10                  15
Lys Arg Val Met Leu Asp Leu Lys Lys Pro Leu Arg Asn Met Asp Lys
            20                  25                  30
Val Ala Glu Lys Asn Leu Asn Thr Leu Gln Pro Asp Gly Ser Trp Lys
        35                  40                  45
Asp Val Pro Tyr Lys Asp Asp Ala Met Thr Asn Trp Leu Pro Asn Asn
    50                  55                  60
His Leu Leu Gln Leu Glu Thr Ile Ile Gln Ala Tyr Ile Glu Lys Asp
65                  70                  75                  80
Ser His Tyr Tyr Gly Asp Asp Lys Val Phe Asp Gln Ile Ser Lys Ala
                85                  90                  95
Phe Lys Tyr Trp Tyr Asp Ser Asp Pro Lys Ser Arg Asn Trp Trp His
            100                 105                 110
Asn Glu Ile Ala Thr Pro Gln Ala Leu Gly Glu Met Leu Ile Leu Met
        115                 120                 125
Arg Tyr Gly Lys Lys Pro Leu Asp Glu Ala Leu Val His Lys Leu Thr
    130                 135                 140
Glu Arg Met Lys Arg Gly Glu Pro Glu Lys Lys Thr Gly Ala Asn Lys
145                 150                 155                 160
Thr Asp Ile Ala Leu His Tyr Phe Tyr Arg Ala Leu Leu Thr Ser Asp
                165                 170                 175
Glu Ala Leu Leu Ser Phe Ala Val Lys Glu Leu Phe Tyr Pro Val Gln
            180                 185                 190
Phe Val His Tyr Glu Glu Gly Leu Gln Tyr Asp Tyr Ser Tyr Leu Gln
        195                 200                 205
His Gly Pro Gln Leu Gln Ile Ser Ser Tyr Gly Ala Val Phe Ile Thr
    210                 215                 220
Gly Val Leu Lys Leu Ala Asn Tyr Val Arg Asp Thr Pro Tyr Ala Leu
225                 230                 235                 240
Ser Thr Glu Lys Leu Ala Ile Phe Ser Lys Tyr Tyr Arg Asp Ser Tyr
                245                 250                 255
Leu Lys Ala Ile Arg Gly Ser Tyr Met Asp Phe Asn Val Glu Gly Arg
            260                 265                 270
Gly Val Ser Arg Pro Asp Ile Leu Asn Lys Lys Ala Glu Lys Lys Arg
        275                 280                 285
Leu Leu Val Ala Lys Met Ile Asp Leu Lys His Thr Glu Glu Trp Ala
    290                 295                 300
```

```
Asp Ala Ile Ala Arg Thr Asp Ser Thr Val Ala Ala Gly Tyr Lys Ile
305                 310                 315                 320
Glu Pro Tyr His His Gln Phe Trp Asn Gly Asp Tyr Val Gln His Leu
                325                 330                 335
Arg Pro Ala Tyr Ser Phe Asn Val Arg Met Val Ser Lys Arg Thr Arg
            340                 345                 350
Arg Ser Glu Ser Gly Asn Lys Glu Asn Leu Leu Gly Arg Tyr Leu Ser
        355                 360                 365
Asp Gly Ala Thr Asn Ile Gln Leu Arg Gly Pro Glu Tyr Tyr Asn Ile
    370                 375                 380
Met Pro Val Trp Glu Trp Asp Lys Ile Pro Gly Ile Thr Ser Arg Asp
385                 390                 395                 400
Tyr Leu Thr Asp Arg Pro Leu Thr Lys Leu Trp Gly Glu Gln Gly Ser
                405                 410                 415
Asn Asp Phe Ala Gly Gly Val Ser Asp Gly Val Tyr Gly Ala Ser Ala
            420                 425                 430
Tyr Ala Leu Asp Tyr Asp Ser Leu Gln Ala Lys Lys Ala Trp Phe Phe
        435                 440                 445
Phe Asp Lys Glu Ile Val Cys Leu Gly Ala Gly Ile Asn Ser Asn Ala
    450                 455                 460
Pro Glu Asn Ile Thr Thr Thr Leu Asn Gln Ser Trp Leu Asn Gly Pro
465                 470                 475                 480
Val Ile Ser Thr Ala Gly Lys Thr Gly Arg Gly Lys Ile Thr Thr Phe
                485                 490                 495
Lys Ala Gln Gly Gln Phe Trp Leu Leu His Asp Ala Ile Gly Tyr Tyr
            500                 505                 510
Phe Pro Glu Gly Ala Asn Leu Ser Leu Ser Thr Gln Ser Gln Lys Gly
        515                 520                 525
Asn Trp Phe His Ile Asn Asn Ser His Ser Lys Asp Glu Val Ser Gly
    530                 535                 540
Asp Val Phe Lys Leu Trp Ile Asn His Gly Ala Arg Pro Glu Asn Ala
545                 550                 555                 560
Gln Tyr Ala Tyr Ile Val Leu Pro Gly Ile Asn Lys Pro Glu Glu Ile
                565                 570                 575
Lys Lys Tyr Asn Gly Thr Ala Pro Lys Val Leu Ala Asn Thr Asn Gln
            580                 585                 590
Leu Gln Ala Val Tyr His Gln Gln Leu Asp Met Val Gln Ala Ile Phe
        595                 600                 605
Tyr Thr Ala Gly Lys Leu Ser Val Ala Gly Ile Glu Ile Glu Thr Asp
    610                 615                 620
Lys Pro Cys Ala Val Leu Ile Lys His Ile Asn Gly Lys Gln Val Ile
625                 630                 635                 640
Trp Ala Ala Asp Pro Leu Gln Lys Glu Lys Thr Ala Val Leu Ser Ile
                645                 650                 655
Arg Asp Leu Lys Thr Gly Lys Thr Asn Arg Val Lys Ile Asp Phe Pro
            660                 665                 670
Gln Gln Glu Phe Ala Gly Ala Thr Val Glu Leu Lys
        675                 680
```

<210> 100
<211> 844
<212> PRT
<213> Victivallis vadensis

<220>
<223> Victivallis vadensis ATCC BAA-548 chondroitin AC lyase

<400> 100
Met His Arg Lys Ile Val Phe Pro Leu Phe Val Leu Leu Phe Thr Ala
 1   5   10   15
Phe Ala Ala Phe Ala Ala Ser Gln Pro Gln Trp Lys Trp Arg Gln Ser
            20   25   30
Lys Tyr Cys Arg Ile Thr Glu His Ala Gly Lys Lys Leu Leu Thr Val
        35   40   45
Ala Ile Pro Ala Asp Ala Pro Glu Ile Ser Arg Arg Asn Thr Ala Asp
    50   55   60
Thr Pro Val Gly Leu Thr Cys Phe Glu Gly Gln Pro Ile Glu Phe Ser
65   70   75   80
Ile Arg Leu Arg Asn Ser Gly Ile Ser Arg Pro Asp Asn Leu His Asn
                85   90   95
Gly Ile Lys Phe Gln Leu Tyr Phe Arg Asp Gly Asn Gly Thr Glu Arg
            100   105   110
Trp Thr Gln Ala Glu Ile Pro His Glu Pro Phe Pro Trp Arg Arg Phe
        115   120   125
Arg Phe Ser Glu Arg Ile Pro Ala Asp Ala Thr Ser Gly Thr Leu Arg
    130   135   140
Leu Gly Leu Gln Gly Ser Ser Gly Asn Val Glu Phe Asp Leu Asp Ser
145   150   155   160
Leu Gln Ile Arg Pro Leu Asp Pro Glu Leu Ser Pro Val Pro Pro Thr
                165   170   175
Pro Glu Gln Ile Arg Glu Cys Glu Leu Ile Glu Ser Arg Leu Arg Ala
            180   185   190
Gly Leu Pro Ala Gln Gln Pro Pro Pro Gly Pro Glu Val Lys Lys Leu
        195   200   205
Leu Glu Arg Gln Asn Gly Asp Gly Thr Phe Arg Asp Leu Asp Tyr Ser
    210   215   220
Ala Arg Asn Arg Ser Ile Trp Pro Ala Ala Arg His Leu Lys Arg Thr
225   230   235   240
Phe Glu Leu Ala Leu Ala Arg Ala Thr Pro Gly His Ala Leu Tyr Arg
                245   250   255
Asp Pro Ala Ala Gly Glu Ala Val Arg Lys Ala Val Ala Trp Trp Ala
            260   265   270
Glu Arg Gln Pro Gln Asn Gly Asn Trp Trp Trp Asn Asp Met Tyr Val
        275   280   285
Pro Lys Ile Leu Gly Asn Ile Leu Leu Leu Ser Pro Glu Leu Phe Pro
    290   295   300
Asp Gly Pro Arg Arg Arg Ala Ala Leu Asn Val Cys Arg Gln Ala Cys
305   310   315   320
Phe Leu Ser Arg Tyr Thr Gly Asn Asn Arg Val Phe Ile Ala Ala Asn
                325   330   335
Ile Phe Cys Arg Ala Leu Leu Glu Arg Asn Leu Pro Val Met Asp Arg
            340   345   350
Ala Ala Ala Val Leu Ser Glu Glu Ile Arg Phe Ala Pro Ala Glu His
        355   360   365
Lys Thr Ala Trp Ser Phe Gly Gly Ile Arg Ala Asp Gly Cys Tyr His
    370   375   380
Gln His Gly Pro Gln Ile Gln Phe Gly Asn Tyr Gly Gly Glu Phe Leu
385   390   395   400
Ala Asn Ile Ala Tyr Trp Ser Asn Ile Leu Lys Glu Thr His Trp Glu
                405   410   415
Leu Ser Pro Glu Gln Trp Arg Ile Met Arg His Leu Thr Phe Asn Gly
            420   425   430
Phe Gln Trp Val Leu Trp Arg Gly Arg Met Asp Leu Leu Ala Cys Gly

```
        435                 440                 445
Arg Gln Leu Gly Arg Asn Ala Ala Glu Thr Lys Gly Glu Arg Thr Leu
    450                 455                 460
Asn Ala Phe Ala Gln Leu Arg Asn Ala Asp Pro Gly Asp Arg Ala Pro
465                 470                 475                 480
Tyr Asp Ala Ala Leu Arg Arg Asn Arg Asp Gly Glu Asn Thr Leu Thr
                485                 490                 495
Gly Asn Arg His Phe Trp Asn Ser Asp Tyr Met Val His Arg Arg Pro
            500                 505                 510
Thr Trp Tyr Ala Ser Val Arg Met Asn Ser Val Arg Val Arg Pro Ile
        515                 520                 525
Glu Asp Asp Thr Asn Trp Asp Asn Ala Leu Gly Arg Tyr Phe Ser Asp
    530                 535                 540
Gly Ala Cys Leu Val Met Arg Ser Gly Arg Glu Tyr Glu Asn Ile Thr
545                 550                 555                 560
Ala Cys Trp Asp Trp Thr Arg Leu Pro Gly Thr Thr Leu Pro Lys Thr
                565                 570                 575
Pro Val Tyr Thr Gly Glu Asp Ala Arg Arg Phe Gly Leu Lys Ile Gly
            580                 585                 590
Gly Gly Asp Leu Pro Arg Trp Thr His Ser Arg Asn Trp Arg Gln Leu
        595                 600                 605
Gly Glu Thr Gly Phe Val Gly Gly Val Thr Asp Gly Glu Arg Gly Ala
    610                 615                 620
Ala Val Tyr Thr Gln Asp Leu Asp Gly Val Arg Ala Arg Lys Ala Trp
625                 630                 635                 640
Phe Phe Asp Arg Asp Ala Ile Tyr Cys Leu Gly Ser Gly Ile Thr Ser
                645                 650                 655
Thr Ser Pro Tyr Glu Val Ala Thr Thr Val Asn Ser Cys Leu Arg Asn
            660                 665                 670
Gly Glu Ile Gln Gln Gly Asp Gly Trp Phe Arg His Asp Gly Ile Gly
        675                 680                 685
Tyr Arg Gly Glu Asn Leu Lys Leu Thr Ala Gly Pro Arg Thr Gly Asp
    690                 695                 700
Trp Arg Tyr Val Glu Gly Gly Leu Thr Arg Pro Val Pro Glu Thr Lys
705                 710                 715                 720
Glu Leu Phe Thr Leu Thr Val Glu His Gly Val Lys Pro Arg Asn Ala
                725                 730                 735
Ser Tyr Ile Tyr Thr Ile Leu Pro Gly Ala Thr Pro Glu Glu Thr Ala
            740                 745                 750
Gly Thr Pro Pro Gly Arg Val Leu Arg Asn Thr Pro Glu Cys Gln Ala
        755                 760                 765
Val Glu Phe Ala Asp Gly Val Arg Ala Ala Ile Phe Tyr Glu Pro Gly
    770                 775                 780
Arg Leu Asp Asp Phe Glu Thr Asp Thr Pro Gly Val Phe Leu Ile Gly
785                 790                 795                 800
Lys Gly Thr Val His Ala Ala Asp Pro Thr Gly Arg His Ser Ser Phe
                805                 810                 815
Thr Leu Lys Leu Asn Gly Val Ser Arg Lys Val Pro Leu Pro Ala Gly
            820                 825                 830
Glu Phe Ala Gly Gln Ser Val Lys Ile Val Leu Lys
        835                 840
```

<210> 101
<211> 510
<212> PRT
<213> Pan troglodyte

<220>
<223> Chimpanzee PH20

<400> 101
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1   5   10   15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20   25   30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35   40   45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50   55   60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65   70   75   80
Ile Asn Val Thr Gly Gln Asp Val Thr Ile Phe Tyr Val Asp Arg Leu
                85   90   95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100   105   110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115   120   125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130   135   140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145   150   155   160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165   170   175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180   185   190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195   200   205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210   215   220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225   230   235   240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245   250   255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260   265   270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Gln Glu Ala Ile Arg Val
        275   280   285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Val Tyr Thr
    290   295   300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305   310   315   320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325   330   335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340   345   350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355   360   365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370   375   380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385   390   395   400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405   410   415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420   425   430

```
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Ser Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Asp
                485                 490                 495
Leu Cys Asp Leu Tyr Leu Val Pro Thr Ser Tyr Leu Ile Leu
            500                 505                 510


<210> 102
<211> 512
<212> PRT
<213> Macaca mulatta

<220>
<223> Rhesus Monkey PH20

<400> 102
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Ile Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asn Glu Pro Leu Asp Met Ser Leu Phe Thr Leu Met Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ile Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Leu Thr Thr Gly Val Thr Val His Gly
            100                 105                 110
Gly Ile Pro Gln Lys Val Ser Leu Gln Asp His Leu Asp Lys Ser Lys
        115                 120                 125
Gln Asp Ile Leu Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Pro Gln Ala Thr Asp Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Met Leu Glu Thr Ile Lys Leu Gly Arg
        195                 200                 205
Ser Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Arg Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asp
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Val Val
            260                 265                 270
Val Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Asn Pro Leu Pro Val Phe Val Tyr Ala
```

```
    290                 295                 300
Arg Leu Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Arg Glu Glu
305                 310                 315                 320
Leu Val Ser Thr Leu Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Ser Leu Ser Ile Thr Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Thr Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asp Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Asp Ile Arg Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val His Gly Lys Pro Thr Val Glu Asp Leu Glu Glu Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Thr Asn Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Ser Leu Lys Pro Pro Val Glu Thr Glu Gly Ser Pro Pro
465                 470                 475                 480
Ile Phe Tyr Asn Thr Ser Ser Ser Thr Val Ser Thr Thr Met Phe Ile
                485                 490                 495
Trp Arg Leu Glu Val Trp Asp Gln Gly Ile Ser Arg Ile Gly Phe Phe
            500                 505                 510


<210> 103
<211> 505
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-505


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 103
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
```

```
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val
                485                 490                 495
Ser Ile Leu Phe Leu Ile Ile Ser Ser
            500                 505
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<210> 104
<211> 503
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-503

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 104
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1   5   10   15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20   25   30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35   40   45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50   55   60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65   70   75   80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85   90   95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100   105   110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115   120   125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130   135   140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145   150   155   160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165   170   175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180   185   190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195   200   205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210   215   220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225   230   235   240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245   250   255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260   265   270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275   280   285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290   295   300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305   310   315   320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325   330   335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340   345   350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355   360   365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln

```
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val
                485                 490                 495
Ser Ile Leu Phe Leu Ile Ile
            500


<210> 105
<211> 501
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-501


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 105
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
```

```
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val
                485                 490                 495
Ser Ile Leu Phe Leu
            500
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<210> 106
<211> 499
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-499

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 106
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1   5   10   15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20   25   30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35   40   45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50   55   60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65   70   75   80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85   90   95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100   105   110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115   120   125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130   135   140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145   150   155   160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165   170   175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180   185   190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195   200   205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210   215   220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225   230   235   240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245   250   255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260   265   270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275   280   285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290   295   300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305   310   315   320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325   330   335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340   345   350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355   360   365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370   375   380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385   390   395   400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405   410   415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420   425   430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435   440   445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys

```
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val
                485                 490                 495
Ser Ile Leu
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<210> 107
<211> 497
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-497

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 107

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Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
```

```
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val
                485                 490                 495
Ser
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<210> 108
<211> 495
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-495

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 108

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Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
```

```
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile
                485                 490                 495
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<210> 109

<211> 493
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-493

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 109
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1   5   10   15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20   25   30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35   40   45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50   55   60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65   70   75   80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85   90   95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100   105   110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115   120   125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130   135   140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145   150   155   160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165   170   175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180   185   190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195   200   205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210   215   220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225   230   235   240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245   250   255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260   265   270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275   280   285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290   295   300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305   310   315   320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325   330   335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu

```
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr Leu Ser Ala Thr Met
                485                 490


<210> 110
<211> 491
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-491


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 110
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
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                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr Leu Ser Ala
                485                 490


<210> 111
<211> 489
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-489


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence
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<400> 111
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1   5   10   15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20   25   30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35   40   45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50   55   60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65   70   75   80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85   90   95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100   105   110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115   120   125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130   135   140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145   150   155   160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165   170   175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180   185   190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195   200   205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210   215   220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225   230   235   240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245   250   255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260   265   270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275   280   285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290   295   300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305   310   315   320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325   330   335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340   345   350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355   360   365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370   375   380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385   390   395   400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405   410   415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420   425   430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435   440   445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys

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    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr Leu
                485
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<210> 112
<211> 490
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-490

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 112

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Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
```

```
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr Leu Ser
                485                 490


<210> 113
<211> 487
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-487


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 113
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
```

```
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser
                485
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<210> 114
<211> 485
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues

1-485

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 114

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Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
```

385 390 395 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
405 410 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
420 425 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
435 440 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
450 455 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465 470 475 480
Phe Tyr Asn Ala Ser
485

<210> 115
<211> 484
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-484

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 115
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
1 5 10 15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
20 25 30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
35 40 45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
50 55 60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65 70 75 80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
85 90 95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
100 105 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
115 120 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
130 135 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145 150 155 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
165 170 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
180 185 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
195 200 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys

```
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala



<210> 116
<211> 476
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-476


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 116
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
```

```
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu
465                 470                 475
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<210> 117

<211> 475
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-475

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 117
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1   5   10   15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20   25   30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35   40   45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50   55   60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65   70   75   80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85   90   95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100   105   110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115   120   125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130   135   140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145   150   155   160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165   170   175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180   185   190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195   200   205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210   215   220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225   230   235   240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245   250   255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260   265   270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275   280   285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290   295   300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305   310   315   320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325   330   335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu

```
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr
465                 470                 475


<210> 118
<211> 474
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-474


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 118
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
```

```
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu
465                 470


<210> 119
<211> 473
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-473


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 119
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
```

```
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met
465                 470
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<210> 120
<211> 472
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-472

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 120
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1   5   10   15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20   25   30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35   40   45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50   55   60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65   70   75   80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85   90   95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100   105   110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115   120   125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130   135   140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145   150   155   160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165   170   175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180   185   190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195   200   205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210   215   220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225   230   235   240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245   250   255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260   265   270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275   280   285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290   295   300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305   310   315   320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile

```
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro
465                 470


<210> 121
<211> 471
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-471


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 121
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
```

```
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro
465                 470


<210> 122
<211> 470
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-470


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 122
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
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 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys
```

465 470

<210> 123
<211> 469
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues 1-469

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 123
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
1 5 10 15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
20 25 30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
35 40 45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
50 55 60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65 70 75 80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
85 90 95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
100 105 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
115 120 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
130 135 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145 150 155 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
165 170 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
180 185 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
195 200 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
210 215 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225 230 235 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
245 250 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
260 265 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
275 280 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
290 295 300

```
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu
465
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<210> 124
<211> 468
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-468

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 124

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Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
```

```
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe
465
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<210> 125
<211> 466
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-466

<220>
<221> SIGNAL
<222> (1)...(35)

<223> signal sequence

<400> 125

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Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
```

```
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp
465


<210> 126
<211> 465
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-465


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 126
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
```

```
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile
465
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<210> 127
<211> 464
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-464

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 127

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Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
```

```
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460


<210> 128
<211> 462
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-462


<220>
<221> SIGNAL
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<222> (1)...(35)
<223> signal sequence

<400> 128
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1   5   10   15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20   25   30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35   40   45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50   55   60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65   70   75   80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85   90   95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100   105   110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115   120   125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130   135   140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145   150   155   160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165   170   175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180   185   190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195   200   205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210   215   220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225   230   235   240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245   250   255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260   265   270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275   280   285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290   295   300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305   310   315   320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325   330   335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340   345   350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355   360   365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370   375   380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385   390   395   400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405   410   415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420   425   430

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Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly
    450                 455                 460


<210> 129
<211> 460
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-460


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 129
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
```

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Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala
    450                 455                 460


<210> 130
<211> 458
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-458


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 130
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
```

```
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys
    450                 455


<210> 131
<211> 456
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-456


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 131
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Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp
    450                 455
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<210> 132
<211> 454
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-454

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 132
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1   5   10   15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20   25   30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35   40   45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50   55   60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65   70   75   80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85   90   95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100   105   110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115   120   125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130   135   140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145   150   155   160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165   170   175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180   185   190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195   200   205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210   215   220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225   230   235   240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245   250   255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260   265   270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275   280   285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290   295   300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305   310   315   320

```
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala
    450


<210> 133
<211> 452
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-452


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 133
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
```

```
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr
    450
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<210> 134
<211> 450
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-450

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 134

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Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
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```
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys
    450
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<210> 135
<211> 508

<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-508

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 135

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Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
```

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Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val
                485                 490                 495
Ser Ile Leu Phe Leu Ile Ile Ser Ser Val Ala Ser
            500                 505


<210> 136
<211> 506
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-506



<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 136
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
```

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145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val
                485                 490                 495
Ser Ile Leu Phe Leu Ile Ile Ser Ser Val
            500                 505
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<210> 137
<211> 504
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues 1-504

<220>

<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 137
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1   5   10   15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20   25   30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35   40   45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50   55   60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65   70   75   80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85   90   95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100   105   110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115   120   125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130   135   140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145   150   155   160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165   170   175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180   185   190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195   200   205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210   215   220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225   230   235   240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245   250   255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260   265   270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275   280   285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290   295   300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305   310   315   320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325   330   335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340   345   350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355   360   365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370   375   380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385   390   395   400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405   410   415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys

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            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val
                485                 490                 495
Ser Ile Leu Phe Leu Ile Ile Ser
            500


<210> 138
<211> 502
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-502


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 138
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
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225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val
                485                 490                 495
Ser Ile Leu Phe Leu Ile
            500


<210> 139
<211> 500
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-500


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 139
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
```

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        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val
                485                 490                 495
Ser Ile Leu Phe
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500

<210> 140
<211> 498
<212> PRT
<213> Homo sapiens

<220>
<223> HuPH20 precursor 1-498

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 140
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1   5   10   15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20   25   30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35   40   45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50   55   60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65   70   75   80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85   90   95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100   105   110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115   120   125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130   135   140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145   150   155   160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165   170   175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180   185   190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195   200   205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210   215   220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225   230   235   240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245   250   255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260   265   270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275   280   285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290   295   300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305   310   315   320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile

```
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val
                485                 490                 495
Ser Ile
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<210> 141
<211> 496
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-496

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 141

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Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
```

```
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val
                485                 490                 495
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<210> 142
<211> 494
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-494

<220>

<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 142
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1   5   10   15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20   25   30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35   40   45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50   55   60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65   70   75   80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85   90   95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100   105   110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115   120   125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130   135   140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145   150   155   160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165   170   175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180   185   190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195   200   205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210   215   220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225   230   235   240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245   250   255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260   265   270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275   280   285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290   295   300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305   310   315   320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325   330   335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340   345   350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355   360   365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370   375   380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385   390   395   400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405   410   415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys

```
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe
                485                 490


<210> 143
<211> 492
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-492


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 143
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
```

```
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr Leu Ser Ala Thr
                485                 490


<210> 144
<211> 488
<212> PRT
<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
      1-488


<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 144
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1               5                  10                  15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20                  25                  30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35                  40                  45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50                  55                  60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
```

```
65                  70                  75                  80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85                  90                  95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100                 105                 110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115                 120                 125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130                 135                 140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145                 150                 155                 160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165                 170                 175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180                 185                 190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195                 200                 205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210                 215                 220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225                 230                 235                 240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245                 250                 255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260                 265                 270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275                 280                 285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290                 295                 300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305                 310                 315                 320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325                 330                 335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340                 345                 350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro Ser Thr
                485
```

<210> 145
<211> 486
<212> PRT

<213> Homo sapiens

<220>
<223> precursor soluble human PH20, amino acid residues
1-486

<220>
<221> SIGNAL
<222> (1)...(35)
<223> signal sequence

<400> 145
Met Gly Val Leu Lys Phe Lys His Ile Phe Phe Arg Ser Phe Val Lys
 1   5   10   15
Ser Ser Gly Val Ser Gln Ile Val Phe Thr Phe Leu Leu Ile Pro Cys
            20   25   30
Cys Leu Thr Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro
        35   40   45
Phe Leu Trp Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe
    50   55   60
Asp Glu Pro Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg
65   70   75   80
Ile Asn Ala Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu
                85   90   95
Gly Tyr Tyr Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly
            100   105   110
Gly Ile Pro Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys
        115   120   125
Lys Asp Ile Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val
    130   135   140
Ile Asp Trp Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro
145   150   155   160
Lys Asp Val Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn
                165   170   175
Val Gln Leu Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe
            180   185   190
Glu Lys Ala Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys
        195   200   205
Leu Leu Arg Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys
    210   215   220
Tyr Asn His His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn
225   230   235   240
Val Glu Ile Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser
                245   250   255
Thr Ala Leu Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val
            260   265   270
Ala Ala Thr Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val
        275   280   285
Ser Lys Ile Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr
    290   295   300
Arg Ile Val Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu
305   310   315   320
Leu Val Tyr Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile
                325   330   335
Val Ile Trp Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu
            340   345   350
Leu Leu Asp Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn

```
        355                 360                 365
Val Thr Leu Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln
    370                 375                 380
Gly Val Cys Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu
385                 390                 395                 400
Asn Pro Asp Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr
                405                 410                 415
Val Arg Gly Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys
            420                 425                 430
Phe Tyr Cys Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp
        435                 440                 445
Val Lys Asp Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
    450                 455                 460
Ile Asp Ala Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile
465                 470                 475                 480
Phe Tyr Asn Ala Ser Pro
                485
```

<210> 146
<211> 472
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-507

<400> 146

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Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
```

```
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435                 440                 445
Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val Ser Ile Leu
    450                 455                 460
Phe Leu Ile Ile Ser Ser Val Ala
465                 470
```

<210> 147
<211> 470
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-505

<400> 147

```
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
```

```
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435                 440                 445
Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val Ser Ile Leu
    450                 455                 460
Phe Leu Ile Ile Ser Ser
465                 470
```

<210> 148
<211> 468
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-503

<400> 148
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1   5   10   15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20   25   30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35   40   45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50   55   60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65   70   75   80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85   90   95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100   105   110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115   120   125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130   135   140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145   150   155   160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165   170   175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180   185   190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195   200   205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210   215   220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225   230   235   240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245   250   255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260   265   270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275   280   285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290   295   300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305   310   315   320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325   330   335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340   345   350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355   360   365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370   375   380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385   390   395   400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405   410   415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420   425   430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435   440   445

```
Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val Ser Ile Leu
    450                 455                 460
Phe Leu Ile Ile
465
```

<210> 149
<211> 466
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
      36-501

<400> 149

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Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
```

```
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435                 440                 445
Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val Ser Ile Leu
    450                 455                 460
Phe Leu
465
```

<210> 150
<211> 464
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-499

<400> 150

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Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
```

```
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435                 440                 445
Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val Ser Ile Leu
    450                 455                 460


<210> 151
<211> 462
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
      36-497


<400> 151
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
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            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435                 440                 445
Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val Ser
    450                 455                 460
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<210> 152
<211> 460
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-495

<400> 152

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Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435                 440                 445
Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile
    450                 455                 460
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<210> 153
<211> 458
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-493

<400> 153
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1   5   10   15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20   25   30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35   40   45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50   55   60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65   70   75   80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85   90   95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100   105   110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115   120   125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130   135   140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145   150   155   160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165   170   175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180   185   190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195   200   205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210   215   220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225   230   235   240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245   250   255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260   265   270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275   280   285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290   295   300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305   310   315   320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325   330   335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340   345   350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp

```
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435                 440                 445
Ala Ser Pro Ser Thr Leu Ser Ala Thr Met
    450                 455


<210> 154
<211> 456
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
      36-491


<400> 154
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
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Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435                 440                 445
Ala Ser Pro Ser Thr Leu Ser Ala
    450                 455


<210> 155
<211> 454
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
      36-489


<400> 155
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
```

145 150 155 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
165 170 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
180 185 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
195 200 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
210 215 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225 230 235 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
245 250 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
260 265 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
275 280 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
290 295 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305 310 315 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
325 330 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
340 345 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
355 360 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
370 375 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385 390 395 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
405 410 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
420 425 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
435 440 445
Ala Ser Pro Ser Thr Leu
450

<210> 156
<211> 455
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-490

<400> 156
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
1 5 10 15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
20 25 30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
35 40 45

```
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435                 440                 445
Ala Ser Pro Ser Thr Leu Ser
    450                 455
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<210> 157
<211> 452
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-487

<400> 157
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1   5   10   15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20   25   30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35   40   45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50   55   60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65   70   75   80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85   90   95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100   105   110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115   120   125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130   135   140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145   150   155   160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165   170   175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180   185   190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195   200   205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210   215   220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225   230   235   240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245   250   255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260   265   270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275   280   285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290   295   300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305   310   315   320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325   330   335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340   345   350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355   360   365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370   375   380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385   390   395   400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp

```
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435                 440                 445
Ala Ser Pro Ser
    450
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<210> 158
<211> 450
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-485

<400> 158

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Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
```

```
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435                 440                 445
Ala Ser
    450
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<210> 159
<211> 449
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-484

<400> 159

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Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
```

```
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435                 440                 445
Ala
```

<210> 160
<211> 441
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-476

<400> 160

```
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
```

```
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu
        435                 440
```

<210> 161
<211> 440
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-475

<400> 161

```
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
```

```
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr
        435                 440
```

<210> 162

<211> 439
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-474

<400> 162
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1   5   10   15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20   25   30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35   40   45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50   55   60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65   70   75   80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85   90   95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100   105   110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115   120   125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130   135   140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145   150   155   160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165   170   175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180   185   190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195   200   205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210   215   220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225   230   235   240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245   250   255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260   265   270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275   280   285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290   295   300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305   310   315   320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325   330   335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340   345   350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355   360   365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370   375   380

```
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu
        435
```

<210> 163
<211> 438
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-473

<400> 163

```
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
```

```
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met
        435
```

<210> 164
<211> 437
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-472

<400> 164

```
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
```

```
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro
        435
```

<210> 165
<211> 436
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-471

<400> 165

```
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
```

```
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro
        435
```

<210> 166
<211> 435
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-470

<400> 166

```
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
```

```
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys
        435
```

<210> 167
<211> 434
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-469

<400> 167
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1   5   10   15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20   25   30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35   40   45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50   55   60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65   70   75   80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85   90   95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100   105   110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115   120   125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130   135   140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145   150   155   160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165   170   175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180   185   190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195   200   205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210   215   220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225   230   235   240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245   250   255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260   265   270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275   280   285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290   295   300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305   310   315   320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325   330   335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340   345   350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355   360   365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370   375   380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385   390   395   400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp

```
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu
```

<210> 168
<211> 433
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-468

<400> 168

```
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
```

```
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe
```

<210> 169
<211> 431
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-466

<400> 169

```
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
```

225 230 235 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
245 250 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
260 265 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
275 280 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
290 295 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305 310 315 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
325 330 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
340 345 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
355 360 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
370 375 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385 390 395 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
405 410 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp
420 425 430

<210> 170
<211> 430
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-465

<400> 170
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
1 5 10 15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
20 25 30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
35 40 45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
50 55 60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65 70 75 80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
85 90 95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
100 105 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
115 120 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
130 135 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145 150 155 160

```
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile
            420                 425                 430


<210> 171
<211> 429
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
      36-464


<400> 171
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
```

```
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys
            420                 425
```

<210> 172
<211> 427
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-462

<400> 172

```
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
```

```
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly
            420                 425
```

<210> 173
<211> 425
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-460

<400> 173
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1   5   10   15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20   25   30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35   40   45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50   55   60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65   70   75   80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85   90   95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100   105   110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115   120   125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130   135   140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145   150   155   160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165   170   175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180   185   190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195   200   205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210   215   220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225   230   235   240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245   250   255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260   265   270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275   280   285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290   295   300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305   310   315   320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325   330   335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340   345   350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355   360   365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370   375   380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385   390   395   400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp

```
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala
            420                 425
```

<210> 174
<211> 423
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues 36-458

<400> 174

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Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
```

```
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys
            420
```

<210> 175
<211> 421
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-456

<400> 175

```
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
```

```
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp
            420
```

<210> 176
<211> 419
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-454

<400> 176

```
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
```

```
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala
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<210> 177
<211> 417
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-452

<400> 177

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Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
```

```
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr
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<210> 178
<211> 415
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-450

<400> 178

```
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
```

```
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys
                405                 410                 415
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<210> 179
<211> 473
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues

<400> 179
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1   5   10   15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20   25   30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35   40   45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50   55   60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65   70   75   80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85   90   95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100   105   110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115   120   125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130   135   140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145   150   155   160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165   170   175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180   185   190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195   200   205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210   215   220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225   230   235   240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245   250   255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260   265   270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275   280   285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290   295   300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305   310   315   320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325   330   335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340   345   350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355   360   365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370   375   380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385   390   395   400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405   410   415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420   425   430

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Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435                 440                 445
Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val Ser Ile Leu
    450                 455                 460
Phe Leu Ile Ile Ser Ser Val Ala Ser
465                 470


<210> 180
<211> 471
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
      36-506


<400> 180
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
```

305 310 315 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
325 330 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
340 345 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
355 360 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
370 375 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385 390 395 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
405 410 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
420 425 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
435 440 445
Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val Ser Ile Leu
450 455 460
Phe Leu Ile Ile Ser Ser Val
465 470

<210> 181
<211> 469
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-504

<400> 181
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
1 5 10 15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
20 25 30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
35 40 45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
50 55 60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65 70 75 80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
85 90 95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
100 105 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
115 120 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
130 135 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145 150 155 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
165 170 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
180 185 190

```
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435                 440                 445
Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val Ser Ile Leu
    450                 455                 460
Phe Leu Ile Ile Ser
465
```

<210> 182
<211> 467
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-502

<400> 182

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Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
```

65 70 75 80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
85 90 95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
100 105 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
115 120 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
130 135 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145 150 155 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
165 170 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
180 185 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
195 200 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
210 215 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225 230 235 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
245 250 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
260 265 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
275 280 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
290 295 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305 310 315 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
325 330 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
340 345 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
355 360 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
370 375 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385 390 395 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
405 410 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
420 425 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
435 440 445
Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val Ser Ile Leu
450 455 460
Phe Leu Ile
465

<210> 183
<211> 465
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-500

<400> 183
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1   5   10   15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20   25   30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35   40   45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50   55   60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65   70   75   80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85   90   95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100   105   110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115   120   125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130   135   140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145   150   155   160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165   170   175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180   185   190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195   200   205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210   215   220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225   230   235   240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245   250   255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260   265   270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275   280   285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290   295   300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305   310   315   320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325   330   335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340   345   350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355   360   365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370   375   380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385   390   395   400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405   410   415

Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420   425   430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435   440   445
Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val Ser Ile Leu
    450   455   460
Phe
465

<210> 184
<211> 463
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
      36-498

<400> 184
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1   5   10   15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20   25   30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35   40   45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50   55   60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65   70   75   80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85   90   95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100   105   110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115   120   125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130   135   140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145   150   155   160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165   170   175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180   185   190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195   200   205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210   215   220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225   230   235   240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245   250   255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260   265   270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275   280   285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp

```
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435                 440                 445
Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val Ser Ile
    450                 455                 460


<210> 185
<211> 461
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
      36-496


<400> 185
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
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His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435                 440                 445
Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe Ile Val
    450                 455                 460
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<210> 186
<211> 459
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-494

<400> 186

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Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
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                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435                 440                 445
Ala Ser Pro Ser Thr Leu Ser Ala Thr Met Phe
    450                 455
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<210> 187
<211> 457
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
36-492

<400> 187
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1   5   10   15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20   25   30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35   40   45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50   55   60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65   70   75   80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85   90   95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100   105   110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115   120   125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130   135   140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145   150   155   160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165   170   175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180   185   190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195   200   205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210   215   220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225   230   235   240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245   250   255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260   265   270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275   280   285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290   295   300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305   310   315   320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325   330   335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340   345   350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355   360   365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370   375   380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385   390   395   400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405   410   415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420   425   430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435   440   445

Ala Ser Pro Ser Thr Leu Ser Ala Thr
450 455

<210> 188
<211> 453
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues 36-488

<400> 188
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
1 5 10 15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
20 25 30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
35 40 45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
50 55 60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65 70 75 80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
85 90 95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
100 105 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
115 120 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
130 135 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145 150 155 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
165 170 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
180 185 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
195 200 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
210 215 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225 230 235 240
Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
245 250 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
260 265 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
275 280 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
290 295 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305 310 315 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
325 330 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys

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            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435                 440                 445
Ala Ser Pro Ser Thr
    450


<210> 189
<211> 451
<212> PRT
<213> Homo sapiens

<220>
<223> mature soluble human PH20, amino acid residues
      36-486


<400> 189
Leu Asn Phe Arg Ala Pro Pro Val Ile Pro Asn Val Pro Phe Leu Trp
 1               5                  10                  15
Ala Trp Asn Ala Pro Ser Glu Phe Cys Leu Gly Lys Phe Asp Glu Pro
            20                  25                  30
Leu Asp Met Ser Leu Phe Ser Phe Ile Gly Ser Pro Arg Ile Asn Ala
        35                  40                  45
Thr Gly Gln Gly Val Thr Ile Phe Tyr Val Asp Arg Leu Gly Tyr Tyr
    50                  55                  60
Pro Tyr Ile Asp Ser Ile Thr Gly Val Thr Val Asn Gly Gly Ile Pro
65                  70                  75                  80
Gln Lys Ile Ser Leu Gln Asp His Leu Asp Lys Ala Lys Lys Asp Ile
                85                  90                  95
Thr Phe Tyr Met Pro Val Asp Asn Leu Gly Met Ala Val Ile Asp Trp
            100                 105                 110
Glu Glu Trp Arg Pro Thr Trp Ala Arg Asn Trp Lys Pro Lys Asp Val
        115                 120                 125
Tyr Lys Asn Arg Ser Ile Glu Leu Val Gln Gln Gln Asn Val Gln Leu
    130                 135                 140
Ser Leu Thr Glu Ala Thr Glu Lys Ala Lys Gln Glu Phe Glu Lys Ala
145                 150                 155                 160
Gly Lys Asp Phe Leu Val Glu Thr Ile Lys Leu Gly Lys Leu Leu Arg
                165                 170                 175
Pro Asn His Leu Trp Gly Tyr Tyr Leu Phe Pro Asp Cys Tyr Asn His
            180                 185                 190
His Tyr Lys Lys Pro Gly Tyr Asn Gly Ser Cys Phe Asn Val Glu Ile
        195                 200                 205
Lys Arg Asn Asp Asp Leu Ser Trp Leu Trp Asn Glu Ser Thr Ala Leu
    210                 215                 220
Tyr Pro Ser Ile Tyr Leu Asn Thr Gln Gln Ser Pro Val Ala Ala Thr
225                 230                 235                 240
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Leu Tyr Val Arg Asn Arg Val Arg Glu Ala Ile Arg Val Ser Lys Ile
                245                 250                 255
Pro Asp Ala Lys Ser Pro Leu Pro Val Phe Ala Tyr Thr Arg Ile Val
            260                 265                 270
Phe Thr Asp Gln Val Leu Lys Phe Leu Ser Gln Asp Glu Leu Val Tyr
        275                 280                 285
Thr Phe Gly Glu Thr Val Ala Leu Gly Ala Ser Gly Ile Val Ile Trp
    290                 295                 300
Gly Thr Leu Ser Ile Met Arg Ser Met Lys Ser Cys Leu Leu Leu Asp
305                 310                 315                 320
Asn Tyr Met Glu Thr Ile Leu Asn Pro Tyr Ile Ile Asn Val Thr Leu
                325                 330                 335
Ala Ala Lys Met Cys Ser Gln Val Leu Cys Gln Glu Gln Gly Val Cys
            340                 345                 350
Ile Arg Lys Asn Trp Asn Ser Ser Asp Tyr Leu His Leu Asn Pro Asp
        355                 360                 365
Asn Phe Ala Ile Gln Leu Glu Lys Gly Gly Lys Phe Thr Val Arg Gly
    370                 375                 380
Lys Pro Thr Leu Glu Asp Leu Glu Gln Phe Ser Glu Lys Phe Tyr Cys
385                 390                 395                 400
Ser Cys Tyr Ser Thr Leu Ser Cys Lys Glu Lys Ala Asp Val Lys Asp
                405                 410                 415
Thr Asp Ala Val Asp Val Cys Ile Ala Asp Gly Val Cys Ile Asp Ala
            420                 425                 430
Phe Leu Lys Pro Pro Met Glu Thr Glu Glu Pro Gln Ile Phe Tyr Asn
        435                 440                 445
Ala Ser Pro
    450
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<210> 190
<211> 2105
<212> DNA
<213> Bos taurus

<220>
<223> cow PH20 DNA

<400> 190

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agtcatatgg agaaagcaaa aaatgacatt gcctattaca taccaaatga cagcgtgggc 720
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cctattcaaa atattaaaaa tcaaacaacc tattaaaatt aaattcagta aaaaaaaaaa 1980
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<210> 191
<211> 1971
<212> DNA
<213> Bos taurus

<220>
<223> cow Hyal1 DNA

<400> 191
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tggttaagac acggagcttc cactgcaggg ggcacgggca gagactaaga tcacgaatgc 1920
taagcggtgc ggttaaacaa ataacaaata aataaactga cattcactgg g 1971

<210> 192
<211> 1912
<212> DNA
<213> Bos taurus

<220>
<223> cow Hyal2 DNA

<400> 192
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gaggaagagg ggcacagctg ggccggggag gacctgaccc tactcccctg cccctggata 1860
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<210> 193
<211> 1537
<212> DNA
<213> Ovis aries

<220>
<223> sheep Hyal2 DNA

<400> 193

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ctggtaacag gattagcaga gcgaggtatg taggcggtgc tacagagttc ttgaagtggt 6540
ggcctaacta cggctacact agaaggacag tatttggtat ctgcgctctg ctgaagccag 6600
ttaccttcgg aaaaagagtt ggtagctctt gatccggcaa acaaaccacc gctggtagcg 6660
gtggtttttt tgtttgcaag cagcagatta cgcgcagaaa aaaaggatct caagaagatc 6720
ctttgatctt ttctacgggg tctgacgctc agtggaacga aaactcacgt taagggattt 6780
tggtcatgag attatcaaaa aggatcttca cctagatcct tttaaattaa aaatgaagtt 6840

ttaaatcaat ctaaagtata tatgagtaaa cttggtctga cagttaccaa tgcttaatca 6900
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cgcgagaccc acgctcaccg gctccagatt tatcagcaat aaaccagcca gccggaaggg 7080
ccgagcgcag aagtggtcct gcaactttat ccgcctccat ccagtctatt aattgttgcc 7140
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ccaaatgtgt ccccctcaca ctcccaaatt cgcgggcttc tgcctcttag accactctac 8040
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<210> 202
<211> 657
<212> PRT
<213> Homo sapiens

<220>
<223> recombinant human aggrecan G1-IGD-G2 domains,
Val20-Gly676 of Accession No. NP_037359

<400> 202
Val Glu Thr Ser Asp His Asp Asn Ser Leu Ser Val Ser Ile Pro Gln
1 5 10 15
Pro Ser Pro Leu Arg Val Leu Leu Gly Thr Ser Leu Thr Ile Pro Cys
20 25 30
Tyr Phe Ile Asp Pro Met His Pro Val Thr Thr Ala Pro Ser Thr Ala
35 40 45
Pro Leu Ala Pro Arg Ile Lys Trp Ser Arg Val Ser Lys Glu Lys Glu
50 55 60
Val Val Leu Leu Val Ala Thr Glu Gly Arg Val Arg Val Asn Ser Ala
65 70 75 80
Tyr Gln Asp Lys Val Ser Leu Pro Asn Tyr Pro Ala Ile Pro Ser Asp
85 90 95
Ala Thr Leu Glu Val Gln Ser Leu Arg Ser Asn Asp Ser Gly Val Tyr
100 105 110
Arg Cys Glu Val Met His Gly Ile Glu Asp Ser Glu Ala Thr Leu Glu
115 120 125
Val Val Val Lys Gly Ile Val Phe His Tyr Arg Ala Ile Ser Thr Arg
130 135 140
Tyr Thr Leu Asp Phe Asp Arg Ala Gln Arg Ala Cys Leu Gln Asn Ser
145 150 155 160
Ala Ile Ile Ala Thr Pro Glu Gln Leu Gln Ala Ala Tyr Glu Asp Gly
165 170 175
Phe His Gln Cys Asp Ala Gly Trp Leu Ala Asp Gln Thr Val Arg Tyr
180 185 190

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Pro Ile His Thr Pro Arg Glu Gly Cys Tyr Gly Asp Lys Asp Glu Phe
        195                 200                 205
Pro Gly Val Arg Thr Tyr Gly Ile Arg Asp Thr Asn Glu Thr Tyr Asp
    210                 215                 220
Val Tyr Cys Phe Ala Glu Glu Met Glu Gly Glu Val Phe Tyr Ala Thr
225                 230                 235                 240
Ser Pro Glu Lys Phe Thr Phe Gln Glu Ala Ala Asn Glu Cys Arg Arg
                245                 250                 255
Leu Gly Ala Arg Leu Ala Thr Thr Gly Gln Leu Tyr Leu Ala Trp Gln
            260                 265                 270
Ala Gly Met Asp Met Cys Ser Ala Gly Trp Leu Ala Asp Arg Ser Val
        275                 280                 285
Arg Tyr Pro Ile Ser Lys Ala Arg Pro Asn Cys Gly Gly Asn Leu Leu
    290                 295                 300
Gly Val Arg Thr Val Tyr Val His Ala Asn Gln Thr Gly Tyr Pro Asp
305                 310                 315                 320
Pro Ser Ser Arg Tyr Asp Ala Ile Cys Tyr Thr Gly Glu Asp Phe Val
                325                 330                 335
Asp Ile Pro Glu Asn Phe Phe Gly Val Gly Gly Glu Glu Asp Ile Thr
            340                 345                 350
Val Gln Thr Val Thr Trp Pro Asp Met Glu Leu Pro Leu Pro Arg Asn
        355                 360                 365
Ile Thr Glu Gly Glu Ala Arg Gly Ser Val Ile Leu Thr Val Lys Pro
    370                 375                 380
Ile Phe Glu Val Ser Pro Ser Pro Leu Glu Pro Glu Glu Pro Phe Thr
385                 390                 395                 400
Phe Ala Pro Glu Ile Gly Ala Thr Ala Phe Ala Glu Val Glu Asn Glu
                405                 410                 415
Thr Gly Glu Ala Thr Arg Pro Trp Gly Phe Pro Thr Pro Gly Leu Gly
            420                 425                 430
Pro Ala Thr Ala Phe Thr Ser Glu Asp Leu Val Val Gln Val Thr Ala
        435                 440                 445
Val Pro Gly Gln Pro His Leu Pro Gly Gly Val Val Phe His Tyr Arg
    450                 455                 460
Pro Gly Pro Thr Arg Tyr Ser Leu Thr Phe Glu Glu Ala Gln Gln Ala
465                 470                 475                 480
Cys Leu Arg Thr Gly Ala Val Ile Ala Ser Pro Glu Gln Leu Gln Ala
                485                 490                 495
Ala Tyr Glu Ala Gly Tyr Glu Gln Cys Asp Ala Gly Trp Leu Arg Asp
            500                 505                 510
Gln Thr Val Arg Tyr Pro Ile Val Ser Pro Arg Thr Pro Cys Val Gly
        515                 520                 525
Asp Lys Asp Ser Ser Pro Gly Val Arg Thr Tyr Gly Val Arg Pro Ser
    530                 535                 540
Thr Glu Thr Tyr Asp Val Tyr Cys Phe Val Asp Arg Leu Glu Gly Glu
545                 550                 555                 560
Val Phe Phe Ala Thr Arg Leu Glu Gln Phe Thr Phe Gln Glu Ala Leu
                565                 570                 575
Glu Phe Cys Glu Ser His Asn Ala Thr Leu Ala Thr Thr Gly Gln Leu
            580                 585                 590
Tyr Ala Ala Trp Ser Arg Gly Leu Asp Lys Cys Tyr Ala Gly Trp Leu
        595                 600                 605
Ala Asp Gly Ser Leu Arg Tyr Pro Ile Val Thr Pro Arg Pro Ala Cys
    610                 615                 620
Gly Gly Asp Lys Pro Gly Val Arg Thr Val Tyr Leu Tyr Pro Asn Gln
625                 630                 635                 640
Thr Gly Leu Pro Asp Pro Leu Ser Arg His His Ala Phe Cys Phe Arg
                645                 650                 655
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Gly

<210> 203
<211> 669
<212> DNA
<213> Homo sapiens

<220>
<223> cDNA fragment of human IgG1 heavy chain

<400> 203
acatgcccac cgtgcccagc acctgaactc ctggggggac cgtcagtctt cctcttcccc 60
ccaaaaccca aggacaccct catgatctcc cggacccctg aggtcacatg cgtggtggtg 120
gacgtgagcc acgaagaccc tgaggtcaag ttcaactggt acgtggacgg cgtggaggtg 180
cataatgcca agacaaagcc gcgggaggag cagtacaaca gcacgtaccg tgtggtcagc 240
gtcctcaccg tcctgcacca ggactggctg aatggcaagg agtacaagtg caaggtctcc 300
aacaaagccc tcccagcccc catcgagaaa accatctcca aagccaaagg gcagccccga 360
gaaccacagg tgtacaccct gcccccatcc cgggatgagc tgaccaagaa ccaggtcagc 420
ctgacctgcc tggtcaaagg cttctatccc agcgacatcg ccgtggagtg ggagagcaat 480
gggcagccgg agaacaacta caagaccacg cctcccgtgc tggactccga cggcccttc 540
ttcctctaca gcaagctcac cgtggacaag agcaggtggc agcaggggaa cgtcttctca 600
tgctccgtga tgcatgaggc tctgcacaac cactacacgc agaagagcct ctccctgtct 660
ccgggtaaa 669

<210> 204
<211> 223
<212> PRT
<213> Homo sapiens

<220>
<223> fragment of IgG1 heavy chain

<400> 204
Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val
 1   5   10   15
Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr
            20   25   30
Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu
        35   40   45
Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys
    50   55   60
Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser
65   70   75   80
Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys
                85   90   95
Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile
            100   105   110
Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro
        115   120   125
Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu
    130   135   140
Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn
145   150   155   160
Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser
                165   170   175
Asp Gly Pro Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg

```
            180                 185                 190
Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu
        195                 200                 205
His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
    210                 215                 220
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<210> 205
<211> 1439
<212> DNA
<213> Homo sapiens

<220>
<223> human Tumor necrosis factor-stimulated gene-6
(TSG-6) preprotein-encoding DNA GI No. 315139000

<400> 205

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actacaactg acgatatgat catcttaatt tacttatttc tcttgctatg ggaagacact 120
caaggatggg gattcaagga tggaattttt cataactcca tatggcttga acgagcagcc 180
ggtgtgtacc acagagaagc acggtctggc aaatacaagc tcacctacgc agaagctaag 240
gcggtgtgtg aatttgaagg cggccatctc gcaacttaca agcagctaga ggcagccaga 300
aaaattggat ttcatgtctg tgctgctgga tggatggcta agggcagagt tggatacccc 360
attgtgaagc cagggcccaa ctgtggattt ggaaaaactg gcattattga ttatggaatc 420
cgtctcaata ggagtgaaag atgggatgcc tattgctaca acccacacgc aaaggagtgt 480
ggtggcgtct ttacagatcc aaagcaaatt tttaaatctc caggcttccc aaatgagtac 540
gaagataacc aaatctgcta ctggcacatt agactcaagt atggtcagcg tattcacctg 600
agtttttag attttgacct tgaagatgac ccaggttgct tggctgatta tgttgaaata 660
tatgacagtt acgatgatgt ccatggcttt gtgggaagat actgtggaga tgagcttcca 720
gatgacatca tcagtacagg aaatgtcatg accttgaagt ttctaagtga tgcttcagtg 780
acagctggag gtttccaaat caaatatgtt gcaatggatc ctgtatccaa atccagtcaa 840
ggaaaaaata caagtactac ttctactgga aataaaaact ttttagctgg aagatttagc 900
cacttataaa aaaaaaaaaa aggatgatca aaacacacag tgtttatgtt ggaatctttt 960
ggaactcctt tgatctcact gttattatta acatttattt attatttttc taaatgtgaa 1020
agcaatacat aatttaggga aaattggaaa atataggaaa ctttaaacga gaaaatgaaa 1080
cctctcataa tcccactgca tagaaataac aagcgttaac attttcatat ttttttcttt 1140
cagtcatttt tctatttgtg gtatatgtat atatgtacct atatgtattt gcatttgaaa 1200
ttttggaatc ctgctctatg tacagttttg tattatactt tttaaatctt gaactttata 1260
aacattttct gaaatcattg attattctac aaaaacatga ttttaaacag ctgtaaaata 1320
ttctatgata tgaatgtttt atgcattatt taagcctgtc tctattgttg gaatttcagg 1380
tcattttcat aaatattgtt gcaataaata tccttgaaca cacaaaaaaa aaaaaaaaa  1439
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<210> 206
<211> 277
<212> PRT
<213> Homo sapiens

<220>
<223> human Tumor necrosis factor-stimulated gene-6
(TSG-6) preprotein, P98066

<220>
<221> SIGNAL
<222> (1)...(17)

<223> signal sequence

<400> 206
Met Ile Ile Leu Ile Tyr Leu Phe Leu Leu Leu Trp Glu Asp Thr Gln
 1   5   10   15
Gly Trp Gly Phe Lys Asp Gly Ile Phe His Asn Ser Ile Trp Leu Glu
            20   25   30
Arg Ala Ala Gly Val Tyr His Arg Glu Ala Arg Ser Gly Lys Tyr Lys
        35   40   45
Leu Thr Tyr Ala Glu Ala Lys Ala Val Cys Glu Phe Glu Gly Gly His
    50   55   60
Leu Ala Thr Tyr Lys Gln Leu Glu Ala Ala Arg Lys Ile Gly Phe His
65   70   75   80
Val Cys Ala Ala Gly Trp Met Ala Lys Gly Arg Val Gly Tyr Pro Ile
                85   90   95
Val Lys Pro Gly Pro Asn Cys Gly Phe Gly Lys Thr Gly Ile Ile Asp
            100   105   110
Tyr Gly Ile Arg Leu Asn Arg Ser Glu Arg Trp Asp Ala Tyr Cys Tyr
        115   120   125
Asn Pro His Ala Lys Glu Cys Gly Gly Val Phe Thr Asp Pro Lys Gln
    130   135   140
Ile Phe Lys Ser Pro Gly Phe Pro Asn Glu Tyr Glu Asp Asn Gln Ile
145   150   155   160
Cys Tyr Trp His Ile Arg Leu Lys Tyr Gly Gln Arg Ile His Leu Ser
                165   170   175
Phe Leu Asp Phe Asp Leu Glu Asp Asp Pro Gly Cys Leu Ala Asp Tyr
            180   185   190
Val Glu Ile Tyr Asp Ser Tyr Asp Asp Val His Gly Phe Val Gly Arg
        195   200   205
Tyr Cys Gly Asp Glu Leu Pro Asp Asp Ile Ile Ser Thr Gly Asn Val
    210   215   220
Met Thr Leu Lys Phe Leu Ser Asp Ala Ser Val Thr Ala Gly Gly Phe
225   230   235   240
Gln Ile Lys Tyr Val Ala Met Asp Pro Val Ser Lys Ser Ser Gln Gly
                245   250   255
Lys Asn Thr Ser Thr Thr Ser Thr Gly Asn Lys Asn Phe Leu Ala Gly
            260   265   270
Arg Phe Ser His Leu
        275

<210> 207
<211> 95
<212> PRT
<213> Homo sapiens

<220>
<223> human TSG-6 aa residues 35-129

<400> 207
Ala Gly Val Tyr His Arg Glu Ala Arg Ser Gly Lys Tyr Lys Leu Thr
 1   5   10   15
Tyr Ala Glu Ala Lys Ala Val Cys Glu Phe Glu Gly Gly His Leu Ala
            20   25   30
Thr Tyr Lys Gln Leu Glu Ala Ala Arg Lys Ile Gly Phe His Val Cys
        35   40   45
Ala Ala Gly Trp Met Ala Lys Gly Arg Val Gly Tyr Pro Ile Val Lys

```
    50                  55                  60
Pro Gly Pro Asn Cys Gly Phe Gly Lys Thr Gly Ile Ile Asp Tyr Gly
65                  70                  75                  80
Ile Arg Leu Asn Arg Ser Glu Arg Trp Asp Ala Tyr Cys Tyr Asn
                85                  90                  95


<210> 208
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> 12 bp sequence

<400> 208
gacaaaactc ac                                                    12

<210> 209
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> 4 amino acid peptide

<400> 209
Asp Lys Thr His
 1


<210> 210
<211> 22
<212> PRT
<213> Homo sapiens

<220>
<223> IgK signal peptide

<400> 210
Met Asp Met Arg Val Pro Ala Gln Leu Leu Gly Leu Leu Leu Leu Trp
 1               5                  10                  15
Leu Pro Gly Ala Arg Gly
            20


<210> 211
<211> 1059
<212> DNA
<213> Artificial Sequence

<220>
<223> TSG-6-LM-Fc fusion protein - Codon optimized DNA
      Seq. used for protein expression

<400> 211
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ggagctagag gagcagatat cgcaggcgtg taccacaggg aggcacggtc cggaaagtac 120
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aaactgacct atgctgaagc aaaggccgtg tgcgagttcg aaggcggaca cctggctaca 180
tataagcagc tggaggccgc tcgcaaaatc gggtttcacg tgtgcgcagc cggttggatg 240
gcaaaggggc gagtcggtta ccccattgtg aaaccaggcc ccaactgtgg cttcggaaag 300
actggcatca ttgactatgg aatcagactg aaccgcagcg agcgatggga cgcatactgc 360
tataataccg gtgataagac tcacacctgc ccccttgtc ctgccccaga actgctgggg 420
ggtccttccg tgttcctgtt tccacccaag ccaaaagaca ccctgatgat ttctaggaca 480
cctgaggtca cttgcgtggt cgtggacgtg agtcacgaag atccagaagt caagtttaac 540
tggtacgtgg atggcgtcga agtgcataat gccaagacaa aacctcgtga ggaacagtac 600
aattctactt atagggtcgt gagtgtcctg accgtgctgc atcaggattg gctgaacggg 660
aaggagtata agtgcaaagt gtcaaataag gctctgcccg cacctatcga gaaaacaatt 720
tccaaggcca aaggccagcc acgggaaccc caggtgtaca ctctgcctcc atccagagag 780
gaaatgacca aaaaccaggt cagcctgaca tgtctggtga aggggttcta tccaagcgac 840
atcgctgtgg agtgggaatc taatggtcag cccgagaaca attacaagac cacacccccc 900
gtcctggact ccgatggcag cttctttctg tattcaaagc tgacagtgga taaatcccgc 960
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actcagaagt ctctgagtct gtcaccaggg aaaggatcc 1059

<210> 212
<211> 349
<212> PRT
<213> Artificial Sequence

<220>
<223> Peptide sequence for TSG-6-LM-Fc fusion protein

<400> 212
Met Arg Val Pro Ala Gln Leu Leu Gly Leu Leu Leu Leu Trp Leu Pro
 1   5   10   15
Gly Ala Arg Gly Ala Asp Ile Ala Gly Val Tyr His Arg Glu Ala Arg
            20   25   30
Ser Gly Lys Tyr Lys Leu Thr Tyr Ala Glu Ala Lys Ala Val Cys Glu
        35   40   45
Phe Glu Gly Gly His Leu Ala Thr Tyr Lys Gln Leu Glu Ala Ala Arg
    50   55   60
Lys Ile Gly Phe His Val Cys Ala Ala Gly Trp Met Ala Lys Gly Arg
65   70   75   80
Val Gly Tyr Pro Ile Val Lys Pro Gly Pro Asn Cys Gly Phe Gly Lys
                85   90   95
Thr Gly Ile Ile Asp Tyr Gly Ile Arg Leu Asn Arg Ser Glu Arg Trp
            100   105   110
Asp Ala Tyr Cys Tyr Asn Thr Gly Asp Lys Thr His Thr Cys Pro Pro
        115   120   125
Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro
    130   135   140
Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr
145   150   155   160
Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn
                165   170   175
Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg
            180   185   190
Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val
        195   200   205
Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser
    210   215   220
Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys
225   230   235   240
Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu

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                245                 250                 255
Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe
            260                 265                 270
Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu
        275                 280                 285
Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe
    290                 295                 300
Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly
305                 310                 315                 320
Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr
                325                 330                 335
Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Ser
            340                 345
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<210> 213
<211> 5540
<212> DNA
<213> Artificial Sequence

<220>
<223> pHZ24-TSG-6-LM-Fc (DNA)

<400> 213

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aatatgaccg ccatgttggc attgattatt gactagttat taatagtaat caattacggg 180
gtcattagtt catagcccat atatggagtt ccgcgttaca taacttacgg taaatggccc 240
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caatgggagt ttgttttggc accaaaatca acgggacttt ccaaaatgtc gtaataaccc 660
cgccccgttg acgcaaatgg gcggtaggcg tgtacggtgg gaggtctata taagcagagc 720
tcgtttagtg aaccgtcaga tcactagaag ctttattgcg gtagtttatc acagttaaat 780
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gctgctggga ctgctgctgc tgtggctgcc tggagctaga ggagcagata tcgcaggcgt 1140
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gccaaaagac accctgatga tttctaggac acctgaggtc acttgcgtgg tcgtggacgt 1560
gagtcacgaa gatccagaag tcaagtttaa ctggtacgtg gatggcgtcg aagtgcataa 1620
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gaccgtgctg catcaggatt ggctgaacgg gaaggagtat aagtgcaaag tgtcaaataa 1740
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ccaggtgtac actctgcctc catccagaga ggaaatgacc aaaaaccagg tcagcctgac 1860
atgtctggtg aaggggttct atccaagcga catcgctgtg gagtgggaat ctaatggtca 1920
gcccgagaac aattacaaga ccacaccccc tgtcctggac tccgatggca gcttctttct 1980
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gtattcaaag ctgacagtgg ataaatcccg ctggcagcag ggaaacgtct tctcctgtag 2040
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gaaaggatcc tagtaagaat tcctcgagag atctatagct aacgcccctc tccctccccc 2160
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ttcttgacga gcattcctag gggtctttcc cctctcgcca aaggaatgca aggtctgttg 2340
aatgtcgtga aggaagcagt tcctctggaa gcttcttgaa gacaaacaac gtctgtagcg 2400
acccttttgca ggcagcggaa ccccccacct ggcgacaggt gcctctgcgg ccaaaagcca 2460
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<211> 1059
<212> DNA
<213> Artificial Sequence

<220>
<223> TSG-6-LM-Fc/deltaHep (DNA)

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<211> 349
<212> PRT
<213> Artificial Sequence

<220>
<223> TSG-6-LM-Fc/deltaHep (protein)

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Ser Gly Lys Tyr Lys Leu Thr Tyr Ala Glu Ala Ala Ala Val Cys Glu
        35   40   45
Phe Glu Gly Gly His Leu Ala Thr Tyr Ala Gln Leu Glu Ala Ala Arg
    50   55   60
Ala Ile Gly Phe His Val Cys Ala Ala Gly Trp Met Ala Lys Gly Arg
65   70   75   80
Val Gly Tyr Pro Ile Val Lys Pro Gly Pro Asn Cys Gly Phe Gly Lys
                85   90   95
Thr Gly Ile Ile Asp Tyr Gly Ile Arg Leu Asn Arg Ser Glu Arg Trp
            100   105   110

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Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro
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Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr
145                 150                 155                 160
Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn
                165                 170                 175
Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg
            180                 185                 190
Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val
        195                 200                 205
Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser
    210                 215                 220
Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys
225                 230                 235                 240
Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu
                245                 250                 255
Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe
            260                 265                 270
Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu
        275                 280                 285
Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe
    290                 295                 300
Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly
305                 310                 315                 320
Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr
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Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Ser
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<210> 216
<211> 285
<212> DNA
<213> Homo sapiens

<220>
<223> TSG-6 preprotein, DNA encoding aa 35-129 (285 bp)

<400> 216
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agaaaaattg gatttcatgt ctgtgctgct ggatggatgg ctaagggcag agttggatac 180
cccattgtga agccagggcc caactgtgga tttggaaaaa ctggcattat tgattatgga 240
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<210> 217
<211> 1059
<212> DNA
<213> Artificial Sequence

<220>
<223> TSG-6-LM-Fc fusion protein encoding DNA

<400> 217

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<210> 218
<211> 5540
<212> DNA
<213> Artificial Sequence

<220>
<223> pHZ24-TSG-6-LM-Fc/deltaHep (DNA)

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<210> 219
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<212> DNA
<213> Homo sapiens

<220>
<223> HAS1 (DNA)

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<211> 3275

<212> DNA
<213> Homo sapiens

<220>
<223> HAS2 (DNA)

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tgagtcttcc acaggctttt ttttttttt ttttttttt taagacgaaa aagagatttt 180
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tgcaacggaa acataaagag aatattagtg aaattatttt ttaaagtggg gaagaatcaa 360
acatttaaga ctcccctatc ctttttaaat gttgttttta aatttcttat ttttttggc 420
cggtcgtctc aaattcatct gatctcttat tacctcaatt ttggaaactg cccgccaccg 480
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<211> 4220
<212> DNA
<213> Homo sapiens

<220>
<223> HAS3 (DNA)

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<210> 222
<211> 260
<212> PRT
<213> Homo sapiens

<220>
<223> mature human Tumor necrosis factor-stimulated
gene-6 (TSG-6) protein P98066

<400> 222
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20 25 30
Thr Tyr Ala Glu Ala Lys Ala Val Cys Glu Phe Glu Gly Gly His Leu
35 40 45
Ala Thr Tyr Lys Gln Leu Glu Ala Ala Arg Lys Ile Gly Phe His Val
50 55 60
Cys Ala Ala Gly Trp Met Ala Lys Gly Arg Val Gly Tyr Pro Ile Val
65 70 75 80
Lys Pro Gly Pro Asn Cys Gly Phe Gly Lys Thr Gly Ile Ile Asp Tyr
85 90 95
Gly Ile Arg Leu Asn Arg Ser Glu Arg Trp Asp Ala Tyr Cys Tyr Asn
100 105 110
Pro His Ala Lys Glu Cys Gly Gly Val Phe Thr Asp Pro Lys Gln Ile
115 120 125
Phe Lys Ser Pro Gly Phe Pro Asn Glu Tyr Glu Asp Asn Gln Ile Cys

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    130                 135                 140
Tyr Trp His Ile Arg Leu Lys Tyr Gly Gln Arg Ile His Leu Ser Phe
145                 150                 155                 160
Leu Asp Phe Asp Leu Glu Asp Asp Pro Gly Cys Leu Ala Asp Tyr Val
                165                 170                 175
Glu Ile Tyr Asp Ser Tyr Asp Asp Val His Gly Phe Val Gly Arg Tyr
            180                 185                 190
Cys Gly Asp Glu Leu Pro Asp Asp Ile Ile Ser Thr Gly Asn Val Met
        195                 200                 205
Thr Leu Lys Phe Leu Ser Asp Ala Ser Val Thr Ala Gly Gly Phe Gln
    210                 215                 220
Ile Lys Tyr Val Ala Met Asp Pro Val Ser Lys Ser Ser Gln Gly Lys
225                 230                 235                 240
Asn Thr Ser Thr Thr Ser Thr Gly Asn Lys Asn Phe Leu Ala Gly Arg
                245                 250                 255
Phe Ser His Leu
            260


<210> 223
<211> 2570
<212> PRT
<213> Homo sapiens

<220>
<223> Stabilin-1 protein Q9NY15


<400> 223
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Leu Ala Gly Phe Ser Phe Val Arg Gly Gln Val Leu Phe Lys Gly Cys
            20                  25                  30
Asp Val Lys Thr Thr Phe Val Thr His Val Pro Cys Thr Ser Cys Ala
        35                  40                  45
Ala Ile Lys Lys Gln Thr Cys Pro Ser Gly Trp Leu Arg Glu Leu Pro
    50                  55                  60
Asp Gln Ile Thr Gln Asp Cys Arg Tyr Glu Val Gln Leu Gly Gly Ser
65                  70                  75                  80
Met Val Ser Met Ser Gly Cys Arg Arg Lys Cys Arg Lys Gln Val Val
                85                  90                  95
Gln Lys Ala Cys Cys Pro Gly Tyr Trp Gly Ser Arg Cys His Glu Cys
            100                 105                 110
Pro Gly Gly Ala Glu Thr Pro Cys Asn Gly His Gly Thr Cys Leu Asp
        115                 120                 125
Gly Met Asp Arg Asn Gly Thr Cys Val Cys Gln Glu Asn Phe Arg Gly
    130                 135                 140
Ser Ala Cys Gln Glu Cys Gln Asp Pro Asn Arg Phe Gly Pro Asp Cys
145                 150                 155                 160
Gln Ser Val Cys Ser Cys Val His Gly Val Cys Asn His Gly Pro Arg
                165                 170                 175
Gly Asp Gly Ser Cys Leu Cys Phe Ala Gly Tyr Thr Gly Pro His Cys
            180                 185                 190
Asp Gln Glu Leu Pro Val Cys Gln Glu Leu Arg Cys Pro Gln Asn Thr
        195                 200                 205
Gln Cys Ser Ala Glu Ala Pro Ser Cys Arg Cys Leu Pro Gly Tyr Thr
    210                 215                 220
Gln Gln Gly Ser Glu Cys Arg Ala Pro Asn Pro Cys Trp Pro Ser Pro
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225                 230                 235                 240
Cys Ser Leu Leu Ala Gln Cys Ser Val Ser Pro Lys Gly Gln Ala Gln
                245                 250                 255
Cys His Cys Pro Glu Asn Tyr His Gly Asp Gly Met Val Cys Leu Pro
            260                 265                 270
Lys Asp Pro Cys Thr Asp Asn Leu Gly Gly Cys Pro Ser Asn Ser Thr
        275                 280                 285
Leu Cys Val Tyr Gln Lys Pro Gly Gln Ala Phe Cys Thr Cys Arg Pro
    290                 295                 300
Gly Leu Val Ser Ile Asn Ser Asn Ala Ser Ala Gly Cys Phe Ala Phe
305                 310                 315                 320
Cys Ser Pro Phe Ser Cys Asp Arg Ser Ala Thr Cys Gln Val Thr Ala
                325                 330                 335
Asp Gly Lys Thr Ser Cys Val Cys Arg Glu Ser Glu Val Gly Asp Gly
            340                 345                 350
Arg Ala Cys Tyr Gly His Leu Leu His Glu Val Gln Lys Ala Thr Gln
        355                 360                 365
Thr Gly Arg Val Phe Leu Gln Leu Arg Val Ala Val Ala Met Met Asp
    370                 375                 380
Gln Gly Cys Arg Glu Ile Leu Thr Thr Ala Gly Pro Phe Thr Val Leu
385                 390                 395                 400
Val Pro Ser Val Ser Ser Phe Ser Ser Arg Thr Met Asn Ala Ser Leu
                405                 410                 415
Ala Gln Gln Leu Cys Arg Gln His Ile Ile Ala Gly Gln His Ile Leu
            420                 425                 430
Glu Asp Thr Arg Thr Gln Gln Thr Arg Arg Trp Trp Thr Leu Ala Gly
        435                 440                 445
Gln Glu Ile Thr Val Thr Phe Asn Gln Phe Thr Lys Tyr Ser Tyr Lys
    450                 455                 460
Tyr Lys Asp Gln Pro Gln Gln Thr Phe Asn Ile Tyr Lys Ala Asn Asn
465                 470                 475                 480
Ile Ala Ala Asn Gly Val Phe His Val Val Thr Gly Leu Arg Trp Gln
                485                 490                 495
Ala Pro Ser Gly Thr Pro Gly Asp Pro Lys Arg Thr Ile Gly Gln Ile
            500                 505                 510
Leu Ala Ser Thr Glu Ala Phe Ser Arg Phe Glu Thr Ile Leu Glu Asn
        515                 520                 525
Cys Gly Leu Pro Ser Ile Leu Asp Gly Pro Gly Pro Phe Thr Val Phe
    530                 535                 540
Ala Pro Ser Asn Glu Ala Val Asp Ser Leu Arg Asp Gly Arg Leu Ile
545                 550                 555                 560
Tyr Leu Phe Thr Ala Gly Leu Ser Lys Leu Gln Glu Leu Val Arg Tyr
                565                 570                 575
His Ile Tyr Asn His Gly Gln Leu Thr Val Glu Lys Leu Ile Ser Lys
            580                 585                 590
Gly Arg Ile Leu Thr Met Ala Asn Gln Val Leu Ala Val Asn Ile Ser
        595                 600                 605
Glu Glu Gly Arg Ile Leu Leu Gly Pro Glu Gly Val Pro Leu Gln Arg
    610                 615                 620
Val Asp Val Met Ala Ala Asn Gly Val Ile His Met Leu Asp Gly Ile
625                 630                 635                 640
Leu Leu Pro Pro Thr Ile Leu Pro Ile Leu Pro Lys His Cys Ser Glu
                645                 650                 655
Glu Gln His Lys Ile Val Ala Gly Ser Cys Val Asp Cys Gln Ala Leu
            660                 665                 670
Asn Thr Ser Thr Cys Pro Pro Asn Ser Val Lys Leu Asp Ile Phe Pro
        675                 680                 685
Lys Glu Cys Val Tyr Ile His Asp Pro Thr Gly Leu Asn Val Leu Lys
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Lys Gly Cys Ala Ser Tyr Cys Asn Gln Thr Ile Met Glu Gln Gly Cys
705                 710                 715                 720
Cys Lys Gly Phe Phe Gly Pro Asp Cys Thr Gln Cys Pro Gly Gly Phe
                725                 730                 735
Ser Asn Pro Cys Tyr Gly Lys Gly Asn Cys Ser Asp Gly Ile Gln Gly
            740                 745                 750
Asn Gly Ala Cys Leu Cys Phe Pro Asp Tyr Lys Gly Ile Ala Cys His
        755                 760                 765
Ile Cys Ser Asn Pro Asn Lys His Gly Glu Gln Cys Gln Glu Asp Cys
    770                 775                 780
Gly Cys Val His Gly Leu Cys Asp Asn Arg Pro Gly Ser Gly Gly Val
785                 790                 795                 800
Cys Gln Gln Gly Thr Cys Ala Pro Gly Phe Ser Gly Arg Phe Cys Asn
                805                 810                 815
Glu Ser Met Gly Asp Cys Gly Pro Thr Gly Leu Ala Gln His Cys His
            820                 825                 830
Leu His Ala Arg Cys Val Ser Gln Glu Gly Val Ala Arg Cys Arg Cys
        835                 840                 845
Leu Asp Gly Phe Glu Gly Asp Gly Phe Ser Cys Thr Pro Ser Asn Pro
    850                 855                 860
Cys Ser His Pro Asp Arg Gly Gly Cys Ser Glu Asn Ala Glu Cys Val
865                 870                 875                 880
Pro Gly Ser Leu Gly Thr His His Cys Thr Cys His Lys Gly Trp Ser
                885                 890                 895
Gly Asp Gly Arg Val Cys Val Ala Ile Asp Glu Cys Glu Leu Asp Met
            900                 905                 910
Arg Gly Gly Cys His Thr Asp Ala Leu Cys Ser Tyr Val Gly Pro Gly
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Gln Ser Arg Cys Thr Cys Lys Leu Gly Phe Ala Gly Asp Gly Tyr Gln
    930                 935                 940
Cys Ser Pro Ile Asp Pro Cys Arg Ala Gly Asn Gly Gly Cys His Gly
945                 950                 955                 960
Leu Ala Thr Cys Arg Ala Val Gly Gly Gly Gln Arg Val Cys Thr Cys
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Pro Pro Gly Phe Gly Gly Asp Gly Phe Ser Cys Tyr Gly Asp Ile Phe
            980                 985                 990
Arg Glu Leu Glu Ala Asn Ala His Phe Ser Ile Phe Tyr Gln Trp Leu
        995                 1000                1005
Lys Ser Ala Gly Ile Thr Leu Pro Ala Asp Arg Arg Val Thr Ala Leu
    1010                1015                1020
Val Pro Ser Glu Ala Ala Val Arg Gln Leu Ser Pro Glu Asp Arg Ala
1025                1030                1035                1040
Phe Trp Leu Gln Pro Arg Thr Leu Pro Asn Leu Val Arg Ala His Phe
                1045                1050                1055
Leu Gln Gly Ala Leu Phe Glu Glu Glu Leu Ala Arg Leu Gly Gly Gln
            1060                1065                1070
Glu Val Ala Thr Leu Asn Pro Thr Thr Arg Trp Glu Ile Arg Asn Ile
        1075                1080                1085
Ser Gly Arg Val Trp Val Gln Asn Ala Ser Val Asp Val Ala Asp Leu
    1090                1095                1100
Leu Ala Thr Asn Gly Val Leu His Ile Leu Ser Gln Val Leu Leu Pro
1105                1110                1115                1120
Pro Arg Gly Asp Val Pro Gly Gly Gln Gly Leu Leu Gln Gln Leu Asp
                1125                1130                1135
Leu Val Pro Ala Phe Ser Leu Phe Arg Glu Leu Leu Gln His His Gly
            1140                1145                1150
Leu Val Pro Gln Ile Glu Ala Ala Thr Ala Tyr Thr Ile Phe Val Pro
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Thr Asn Arg Ser Leu Glu Ala Gln Gly Asn Ser Ser His Leu Asp Ala
    1170                1175                1180
Asp Thr Val Arg His His Val Val Leu Gly Glu Ala Leu Ser Met Glu
1185                1190                1195                1200
Thr Leu Arg Lys Gly Gly His Arg Asn Ser Leu Leu Gly Pro Ala His
                1205                1210                1215
Trp Ile Val Phe Tyr Asn His Ser Gly Gln Pro Glu Val Asn His Val
            1220                1225                1230
Pro Leu Glu Gly Pro Met Leu Glu Ala Pro Gly Arg Ser Leu Ile Gly
        1235                1240                1245
Leu Ser Gly Val Leu Thr Val Gly Ser Ser Arg Cys Leu His Ser His
    1250                1255                1260
Ala Glu Ala Leu Arg Glu Lys Cys Val Asn Cys Thr Arg Arg Phe Arg
1265                1270                1275                1280
Cys Thr Gln Gly Phe Gln Leu Gln Asp Thr Pro Arg Lys Ser Cys Val
                1285                1290                1295
Tyr Arg Ser Gly Phe Ser Phe Ser Arg Gly Cys Ser Tyr Thr Cys Ala
            1300                1305                1310
Lys Lys Ile Gln Val Pro Asp Cys Cys Pro Gly Phe Phe Gly Thr Leu
        1315                1320                1325
Cys Glu Pro Cys Pro Gly Gly Leu Gly Gly Val Cys Ser Gly His Gly
    1330                1335                1340
Gln Cys Gln Asp Arg Phe Leu Gly Ser Gly Glu Cys His Cys His Glu
1345                1350                1355                1360
Gly Phe His Gly Thr Ala Cys Glu Val Cys Glu Leu Gly Arg Tyr Gly
                1365                1370                1375
Pro Asn Cys Thr Gly Val Cys Asp Cys Ala His Gly Leu Cys Gln Glu
            1380                1385                1390
Gly Leu Gln Gly Asp Gly Ser Cys Val Cys Asn Val Gly Trp Gln Gly
        1395                1400                1405
Leu Arg Cys Asp Gln Lys Ile Thr Ser Pro Gln Cys Pro Arg Lys Cys
    1410                1415                1420
Asp Pro Asn Ala Asn Cys Val Gln Asp Ser Ala Gly Ala Ser Thr Cys
1425                1430                1435                1440
Ala Cys Ala Ala Gly Tyr Ser Gly Asn Gly Ile Phe Cys Ser Glu Val
                1445                1450                1455
Asp Pro Cys Ala His Gly His Gly Gly Cys Ser Pro His Ala Asn Cys
            1460                1465                1470
Thr Lys Val Ala Pro Gly Gln Arg Thr Cys Thr Cys Gln Asp Gly Tyr
        1475                1480                1485
Met Gly Asp Gly Glu Leu Cys Gln Glu Ile Asn Ser Cys Leu Ile His
    1490                1495                1500
His Gly Gly Cys His Ile His Ala Glu Cys Ile Pro Thr Gly Pro Gln
1505                1510                1515                1520
Gln Val Ser Cys Ser Cys Arg Glu Gly Tyr Ser Gly Asp Gly Ile Arg
                1525                1530                1535
Thr Cys Glu Leu Leu Asp Pro Cys Ser Lys Asn Asn Gly Gly Cys Ser
            1540                1545                1550
Pro Tyr Ala Thr Cys Lys Ser Thr Gly Asp Gly Gln Arg Thr Cys Thr
        1555                1560                1565
Cys Asp Thr Ala His Thr Val Gly Asp Gly Leu Thr Cys Arg Ala Arg
    1570                1575                1580
Val Gly Leu Glu Leu Leu Arg Asp Lys His Ala Ser Phe Phe Ser Leu
1585                1590                1595                1600
Arg Leu Leu Glu Tyr Lys Glu Leu Lys Gly Asp Gly Pro Phe Thr Ile
                1605                1610                1615
Phe Val Pro His Ala Asp Leu Met Ser Asn Leu Ser Gln Asp Glu Leu
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            1620                1625                1630
Ala Arg Ile Arg Ala His Arg Gln Leu Val Phe Arg Tyr His Val Val
        1635                1640                1645
Gly Cys Arg Arg Leu Arg Ser Glu Asp Leu Leu Glu Gln Gly Tyr Ala
    1650                1655                1660
Thr Ala Leu Ser Gly His Pro Leu Arg Phe Ser Glu Arg Glu Gly Ser
1665                1670                1675                1680
Ile Tyr Leu Asn Asp Phe Ala Arg Val Val Ser Ser Asp His Glu Ala
                1685                1690                1695
Val Asn Gly Ile Leu His Phe Ile Asp Arg Val Leu Leu Pro Pro Glu
            1700                1705                1710
Ala Leu His Trp Glu Pro Asp Asp Ala Pro Ile Pro Arg Arg Asn Val
        1715                1720                1725
Thr Ala Ala Ala Gln Gly Phe Gly Tyr Lys Ile Phe Ser Gly Leu Leu
    1730                1735                1740
Lys Val Ala Gly Leu Leu Pro Leu Leu Arg Glu Ala Ser His Arg Pro
1745                1750                1755                1760
Phe Thr Met Leu Trp Pro Thr Asp Ala Ala Phe Arg Ala Leu Pro Pro
                1765                1770                1775
Asp Arg Gln Ala Trp Leu Tyr His Glu Asp His Arg Asp Lys Leu Ala
            1780                1785                1790
Ala Ile Leu Arg Gly His Met Ile Arg Asn Val Glu Ala Leu Ala Ser
        1795                1800                1805
Asp Leu Pro Asn Leu Gly Pro Leu Arg Thr Met His Gly Thr Pro Ile
    1810                1815                1820
Ser Phe Ser Cys Ser Arg Thr Arg Ala Gly Glu Leu Met Val Gly Glu
1825                1830                1835                1840
Asp Asp Ala Arg Ile Val Gln Arg His Leu Pro Phe Glu Gly Gly Leu
                1845                1850                1855
Ala Tyr Gly Ile Asp Gln Leu Leu Glu Pro Pro Gly Leu Gly Ala Arg
            1860                1865                1870
Cys Asp His Phe Glu Thr Arg Pro Leu Arg Leu Asn Thr Cys Ser Ile
        1875                1880                1885
Cys Gly Leu Glu Pro Pro Cys Pro Glu Gly Ser Gln Glu Gln Gly Ser
    1890                1895                1900
Pro Glu Ala Cys Trp Arg Phe Tyr Pro Lys Phe Trp Thr Ser Pro Pro
1905                1910                1915                1920
Leu His Ser Leu Gly Leu Arg Ser Val Trp Val His Pro Ser Leu Trp
                1925                1930                1935
Gly Arg Pro Gln Gly Leu Gly Arg Gly Cys His Arg Asn Cys Val Thr
            1940                1945                1950
Thr Thr Trp Lys Pro Ser Cys Cys Pro Gly His Tyr Gly Ser Glu Cys
        1955                1960                1965
Gln Ala Cys Pro Gly Gly Pro Ser Ser Pro Cys Ser Asp Arg Gly Val
    1970                1975                1980
Cys Met Asp Gly Met Ser Gly Ser Gly Gln Cys Leu Cys Arg Ser Gly
1985                1990                1995                2000
Phe Ala Gly Thr Ala Cys Glu Leu Cys Ala Pro Gly Ala Phe Gly Pro
                2005                2010                2015
His Cys Gln Ala Cys Arg Cys Thr Val His Gly Arg Cys Asp Glu Gly
            2020                2025                2030
Leu Gly Gly Ser Gly Ser Cys Phe Cys Asp Glu Gly Trp Thr Gly Pro
        2035                2040                2045
Arg Cys Glu Val Gln Leu Glu Leu Gln Pro Val Cys Thr Pro Pro Cys
    2050                2055                2060
Ala Pro Glu Ala Val Cys Arg Ala Gly Asn Ser Cys Glu Cys Ser Leu
2065                2070                2075                2080
Gly Tyr Glu Gly Asp Gly Arg Val Cys Thr Val Ala Asp Leu Cys Gln
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                2085                2090                2095
Asp Gly His Gly Gly Cys Ser Glu His Ala Asn Cys Ser Gln Val Gly
            2100                2105                2110
Thr Met Val Thr Cys Thr Cys Leu Pro Asp Tyr Glu Gly Asp Gly Trp
        2115                2120                2125
Ser Cys Arg Ala Arg Asn Pro Cys Thr Asp Gly His Arg Gly Gly Cys
    2130                2135                2140
Ser Glu His Ala Asn Cys Leu Ser Thr Gly Leu Asn Thr Arg Arg Cys
2145                2150                2155                2160
Glu Cys His Ala Gly Tyr Val Gly Asp Gly Leu Gln Cys Leu Glu Glu
                2165                2170                2175
Ser Glu Pro Pro Val Asp Arg Cys Leu Gly Gln Pro Pro Pro Cys His
            2180                2185                2190
Ser Asp Ala Met Cys Thr Asp Leu His Phe Gln Glu Lys Arg Ala Gly
        2195                2200                2205
Val Phe His Leu Gln Ala Thr Ser Gly Pro Tyr Gly Leu Asn Phe Ser
    2210                2215                2220
Glu Ala Glu Ala Ala Cys Glu Ala Gln Gly Ala Val Leu Ala Ser Phe
2225                2230                2235                2240
Pro Gln Leu Ser Ala Ala Gln Gln Leu Gly Phe His Leu Cys Leu Met
                2245                2250                2255
Gly Trp Leu Ala Asn Gly Ser Thr Ala His Pro Val Val Phe Pro Val
            2260                2265                2270
Ala Asp Cys Gly Asn Gly Arg Val Gly Ile Val Ser Leu Gly Ala Arg
        2275                2280                2285
Lys Asn Leu Ser Glu Arg Trp Asp Ala Tyr Cys Phe Arg Val Gln Asp
    2290                2295                2300
Val Ala Cys Arg Cys Arg Asn Gly Phe Val Gly Asp Gly Ile Ser Thr
2305                2310                2315                2320
Cys Asn Gly Lys Leu Leu Asp Val Leu Ala Ala Thr Ala Asn Phe Ser
                2325                2330                2335
Thr Phe Tyr Gly Met Leu Leu Gly Tyr Ala Asn Ala Thr Gln Arg Gly
            2340                2345                2350
Leu Asp Phe Leu Asp Phe Leu Asp Asp Glu Leu Thr Tyr Lys Thr Leu
        2355                2360                2365
Phe Val Pro Val Asn Glu Gly Phe Val Asp Asn Met Thr Leu Ser Gly
    2370                2375                2380
Pro Asp Leu Glu Leu His Ala Ser Asn Ala Thr Leu Leu Ser Ala Asn
2385                2390                2395                2400
Ala Ser Gln Gly Lys Leu Leu Pro Ala His Ser Gly Leu Ser Leu Ile
                2405                2410                2415
Ile Ser Asp Ala Gly Pro Asp Asn Ser Ser Trp Ala Pro Val Ala Pro
            2420                2425                2430
Gly Thr Val Val Val Ser Arg Ile Ile Val Trp Asp Ile Met Ala Phe
        2435                2440                2445
Asn Gly Ile Ile His Ala Leu Ala Ser Pro Leu Leu Ala Pro Pro Gln
    2450                2455                2460
Pro Gln Ala Val Leu Ala Pro Glu Ala Pro Pro Val Ala Ala Gly Val
2465                2470                2475                2480
Gly Ala Val Leu Ala Ala Gly Ala Leu Leu Gly Leu Val Ala Gly Ala
                2485                2490                2495
Leu Tyr Leu Arg Ala Arg Gly Lys Pro Met Gly Phe Gly Phe Ser Ala
            2500                2505                2510
Phe Gln Ala Glu Asp Asp Ala Asp Asp Asp Phe Ser Pro Trp Gln Glu
        2515                2520                2525
Gly Thr Asn Pro Thr Leu Val Ser Val Pro Asn Pro Val Phe Gly Ser
    2530                2535                2540
Asp Thr Phe Cys Glu Pro Phe Asp Asp Ser Leu Leu Glu Glu Asp Phe
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Pro Asp Thr Gln Arg Ile Leu Thr Val Lys
2565 2570

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Arg Lys Ser Leu Leu Thr Ile Arg Thr Glu Cys Arg Ser Cys Ala Leu
35 40 45
Asn Leu Gly Val Lys Cys Pro Asp Gly Tyr Thr Met Ile Thr Ser Gly
50 55 60
Ser Val Gly Val Arg Asp Cys Arg Tyr Thr Phe Glu Val Arg Thr Tyr
65 70 75 80
Ser Leu Ser Leu Pro Gly Cys Arg His Ile Cys Arg Lys Asp Tyr Leu
85 90 95
Gln Pro Arg Cys Cys Pro Gly Arg Trp Gly Pro Asp Cys Ile Glu Cys
100 105 110
Pro Gly Gly Ala Gly Ser Pro Cys Asn Gly Arg Gly Ser Cys Ala Glu
115 120 125
Gly Met Glu Gly Asn Gly Thr Cys Ser Cys Gln Glu Gly Phe Gly Gly
130 135 140
Thr Ala Cys Glu Thr Cys Ala Asp Asp Asn Leu Phe Gly Pro Ser Cys
145 150 155 160
Ser Ser Val Cys Asn Cys Val His Gly Val Cys Asn Ser Gly Leu Asp
165 170 175
Gly Asp Gly Thr Cys Glu Cys Tyr Ser Ala Tyr Thr Gly Pro Lys Cys
180 185 190
Asp Lys Pro Ile Pro Glu Cys Ala Ala Leu Leu Cys Pro Glu Asn Ser
195 200 205
Arg Cys Ser Pro Ser Thr Glu Asp Glu Asn Lys Leu Glu Cys Lys Cys
210 215 220
Leu Pro Asn Tyr Arg Gly Asp Gly Lys Tyr Cys Asp Pro Ile Asn Pro
225 230 235 240
Cys Leu Arg Lys Ile Cys His Pro His Ala His Cys Thr Tyr Leu Gly
245 250 255
Pro Asn Arg His Ser Cys Thr Cys Gln Glu Gly Tyr Arg Gly Asp Gly
260 265 270
Gln Val Cys Leu Pro Val Asp Pro Cys Gln Ile Asn Phe Gly Asn Cys
275 280 285
Pro Thr Lys Ser Thr Val Cys Lys Tyr Asp Gly Pro Gly Gln Ser His
290 295 300
Cys Glu Cys Lys Glu His Tyr Gln Asn Phe Val Pro Gly Val Gly Cys
305 310 315 320
Ser Met Thr Asp Ile Cys Lys Ser Asp Asn Pro Cys His Arg Asn Ala
325 330 335
Asn Cys Thr Thr Val Ala Pro Gly Arg Thr Glu Cys Ile Cys Gln Lys

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            340                 345                 350
Gly Tyr Val Gly Asp Gly Leu Thr Cys Tyr Gly Asn Ile Met Glu Arg
        355                 360                 365
Leu Arg Glu Leu Asn Thr Glu Pro Arg Gly Lys Trp Gln Gly Arg Leu
    370                 375                 380
Thr Ser Phe Ile Ser Leu Leu Asp Lys Ala Tyr Ala Trp Pro Leu Ser
385                 390                 395                 400
Lys Leu Gly Pro Phe Thr Val Leu Leu Pro Thr Asp Lys Gly Leu Lys
                405                 410                 415
Gly Phe Asn Val Asn Glu Leu Leu Val Asp Asn Lys Ala Ala Gln Tyr
            420                 425                 430
Phe Val Lys Leu His Ile Ile Ala Gly Gln Met Asn Ile Glu Tyr Met
        435                 440                 445
Asn Asn Thr Asp Met Phe Tyr Thr Leu Thr Gly Lys Ser Gly Glu Ile
    450                 455                 460
Phe Asn Ser Asp Lys Asp Asn Gln Ile Lys Leu Lys Leu His Gly Gly
465                 470                 475                 480
Lys Lys Lys Val Lys Ile Ile Gln Gly Asp Ile Ile Ala Ser Asn Gly
                485                 490                 495
Leu Leu His Ile Leu Asp Arg Ala Met Asp Lys Leu Glu Pro Thr Phe
            500                 505                 510
Glu Ser Asn Asn Glu Gln Thr Ile Met Thr Met Leu Gln Pro Arg Tyr
        515                 520                 525
Ser Lys Phe Arg Ser Leu Leu Glu Glu Thr Asn Leu Gly His Ala Leu
    530                 535                 540
Asp Glu Asp Gly Val Gly Gly Pro Tyr Thr Ile Phe Val Pro Asn Asn
545                 550                 555                 560
Glu Ala Leu Asn Asn Met Lys Asp Gly Thr Leu Asp Tyr Leu Leu Ser
                565                 570                 575
Pro Glu Gly Ser Arg Lys Leu Leu Glu Leu Val Arg Tyr His Ile Val
            580                 585                 590
Pro Phe Thr Gln Leu Glu Val Ala Thr Leu Ile Ser Thr Pro His Ile
        595                 600                 605
Arg Ser Met Ala Asn Gln Leu Ile Gln Phe Asn Thr Thr Asp Asn Gly
    610                 615                 620
Gln Ile Leu Ala Asn Asp Val Ala Met Glu Glu Ile Glu Ile Thr Ala
625                 630                 635                 640
Lys Asn Gly Arg Ile Tyr Thr Leu Thr Gly Val Leu Ile Pro Pro Ser
                645                 650                 655
Ile Val Pro Ile Leu Pro His Arg Cys Asp Glu Thr Lys Arg Glu Met
            660                 665                 670
Lys Leu Gly Thr Cys Val Ser Cys Ser Leu Val Tyr Trp Ser Arg Cys
        675                 680                 685
Pro Ala Asn Ser Glu Pro Thr Ala Leu Phe Thr His Arg Cys Val Tyr
    690                 695                 700
Ser Gly Arg Phe Gly Ser Leu Lys Ser Gly Cys Ala Arg Tyr Cys Asn
705                 710                 715                 720
Ala Thr Val Lys Ile Pro Lys Cys Cys Lys Gly Phe Tyr Gly Pro Asp
                725                 730                 735
Cys Asn Gln Cys Pro Gly Gly Phe Ser Asn Pro Cys Ser Gly Asn Gly
            740                 745                 750
Gln Cys Ala Asp Ser Leu Gly Gly Asn Gly Thr Cys Ile Cys Glu Glu
        755                 760                 765
Gly Phe Gln Gly Ser Gln Cys Gln Phe Cys Ser Asp Pro Asn Lys Tyr
    770                 775                 780
Gly Pro Arg Cys Asn Lys Lys Cys Leu Cys Val His Gly Thr Cys Asn
785                 790                 795                 800
Asn Arg Ile Asp Ser Asp Gly Ala Cys Leu Thr Gly Thr Cys Arg Asp
```

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                805                 810                 815
Gly Ser Ala Gly Arg Leu Cys Asp Lys Gln Thr Ser Ala Cys Gly Pro
            820                 825                 830
Tyr Val Gln Phe Cys His Ile His Ala Thr Cys Glu Tyr Ser Asn Gly
        835                 840                 845
Thr Ala Ser Cys Ile Cys Lys Ala Gly Tyr Glu Gly Asp Gly Thr Leu
    850                 855                 860
Cys Ser Glu Met Asp Pro Cys Thr Gly Leu Thr Pro Gly Gly Cys Ser
865                 870                 875                 880
Arg Asn Ala Glu Cys Ile Lys Thr Gly Thr Gly Thr His Thr Cys Val
                885                 890                 895
Cys Gln Gln Gly Trp Thr Gly Asn Gly Arg Asp Cys Ser Glu Ile Asn
            900                 905                 910
Asn Cys Leu Leu Pro Ser Ala Gly Gly Cys His Asp Asn Ala Ser Cys
        915                 920                 925
Leu Tyr Val Gly Pro Gly Gln Asn Glu Cys Glu Cys Lys Lys Gly Phe
    930                 935                 940
Arg Gly Asn Gly Ile Asp Cys Glu Pro Ile Thr Ser Cys Leu Glu Gln
945                 950                 955                 960
Thr Gly Lys Cys His Pro Leu Ala Ser Cys Gln Ser Thr Ser Ser Gly
                965                 970                 975
Val Trp Ser Cys Val Cys Gln Glu Gly Tyr Glu Gly Asp Gly Phe Leu
            980                 985                 990
Cys Tyr Gly Asn Ala Ala Val Glu Leu Ser Phe Leu Ser Glu Ala Ala
        995                 1000                1005
Ile Phe Asn Arg Trp Ile Asn Asn Ala Ser Leu Gln Pro Thr Leu Ser
    1010                1015                1020
Ala Thr Ser Asn Leu Thr Val Leu Val Pro Ser Gln Gln Ala Thr Glu
1025                1030                1035                1040
Asp Met Asp Gln Asp Glu Lys Ser Phe Trp Leu Ser Gln Ser Asn Ile
                1045                1050                1055
Pro Ala Leu Ile Lys Tyr His Met Leu Leu Gly Thr Tyr Arg Val Ala
            1060                1065                1070
Asp Leu Gln Thr Leu Ser Ser Ser Asp Met Leu Ala Thr Ser Leu Gln
        1075                1080                1085
Gly Asn Phe Leu His Leu Ala Lys Val Asp Gly Asn Ile Thr Ile Glu
    1090                1095                1100
Gly Ala Ser Ile Val Asp Gly Asp Asn Ala Ala Thr Asn Gly Val Ile
1105                1110                1115                1120
His Ile Ile Asn Lys Val Leu Val Pro Gln Arg Arg Leu Thr Gly Ser
                1125                1130                1135
Leu Pro Asn Leu Leu Met Arg Leu Glu Gln Met Pro Asp Tyr Ser Ile
            1140                1145                1150
Phe Arg Gly Tyr Ile Ile Gln Tyr Asn Leu Ala Asn Ala Ile Glu Ala
        1155                1160                1165
Ala Asp Ala Tyr Thr Val Phe Ala Pro Asn Asn Asn Ala Ile Glu Asn
    1170                1175                1180
Tyr Ile Arg Glu Lys Lys Val Leu Ser Leu Glu Glu Asp Val Leu Arg
1185                1190                1195                1200
Tyr His Val Val Leu Glu Glu Lys Leu Leu Lys Asn Asp Leu His Asn
                1205                1210                1215
Gly Met His Arg Glu Thr Met Leu Gly Phe Ser Tyr Phe Leu Ser Phe
            1220                1225                1230
Phe Leu His Asn Asp Gln Leu Tyr Val Asn Glu Ala Pro Ile Asn Tyr
        1235                1240                1245
Thr Asn Val Ala Thr Asp Lys Gly Val Ile His Gly Leu Gly Lys Val
    1250                1255                1260
Leu Glu Ile Gln Lys Asn Arg Cys Asp Asn Asn Asp Thr Thr Ile Ile
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1265                1270                1275                1280
Arg Gly Arg Cys Arg Thr Cys Ser Ser Glu Leu Thr Cys Pro Phe Gly
                1285                1290                1295
Thr Lys Ser Leu Gly Asn Glu Lys Arg Arg Cys Ile Tyr Thr Ser Tyr
            1300                1305                1310
Phe Met Gly Arg Arg Thr Leu Phe Ile Gly Cys Gln Pro Lys Cys Val
        1315                1320                1325
Arg Thr Val Ile Thr Arg Glu Cys Cys Ala Gly Phe Phe Gly Pro Gln
    1330                1335                1340
Cys Gln Pro Cys Pro Gly Asn Ala Gln Asn Val Cys Phe Gly Asn Gly
1345                1350                1355                1360
Ile Cys Leu Asp Gly Val Asn Gly Thr Gly Val Cys Glu Cys Gly Glu
                1365                1370                1375
Gly Phe Ser Gly Thr Ala Cys Glu Thr Cys Thr Glu Gly Lys Tyr Gly
            1380                1385                1390
Ile His Cys Asp Gln Ala Cys Ser Cys Val His Gly Arg Cys Asn Gln
        1395                1400                1405
Gly Pro Leu Gly Asp Gly Ser Cys Asp Cys Asp Val Gly Trp Arg Gly
    1410                1415                1420
Val His Cys Asp Asn Ala Thr Thr Glu Asp Asn Cys Asn Gly Thr Cys
1425                1430                1435                1440
His Thr Ser Ala Asn Cys Leu Thr Asn Ser Asp Gly Thr Ala Ser Cys
                1445                1450                1455
Lys Cys Ala Ala Gly Phe Gln Gly Asn Gly Thr Ile Cys Thr Ala Ile
            1460                1465                1470
Asn Ala Cys Glu Ile Ser Asn Gly Gly Cys Ser Ala Lys Ala Asp Cys
        1475                1480                1485
Lys Arg Thr Thr Pro Gly Arg Arg Val Cys Thr Cys Lys Ala Gly Tyr
    1490                1495                1500
Thr Gly Asp Gly Ile Val Cys Leu Glu Ile Asn Pro Cys Leu Glu Asn
1505                1510                1515                1520
His Gly Gly Cys Asp Lys Asn Ala Glu Cys Thr Gln Thr Gly Pro Asn
                1525                1530                1535
Gln Ala Ala Cys Asn Cys Leu Pro Ala Tyr Thr Gly Asp Gly Lys Val
            1540                1545                1550
Cys Thr Leu Ile Asn Val Cys Leu Thr Lys Asn Gly Gly Cys Ser Glu
        1555                1560                1565
Phe Ala Ile Cys Asn His Thr Gly Gln Val Glu Arg Thr Cys Thr Cys
    1570                1575                1580
Lys Pro Asn Tyr Ile Gly Asp Gly Phe Thr Cys Arg Gly Ser Ile Tyr
1585                1590                1595                1600
Gln Glu Leu Pro Lys Asn Pro Lys Thr Ser Gln Tyr Phe Phe Gln Leu
                1605                1610                1615
Gln Glu His Phe Val Lys Asp Leu Val Gly Pro Gly Pro Phe Thr Val
            1620                1625                1630
Phe Ala Pro Leu Ser Ala Ala Phe Asp Glu Glu Ala Arg Val Lys Asp
        1635                1640                1645
Trp Asp Lys Tyr Gly Leu Met Pro Gln Val Leu Arg Tyr His Val Val
    1650                1655                1660
Ala Cys His Gln Leu Leu Leu Glu Asn Leu Lys Leu Ile Ser Asn Ala
1665                1670                1675                1680
Thr Ser Leu Gln Gly Glu Pro Ile Val Ile Ser Val Ser Gln Ser Thr
                1685                1690                1695
Val Tyr Ile Asn Asn Lys Ala Lys Ile Ile Ser Ser Asp Ile Ile Ser
            1700                1705                1710
Thr Asn Gly Ile Val His Ile Ile Asp Lys Leu Leu Ser Pro Lys Asn
        1715                1720                1725
Leu Leu Ile Thr Pro Lys Asp Asn Ser Gly Arg Ile Leu Gln Asn Leu
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    1730                1735                1740
Thr Thr Leu Ala Thr Asn Asn Gly Tyr Ile Lys Phe Ser Asn Leu Ile
1745                1750                1755                1760
Gln Asp Ser Gly Leu Leu Ser Val Ile Thr Asp Pro Ile His Thr Pro
                1765                1770                1775
Val Thr Leu Phe Trp Pro Thr Asp Gln Ala Leu His Ala Leu Pro Ala
            1780                1785                1790
Glu Gln Gln Asp Phe Leu Phe Asn Gln Asp Asn Lys Asp Lys Leu Lys
        1795                1800                1805
Glu Tyr Leu Lys Phe His Val Ile Arg Asp Ala Lys Val Leu Ala Val
    1810                1815                1820
Asp Leu Pro Thr Ser Thr Ala Trp Lys Thr Leu Gln Gly Ser Glu Leu
1825                1830                1835                1840
Ser Val Lys Cys Gly Ala Gly Arg Asp Ile Gly Asp Leu Phe Leu Asn
                1845                1850                1855
Gly Gln Thr Cys Arg Ile Val Gln Arg Glu Leu Leu Phe Asp Leu Gly
            1860                1865                1870
Val Ala Tyr Gly Ile Asp Cys Leu Leu Ile Asp Pro Thr Leu Gly Gly
        1875                1880                1885
Arg Cys Asp Thr Phe Thr Thr Phe Asp Ala Ser Gly Glu Cys Gly Ser
    1890                1895                1900
Cys Val Asn Thr Pro Ser Cys Pro Arg Trp Ser Lys Pro Lys Gly Val
1905                1910                1915                1920
Lys Gln Lys Cys Leu Tyr Asn Leu Pro Phe Lys Arg Asn Leu Glu Gly
                1925                1930                1935
Cys Arg Glu Arg Cys Ser Leu Val Ile Gln Ile Pro Arg Cys Cys Lys
            1940                1945                1950
Gly Tyr Phe Gly Arg Asp Cys Gln Ala Cys Pro Gly Gly Pro Asp Ala
        1955                1960                1965
Pro Cys Asn Asn Arg Gly Val Cys Leu Asp Gln Tyr Ser Ala Thr Gly
    1970                1975                1980
Glu Cys Lys Cys Asn Thr Gly Phe Asn Gly Thr Ala Cys Glu Met Cys
1985                1990                1995                2000
Trp Pro Gly Arg Phe Gly Pro Asp Cys Leu Pro Cys Gly Cys Ser Asp
                2005                2010                2015
His Gly Gln Cys Asp Asp Gly Ile Thr Gly Ser Gly Gln Cys Leu Cys
            2020                2025                2030
Glu Thr Gly Trp Thr Gly Pro Ser Cys Asp Thr Gln Ala Val Leu Pro
        2035                2040                2045
Ala Val Cys Thr Pro Pro Cys Ser Ala His Ala Thr Cys Lys Glu Asn
    2050                2055                2060
Asn Thr Cys Glu Cys Asn Leu Asp Tyr Glu Gly Asp Gly Ile Thr Cys
2065                2070                2075                2080
Thr Val Val Asp Phe Cys Lys Gln Asp Asn Gly Gly Cys Ala Lys Val
                2085                2090                2095
Ala Arg Cys Ser Gln Lys Gly Thr Lys Val Ser Cys Ser Cys Gln Lys
            2100                2105                2110
Gly Tyr Lys Gly Asp Gly His Ser Cys Thr Glu Ile Asp Pro Cys Ala
        2115                2120                2125
Asp Gly Leu Asn Gly Gly Cys His Glu His Ala Thr Cys Lys Met Thr
    2130                2135                2140
Gly Pro Gly Lys His Lys Cys Glu Cys Lys Ser His Tyr Val Gly Asp
2145                2150                2155                2160
Gly Leu Asn Cys Glu Pro Glu Gln Leu Pro Ile Asp Arg Cys Leu Gln
                2165                2170                2175
Asp Asn Gly Gln Cys His Ala Asp Ala Lys Cys Val Asp Leu His Phe
            2180                2185                2190
Gln Asp Thr Thr Val Gly Val Phe His Leu Arg Ser Pro Leu Gly Gln
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        2195                2200                2205
Tyr Lys Leu Thr Phe Asp Lys Ala Arg Glu Ala Cys Ala Asn Glu Ala
    2210                2215                2220
Ala Thr Met Ala Thr Tyr Asn Gln Leu Ser Tyr Ala Gln Lys Ala Lys
2225                2230                2235                2240
Tyr His Leu Cys Ser Ala Gly Trp Leu Glu Thr Gly Arg Val Ala Tyr
                2245                2250                2255
Pro Thr Ala Phe Ala Ser Gln Asn Cys Gly Ser Gly Val Val Gly Ile
            2260                2265                2270
Val Asp Tyr Gly Pro Arg Pro Asn Lys Ser Glu Met Trp Asp Val Phe
        2275                2280                2285
Cys Tyr Arg Met Lys Asp Val Asn Cys Thr Cys Lys Val Gly Tyr Val
    2290                2295                2300
Gly Asp Gly Phe Ser Cys Ser Gly Asn Leu Leu Gln Val Leu Met Ser
2305                2310                2315                2320
Phe Pro Ser Leu Thr Asn Phe Leu Thr Glu Val Leu Ala Tyr Ser Asn
                2325                2330                2335
Ser Ser Ala Arg Gly Arg Ala Phe Leu Glu His Leu Thr Asp Leu Ser
            2340                2345                2350
Ile Arg Gly Thr Leu Phe Val Pro Gln Asn Ser Gly Leu Gly Glu Asn
        2355                2360                2365
Glu Thr Leu Ser Gly Arg Asp Ile Glu His His Leu Ala Asn Val Ser
    2370                2375                2380
Met Phe Phe Tyr Asn Asp Leu Val Asn Gly Thr Thr Leu Gln Thr Arg
2385                2390                2395                2400
Leu Gly Ser Lys Leu Leu Ile Thr Ala Ser Gln Asp Pro Leu Gln Pro
                2405                2410                2415
Thr Glu Thr Arg Phe Val Asp Gly Arg Ala Ile Leu Gln Trp Asp Ile
            2420                2425                2430
Phe Ala Ser Asn Gly Ile Ile His Val Ile Ser Arg Pro Leu Lys Ala
        2435                2440                2445
Pro Pro Ala Pro Val Thr Leu Thr His Thr Gly Leu Gly Ala Gly Ile
    2450                2455                2460
Phe Phe Ala Ile Ile Leu Val Thr Gly Ala Val Ala Leu Ala Ala Tyr
2465                2470                2475                2480
Ser Tyr Phe Arg Ile Asn Arg Arg Thr Ile Gly Phe Gln His Phe Glu
                2485                2490                2495
Ser Glu Glu Asp Ile Asn Val Ala Ala Leu Gly Lys Gln Gln Pro Glu
            2500                2505                2510
Asn Ile Ser Asn Pro Leu Tyr Glu Ser Thr Thr Ser Ala Pro Pro Glu
        2515                2520                2525
Pro Ser Tyr Asp Pro Phe Thr Asp Ser Glu Glu Arg Gln Leu Glu Gly
    2530                2535                2540
Asn Asp Pro Leu Arg Thr Leu
2545                2550


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<220>
<223> CAB61358 protein


<400> 225
Gly Thr Ala Ser Cys Lys Cys Ala Ala Gly Phe Gln Gly Asn Gly Thr
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```
 1               5                  10                  15
Ile Cys Thr Ala Ile Asn Ala Cys Glu Ile Ser Asn Gly Gly Cys Ser
            20                  25                  30
Ala Lys Ala Asp Cys Lys Arg Thr Thr Pro Gly Arg Arg Val Cys Thr
        35                  40                  45
Cys Lys Ala Gly Tyr Thr Gly Asp Gly Ile Val Cys Leu Glu Ile Asn
    50                  55                  60
Pro Cys Leu Glu Asn His Gly Gly Cys Asp Lys Asn Ala Glu Cys Thr
65                  70                  75                  80
Gln Thr Gly Pro Asn Gln Ala Ala Cys Asn Cys Leu Pro Ala Tyr Thr
                85                  90                  95
Gly Asp Gly Lys Val Cys Thr Leu Ile Asn Val Cys Leu Thr Lys Asn
            100                 105                 110
Gly Gly Cys Ser Glu Phe Ala Ile Cys Asn His Thr Gly Gln Val Glu
        115                 120                 125
Arg Thr Cys Thr Cys Lys Pro Asn Tyr Ile Gly Asp Gly Phe Thr Cys
    130                 135                 140
Arg Gly Ser Ile Tyr Gln Glu Leu Pro Lys Asn Pro Lys Thr Ser Gln
145                 150                 155                 160
Tyr Phe Phe Gln Leu Gln Glu His Phe Val Lys Asp Leu Val Gly Pro
                165                 170                 175
Gly Pro Phe Thr Val Phe Ala Pro Leu Ser Ala Ala Phe Asp Glu Glu
            180                 185                 190
Ala Arg Val Lys Asp Trp Asp Lys Tyr Gly Leu Met Pro Gln Val Leu
        195                 200                 205
Arg Tyr His Val Val Ala Cys His Gln Leu Leu Leu Glu Asn Leu Lys
    210                 215                 220
Leu Ile Ser Asn Ala Thr Ser Leu Gln Gly Glu Pro Ile Val Ile Ser
225                 230                 235                 240
Val Ser Gln Ser Thr Val Tyr Ile Asn Asn Lys Ala Lys Ile Ile Ser
                245                 250                 255
Ser Asp Ile Ile Ser Thr Asn Gly Ile Val His Ile Ile Asp Lys Leu
            260                 265                 270
Leu Ser Pro Lys Asn Leu Leu Ile Thr Pro Lys Asp Asn Ser Gly Arg
        275                 280                 285
Ile Leu Gln Asn Leu Thr Thr Leu Ala Thr Asn Asn Gly Tyr Ile Lys
    290                 295                 300
Phe Ser Asn Leu Ile Gln Asp Ser Gly Leu Leu Ser Val Ile Thr Asp
305                 310                 315                 320
Pro Ile His Thr Pro Val Thr Leu Phe Trp Pro Thr Asp Gln Ala Leu
                325                 330                 335
His Ala Leu Pro Ala Glu Gln Gln Asp Phe Leu Phe Asn Gln Asp Asn
            340                 345                 350
Lys Asp Lys Leu Lys Glu Tyr Leu Lys Phe His Val Ile Arg Asp Ala
        355                 360                 365
Lys Val Leu Ala Val Asp Leu Pro Thr Ser Thr Ala Trp Lys Thr Leu
    370                 375                 380
Gln Gly Ser Glu Leu Ser Val Lys Cys Gly Ala Gly Arg Asp Ile Gly
385                 390                 395                 400
Asp Leu Phe Leu Asn Gly Gln Thr Cys Arg Ile Val Gln Arg Glu Leu
                405                 410                 415
Leu Phe Asp Leu Gly Val Ala Tyr Gly Ile Asp Cys Leu Leu Ile Asp
            420                 425                 430
Pro Thr Leu Gly Gly Arg Cys Asp Thr Phe Thr Thr Phe Asp Ala Ser
        435                 440                 445
Gly Glu Cys Gly Ser Cys Val Asn Thr Pro Ser Cys Pro Arg Trp Ser
    450                 455                 460
Lys Pro Lys Gly Val Lys Gln Lys Cys Leu Tyr Asn Leu Pro Phe Lys
```

```
465                 470                 475                 480
Arg Asn Leu Glu Gly Cys Arg Glu Arg Cys Ser Leu Val Ile Gln Ile
                485                 490                 495
Pro Arg Cys Cys Lys Gly Tyr Phe Gly Arg Asp Cys Gln Ala Cys Pro
            500                 505                 510
Gly Gly Pro Asp Ala Pro Cys Asn Asn Arg Gly Val Cys Leu Asp Gln
        515                 520                 525
Tyr Ser Ala Thr Gly Glu Cys Lys Cys Asn Thr Gly Phe Asn Gly Thr
    530                 535                 540
Ala Cys Glu Met Cys Trp Pro Gly Arg Phe Gly Pro Asp Cys Leu Pro
545                 550                 555                 560
Cys Gly Cys Ser Asp His Gly Gln Cys Asp Asp Gly Ile Thr Gly Ser
                565                 570                 575
Gly Gln Cys Leu Cys Glu Thr Gly Trp Thr Gly Pro Ser Cys Asp Thr
            580                 585                 590
Gln Ala Val Leu Pro Ala Val Cys Thr Pro Pro Cys Ser Ala His Ala
        595                 600                 605
Thr Cys Lys Glu Asn Asn Thr Cys Glu Cys Asn Leu Asp Tyr Glu Gly
    610                 615                 620
Asp Gly Ile Thr Cys Thr Val Val Asp Phe Cys Lys Gln Asp Asn Gly
625                 630                 635                 640
Gly Cys Ala Lys Val Ala Arg Cys Ser Gln Lys Gly Thr Lys Val Ser
                645                 650                 655
Cys Ser Cys Gln Lys Gly Tyr Lys Gly Asp Gly His Ser Cys Thr Glu
            660                 665                 670
Ile Asp Pro Cys Ala Asp Gly Leu Asn Gly Gly Cys His Glu His Ala
        675                 680                 685
Thr Cys Lys Met Thr Gly Pro Gly Lys His Lys Cys Glu Cys Lys Ser
    690                 695                 700
His Tyr Val Gly Asp Gly Leu Asn Cys Glu Pro Glu Gln Leu Pro Ile
705                 710                 715                 720
Asp Arg Cys Leu Gln Asp Asn Gly Gln Cys His Ala Asp Ala Lys Cys
                725                 730                 735
Val Asp Leu His Phe Gln Asp Thr Thr Val Gly Val Phe His Leu Arg
            740                 745                 750
Ser Pro Leu Gly Gln Tyr Lys Leu Thr Phe Asp Lys Ala Arg Glu Ala
        755                 760                 765
Cys Ala Asn Glu Ala Ala Thr Met Ala Thr Tyr Asn Gln Leu Ser Tyr
    770                 775                 780
Ala Gln Lys Ala Lys Tyr His Leu Cys Ser Ala Gly Trp Leu Glu Thr
785                 790                 795                 800
Gly Arg Val Ala Tyr Pro Thr Ala Phe Ala Ser Gln Asn Cys Gly Ser
                805                 810                 815
Gly Val Val Gly Ile Val Asp Tyr Gly Pro Arg Pro Asn Lys Ser Glu
            820                 825                 830
Met Trp Asp Val Phe Cys Tyr Arg Met Lys Gly Ser Ala Gly Leu Phe
        835                 840                 845
Gln Gln Leu Ser Ser Arg Pro Cys Ile Ser Arg Thr Pro Asp
    850                 855                 860
```

<210> 226
<211> 768
<212> PRT
<213> Homo sapiens

<220>
<223> KIAA0527 protein AB011099

<400> 226
Pro Arg Val Pro Gln Thr Gly Gly Gly Ser Leu Arg Pro Ala Ser Tyr
 1   5   10   15
Ser Pro Arg Leu Pro Ala Pro Ser Pro Ser Ala Pro Leu Tyr Pro Gln
            20   25   30
Ser Ala Arg Pro Ser Ala Ala Pro Phe Gly Thr Glu Val Ser Arg Cys
        35   40   45
Pro Ala Arg Arg Arg Ser Arg Val Thr Ala Ala Ser Ser Ala Pro Gln
    50   55   60
Arg Arg Pro Pro Gly Val Arg Arg Pro Arg Arg Ser Gly Ser Ala Ser
65   70   75   80
Arg Ala Ser Pro Gly Ser Pro Arg Ser Ser Leu Ser Ala Arg Pro Ala
                85   90   95
Arg Ser Leu Arg Phe Val Ser Arg Ala Gln Ser Ala Glu Pro Ser Gly
            100   105   110
Ala Arg Trp Ala Val Ala Trp Ala Thr Pro Asn Ala Ala Arg Ala Leu
        115   120   125
Thr Arg Val Arg Trp Pro Ala His Ser Arg Thr Met Thr Ala Glu Gly
    130   135   140
Pro Ser Pro Pro Ala Arg Trp His Arg Arg Leu Pro Gly Leu Trp Ala
145   150   155   160
Ala Ala Leu Leu Leu Leu Gly Leu Pro Arg Leu Ser Val Arg Ala Asp
                165   170   175
Gly Lys Leu Phe Val Leu Glu Ser Gln Asn Gly Ser Gln Gly Leu Gln
            180   185   190
Leu Glu Ala Ala Arg Leu Ser Cys Lys Ser Arg Gly Ala His Leu Ala
        195   200   205
Ser Ala Asp Glu Leu Arg Arg Val Val Gln Asp Cys Ser Phe Ala Val
    210   215   220
Cys Thr Thr Gly Trp Leu Ala Asp Gly Thr Leu Gly Thr Thr Val Cys
225   230   235   240
Ser Lys Gly Ser Gly Glu Gln Gln Ile Met Arg Ala Val Asp Val Arg
                245   250   255
Ile Glu Ser Asn Pro Val Pro Gly Gly Thr Tyr Ser Ala Leu Cys Ile
            260   265   270
Lys Asp Glu Glu Lys Pro Cys Gly Asp Pro Pro Ser Phe Pro His Thr
        275   280   285
Ile Leu Gln Gly Arg Thr Gly Leu Glu Met Gly Asp Glu Leu Leu Tyr
    290   295   300
Val Cys Ala Pro Gly His Ile Met Gly His Arg Glu Thr Ala Phe Thr
305   310   315   320
Leu Leu Cys Asn Ser Cys Gly Glu Trp Tyr Gly Leu Val Gln Ala Cys
                325   330   335
Gly Lys Asp Glu Ala Glu Ala His Ile Asp Tyr Glu Asp Asn Phe Pro
            340   345   350
Asp Asp Arg Ser Val Ser Phe Arg Glu Leu Met Glu Asp Ser Arg Thr
        355   360   365
Glu Ala Asp Glu Asp Arg Gly Gln Gly Asp Ser Ser Glu Glu Ala Pro
    370   375   380
Lys Gln Asp Arg Leu Val Ser Ile Ser Val Gly Arg Glu Asn Ile Ala
385   390   395   400
Arg Asp Lys Val Phe Val Pro Thr Thr Gly Ser Pro Gly Ala Gly Ser
                405   410   415
Ser Val Pro Ala Asp Ser Pro Gly Ser Arg Leu Leu Gln Lys His Leu
            420   425   430
Phe Trp Phe Pro Ala Glu Ala Phe His Lys Pro Gly Leu Glu Lys Glu

```
        435                 440                 445
Val Asp Asp Asp Thr Lys Lys Gln Phe Ser Ala Gly Asp Asn His Ser
    450                 455                 460
Gly Val Lys Leu Val Pro Gly Glu Pro Glu Thr Lys Val Ile Tyr Gly
465                 470                 475                 480
Asn Thr Asp Gly Pro Ser Gly Pro Phe Val Gly Lys Asn Asp Ser Lys
                485                 490                 495
Ala Gly Asp Pro Val Val Ser Ser Ser Asp Glu Ser Trp Leu Asp Gly
            500                 505                 510
Tyr Pro Val Thr Asp Gly Ala Trp Arg Lys Thr Glu Ala Glu Glu Glu
        515                 520                 525
Glu Asp Gly Asp Arg Gly Asp Gly Ser Val Gly Leu Asp Glu Asn Val
    530                 535                 540
Leu Val Thr Pro Asp Gln Pro Ile Leu Val Glu Val Lys Lys Pro Lys
545                 550                 555                 560
Ser Ser Thr Leu Thr Pro Ser Glu Gly Met Thr His Ser Ser Val Leu
                565                 570                 575
Pro Ser Gln Met Leu Asp Val Glu Ala Leu Ala Leu Arg Pro Val Asn
            580                 585                 590
Ala Ser Glu Thr Glu Gly Ile Gly Asp Gly Asp Leu Thr Lys Tyr Gln
        595                 600                 605
Ser Thr Leu Pro Trp Arg Phe Ile Thr Glu Glu Ser Pro Met Ala Thr
    610                 615                 620
Leu Ser Tyr Glu Leu Thr Ser Ser Thr Leu Glu Ile Leu Thr Val Asn
625                 630                 635                 640
Thr Val Lys Gln Thr Pro Asn His Ile Pro Ser Thr Ile Met Ala Thr
                645                 650                 655
Thr Gln Pro Pro Val Glu Thr Thr Val Pro Glu Ile Gln Asp Ser Phe
            660                 665                 670
Pro Tyr Leu Leu Ser Glu Asp Phe Phe Gly Gln Glu Gly Pro Gly Pro
        675                 680                 685
Gly Ala Ser Glu Glu Leu His Pro Thr Leu Glu Ser Cys Val Gly Asp
    690                 695                 700
Gly Cys Pro Gly Leu Ser Arg Gly Pro Val Ile Ala Thr Ile Val Thr
705                 710                 715                 720
Val Leu Cys Leu Leu Leu Leu Leu Ala Gly Val Gly Met Val Trp Gly
                725                 730                 735
Tyr Arg Lys Cys Gln His Lys Ser Ser Val Tyr Lys Leu Asn Val Gly
            740                 745                 750
Gln Arg Gln Ala Arg His Tyr His Gln Gln Ile Glu Met Glu Lys Val
        755                 760                 765


<210> 227
<211> 742
<212> PRT
<213> Homo sapiens

<220>
<223> CD44 protein P16070



<400> 227
Met Asp Lys Phe Trp Trp His Ala Ala Trp Gly Leu Cys Leu Val Pro
 1               5                  10                  15
Leu Ser Leu Ala Gln Ile Asp Leu Asn Ile Thr Cys Arg Phe Ala Gly
            20                  25                  30
```

```
Val Phe His Val Glu Lys Asn Gly Arg Tyr Ser Ile Ser Arg Thr Glu
         35                  40                  45
Ala Ala Asp Leu Cys Lys Ala Phe Asn Ser Thr Leu Pro Thr Met Ala
     50                  55                  60
Gln Met Glu Lys Ala Leu Ser Ile Gly Phe Glu Thr Cys Arg Tyr Gly
65                  70                  75                  80
Phe Ile Glu Gly His Val Val Ile Pro Arg Ile His Pro Asn Ser Ile
                 85                  90                  95
Cys Ala Ala Asn Asn Thr Gly Val Tyr Ile Leu Thr Ser Asn Thr Ser
            100                 105                 110
Gln Tyr Asp Thr Tyr Cys Phe Asn Ala Ser Ala Pro Pro Glu Glu Asp
        115                 120                 125
Cys Thr Ser Val Thr Asp Leu Pro Asn Ala Phe Asp Gly Pro Ile Thr
    130                 135                 140
Ile Thr Ile Val Asn Arg Asp Gly Thr Arg Tyr Val Gln Lys Gly Glu
145                 150                 155                 160
Tyr Arg Thr Asn Pro Glu Asp Ile Tyr Pro Ser Asn Pro Thr Asp Asp
                165                 170                 175
Asp Val Ser Ser Gly Ser Ser Ser Glu Arg Ser Ser Thr Ser Gly Gly
            180                 185                 190
Tyr Ile Phe Tyr Thr Phe Ser Thr Val His Pro Ile Pro Asp Glu Asp
        195                 200                 205
Ser Pro Trp Ile Thr Asp Ser Thr Asp Arg Ile Pro Ala Thr Thr Leu
    210                 215                 220
Met Ser Thr Ser Ala Thr Ala Thr Glu Thr Ala Thr Lys Arg Gln Glu
225                 230                 235                 240
Thr Trp Asp Trp Phe Ser Trp Leu Phe Leu Pro Ser Glu Ser Lys Asn
                245                 250                 255
His Leu His Thr Thr Thr Gln Met Ala Gly Thr Ser Ser Asn Thr Ile
            260                 265                 270
Ser Ala Gly Trp Glu Pro Asn Glu Glu Asn Glu Asp Glu Arg Asp Arg
        275                 280                 285
His Leu Ser Phe Ser Gly Ser Gly Ile Asp Asp Asp Glu Asp Phe Ile
    290                 295                 300
Ser Ser Thr Ile Ser Thr Thr Pro Arg Ala Phe Asp His Thr Lys Gln
305                 310                 315                 320
Asn Gln Asp Trp Thr Gln Trp Asn Pro Ser His Ser Asn Pro Glu Val
                325                 330                 335
Leu Leu Gln Thr Thr Thr Arg Met Thr Asp Val Asp Arg Asn Gly Thr
            340                 345                 350
Thr Ala Tyr Glu Gly Asn Trp Asn Pro Glu Ala His Pro Pro Leu Ile
        355                 360                 365
His His Glu His His Glu Glu Glu Glu Thr Pro His Ser Thr Ser Thr
    370                 375                 380
Ile Gln Ala Thr Pro Ser Ser Thr Thr Glu Glu Thr Ala Thr Gln Lys
385                 390                 395                 400
Glu Gln Trp Phe Gly Asn Arg Trp His Glu Gly Tyr Arg Gln Thr Pro
                405                 410                 415
Lys Glu Asp Ser His Ser Thr Thr Gly Thr Ala Ala Ala Ser Ala His
            420                 425                 430
Thr Ser His Pro Met Gln Gly Arg Thr Thr Pro Ser Pro Glu Asp Ser
        435                 440                 445
Ser Trp Thr Asp Phe Phe Asn Pro Ile Ser His Pro Met Gly Arg Gly
    450                 455                 460
His Gln Ala Gly Arg Arg Met Asp Met Asp Ser Ser His Ser Ile Thr
465                 470                 475                 480
Leu Gln Pro Thr Ala Asn Pro Asn Thr Gly Leu Val Glu Asp Leu Asp
                485                 490                 495
```

```
Arg Thr Gly Pro Leu Ser Met Thr Thr Gln Gln Ser Asn Ser Gln Ser
            500                 505                 510
Phe Ser Thr Ser His Glu Gly Leu Glu Glu Asp Lys Asp His Pro Thr
        515                 520                 525
Thr Ser Thr Leu Thr Ser Ser Asn Arg Asn Asp Val Thr Gly Gly Arg
    530                 535                 540
Arg Asp Pro Asn His Ser Glu Gly Ser Thr Thr Leu Leu Glu Gly Tyr
545                 550                 555                 560
Thr Ser His Tyr Pro His Thr Lys Glu Ser Arg Thr Phe Ile Pro Val
                565                 570                 575
Thr Ser Ala Lys Thr Gly Ser Phe Gly Val Thr Ala Val Thr Val Gly
            580                 585                 590
Asp Ser Asn Ser Asn Val Asn Arg Ser Leu Ser Gly Asp Gln Asp Thr
        595                 600                 605
Phe His Pro Ser Gly Gly Ser His Thr Thr His Gly Ser Glu Ser Asp
    610                 615                 620
Gly His Ser His Gly Ser Gln Glu Gly Gly Ala Asn Thr Thr Ser Gly
625                 630                 635                 640
Pro Ile Arg Thr Pro Gln Ile Pro Glu Trp Leu Ile Ile Leu Ala Ser
                645                 650                 655
Leu Leu Ala Leu Ala Leu Ile Leu Ala Val Cys Ile Ala Val Asn Ser
            660                 665                 670
Arg Arg Arg Cys Gly Gln Lys Lys Lys Leu Val Ile Asn Ser Gly Asn
        675                 680                 685
Gly Ala Val Glu Asp Arg Lys Pro Ser Gly Leu Asn Gly Glu Ala Ser
    690                 695                 700
Lys Ser Gln Glu Met Val His Leu Val Asn Lys Glu Ser Ser Glu Thr
705                 710                 715                 720
Pro Asp Gln Phe Met Thr Ala Asp Glu Thr Arg Asn Leu Gln Asn Val
                725                 730                 735
Asp Met Lys Ile Gly Val
            740
```

<210> 228
<211> 322
<212> PRT
<213> Homo sapiens

<220>
<223> Lymphatic vessel endothelial hyaluronic acid receptor 1 LYVE-1

<400> 228

```
Met Ala Arg Cys Phe Ser Leu Val Leu Leu Leu Thr Ser Ile Trp Thr
 1               5                  10                  15
Thr Arg Leu Leu Val Gln Gly Ser Leu Arg Ala Glu Glu Leu Ser Ile
            20                  25                  30
Gln Val Ser Cys Arg Ile Met Gly Ile Thr Leu Val Ser Lys Lys Ala
        35                  40                  45
Asn Gln Gln Leu Asn Phe Thr Glu Ala Lys Glu Ala Cys Arg Leu Leu
    50                  55                  60
Gly Leu Ser Leu Ala Gly Lys Asp Gln Val Glu Thr Ala Leu Lys Ala
65                  70                  75                  80
Ser Phe Glu Thr Cys Ser Tyr Gly Trp Val Gly Asp Gly Phe Val Val
                85                  90                  95
Ile Ser Arg Ile Ser Pro Asn Pro Lys Cys Gly Lys Asn Gly Val Gly
            100                 105                 110
```

```
Val Leu Ile Trp Lys Val Pro Val Ser Arg Gln Phe Ala Ala Tyr Cys
        115                 120                 125
Tyr Asn Ser Ser Asp Thr Trp Thr Asn Ser Cys Ile Pro Glu Ile Ile
    130                 135                 140
Thr Thr Lys Asp Pro Ile Phe Asn Thr Gln Thr Ala Thr Gln Thr Thr
145                 150                 155                 160
Glu Phe Ile Val Ser Asp Ser Thr Tyr Ser Val Ala Ser Pro Tyr Ser
                165                 170                 175
Thr Ile Pro Ala Pro Thr Thr Thr Pro Pro Ala Pro Ala Ser Thr Ser
            180                 185                 190
Ile Pro Arg Arg Lys Lys Leu Ile Cys Val Thr Glu Val Phe Met Glu
        195                 200                 205
Thr Ser Thr Met Ser Thr Glu Thr Glu Pro Phe Val Glu Asn Lys Ala
    210                 215                 220
Ala Phe Lys Asn Glu Ala Ala Gly Phe Gly Gly Val Pro Thr Ala Leu
225                 230                 235                 240
Leu Val Leu Ala Leu Leu Phe Phe Gly Ala Ala Ala Gly Leu Gly Phe
                245                 250                 255
Cys Tyr Val Lys Arg Tyr Val Lys Ala Phe Pro Phe Thr Asn Lys Asn
            260                 265                 270
Gln Gln Lys Glu Met Ile Glu Thr Lys Val Val Lys Glu Glu Lys Ala
        275                 280                 285
Asn Asp Ser Asn Pro Asn Glu Glu Ser Lys Lys Thr Asp Lys Asn Pro
    290                 295                 300
Glu Glu Ser Lys Ser Pro Ser Lys Thr Thr Val Arg Cys Leu Glu Ala
305                 310                 315                 320
Glu Val
```

<210> 229
<211> 354
<212> PRT
<213> Homo sapiens

<220>
<223> HAPLN1 Hyaluronan and proteoglycan link protein 1
P10915

<400> 229

```
Met Lys Ser Leu Leu Leu Leu Val Leu Ile Ser Ile Cys Trp Ala Asp
 1               5                  10                  15
His Leu Ser Asp Asn Tyr Thr Leu Asp His Asp Arg Ala Ile His Ile
            20                  25                  30
Gln Ala Glu Asn Gly Pro His Leu Leu Val Glu Ala Glu Gln Ala Lys
        35                  40                  45
Val Phe Ser His Arg Gly Gly Asn Val Thr Leu Pro Cys Lys Phe Tyr
    50                  55                  60
Arg Asp Pro Thr Ala Phe Gly Ser Gly Ile His Lys Ile Arg Ile Lys
65                  70                  75                  80
Trp Thr Lys Leu Thr Ser Asp Tyr Leu Lys Glu Val Asp Val Phe Val
                85                  90                  95
Ser Met Gly Tyr His Lys Lys Thr Tyr Gly Gly Tyr Gln Gly Arg Val
            100                 105                 110
Phe Leu Lys Gly Gly Ser Asp Ser Asp Ala Ser Leu Val Ile Thr Asp
        115                 120                 125
Leu Thr Leu Glu Asp Tyr Gly Arg Tyr Lys Cys Glu Val Ile Glu Gly
```

```
    130                 135                 140
Leu Glu Asp Asp Thr Val Val Val Ala Leu Asp Leu Gln Gly Val Val
145                 150                 155                 160
Phe Pro Tyr Phe Pro Arg Leu Gly Arg Tyr Asn Leu Asn Phe His Glu
                165                 170                 175
Ala Gln Gln Ala Cys Leu Asp Gln Asp Ala Val Ile Ala Ser Phe Asp
            180                 185                 190
Gln Leu Tyr Asp Ala Trp Arg Gly Gly Leu Asp Trp Cys Asn Ala Gly
        195                 200                 205
Trp Leu Ser Asp Gly Ser Val Gln Tyr Pro Ile Thr Lys Pro Arg Glu
    210                 215                 220
Pro Cys Gly Gly Gln Asn Thr Val Pro Gly Val Arg Asn Tyr Gly Phe
225                 230                 235                 240
Trp Asp Lys Asp Lys Ser Arg Tyr Asp Val Phe Cys Phe Thr Ser Asn
                245                 250                 255
Phe Asn Gly Arg Phe Tyr Tyr Leu Ile His Pro Thr Lys Leu Thr Tyr
            260                 265                 270
Asp Glu Ala Val Gln Ala Cys Leu Asn Asp Gly Ala Gln Ile Ala Lys
        275                 280                 285
Val Gly Gln Ile Phe Ala Ala Trp Lys Ile Leu Gly Tyr Asp Arg Cys
    290                 295                 300
Asp Ala Gly Trp Leu Ala Asp Gly Ser Val Arg Tyr Pro Ile Ser Arg
305                 310                 315                 320
Pro Arg Arg Arg Cys Ser Pro Thr Glu Ala Ala Val Arg Phe Val Gly
                325                 330                 335
Phe Pro Asp Lys Lys His Lys Leu Tyr Gly Val Tyr Cys Phe Arg Ala
            340                 345                 350
Tyr Asn
```

<210> 230
<211> 340
<212> PRT
<213> Homo sapiens

<220>
<223> HAPLN2 Hyaluronan and proteoglycan link protein 2
Q9CZV7

<400> 230

```
Met Pro Gly Trp Leu Thr Leu Pro Thr Leu Cys Arg Phe Leu Leu Trp
 1               5                  10                  15
Ala Phe Thr Ile Phe His Lys Ala Gln Gly Asp Pro Ala Ser His Pro
            20                  25                  30
Gly Pro His Tyr Leu Leu Pro Pro Ile His Glu Val Ile His Ser His
        35                  40                  45
Arg Gly Ala Thr Ala Thr Leu Pro Cys Val Leu Gly Thr Thr Pro Pro
    50                  55                  60
Ser Tyr Lys Val Arg Trp Ser Lys Val Glu Pro Gly Glu Leu Arg Glu
65                  70                  75                  80
Thr Leu Ile Leu Ile Thr Asn Gly Leu His Ala Arg Gly Tyr Gly Pro
                85                  90                  95
Leu Gly Gly Arg Ala Arg Met Arg Arg Gly His Arg Leu Asp Ala Ser
            100                 105                 110
Leu Val Ile Ala Gly Val Arg Leu Glu Asp Glu Gly Arg Tyr Arg Cys
        115                 120                 125
```

```
Glu Leu Ile Asn Gly Ile Glu Asp Glu Ser Val Ala Leu Thr Leu Ser
    130                 135                 140
Leu Glu Gly Val Val Phe Pro Tyr Gln Pro Ser Arg Gly Arg Tyr Gln
145                 150                 155                 160
Phe Asn Tyr Tyr Glu Ala Lys Gln Ala Cys Glu Glu Gln Asp Gly Arg
                165                 170                 175
Leu Ala Thr Tyr Ser Gln Leu Tyr Gln Ala Trp Thr Glu Gly Leu Asp
            180                 185                 190
Trp Cys Asn Ala Gly Trp Leu Leu Glu Gly Ser Val Arg Tyr Pro Val
        195                 200                 205
Leu Thr Ala Arg Ala Pro Cys Gly Gly Arg Gly Arg Pro Gly Ile Arg
    210                 215                 220
Ser Tyr Gly Pro Arg Asp Arg Met Arg Asp Arg Tyr Asp Ala Phe Cys
225                 230                 235                 240
Phe Thr Ser Ala Leu Ala Gly Gln Val Phe Phe Val Pro Gly Arg Leu
                245                 250                 255
Thr Leu Ser Glu Ala His Ala Ala Cys Arg Arg Arg Gly Ala Val Val
            260                 265                 270
Ala Lys Val Gly His Leu Tyr Ala Ala Trp Lys Phe Ser Gly Leu Asp
        275                 280                 285
Gln Cys Asp Gly Gly Trp Leu Ala Asp Gly Ser Val Arg Phe Pro Ile
    290                 295                 300
Thr Thr Pro Arg Pro Arg Cys Gly Gly Leu Pro Asp Pro Gly Val Arg
305                 310                 315                 320
Ser Phe Gly Phe Pro Arg Pro Gln Gln Ala Ala Tyr Gly Thr Tyr Cys
                325                 330                 335
Tyr Ala Glu Asn
            340
```

<210> 231
<211> 360
<212> PRT
<213> Homo sapiens

<220>
<223> HAPLN3 Hyaluronan and proteoglycan link protein 3
Q96S86

<400> 231

```
Met Gly Leu Leu Leu Leu Val Pro Leu Leu Leu Leu Pro Gly Ser Tyr
 1               5                  10                  15
Gly Leu Pro Phe Tyr Asn Gly Phe Tyr Tyr Ser Asn Ser Ala Asn Asp
            20                  25                  30
Gln Asn Leu Gly Asn Gly His Gly Lys Asp Leu Leu Asn Gly Val Lys
        35                  40                  45
Leu Val Val Glu Thr Pro Glu Glu Thr Leu Phe Thr Tyr Gln Gly Ala
    50                  55                  60
Ser Val Ile Leu Pro Cys Arg Tyr Arg Tyr Glu Pro Ala Leu Val Ser
65                  70                  75                  80
Pro Arg Arg Val Arg Val Lys Trp Trp Lys Leu Ser Glu Asn Gly Ala
                85                  90                  95
Pro Glu Lys Asp Val Leu Val Ala Ile Gly Leu Arg His Arg Ser Phe
            100                 105                 110
Gly Asp Tyr Gln Gly Arg Val His Leu Arg Gln Asp Lys Glu His Asp
        115                 120                 125
Val Ser Leu Glu Ile Gln Asp Leu Arg Leu Glu Asp Tyr Gly Arg Tyr
```

```
    130                 135                 140
Arg Cys Glu Val Ile Asp Gly Leu Glu Asp Glu Ser Gly Leu Val Glu
145                 150                 155                 160
Leu Glu Leu Arg Gly Val Val Phe Pro Tyr Gln Ser Pro Asn Gly Arg
                165                 170                 175
Tyr Gln Phe Asn Phe His Glu Gly Gln Gln Val Cys Ala Glu Gln Ala
            180                 185                 190
Ala Val Val Ala Ser Phe Glu Gln Leu Phe Arg Ala Trp Glu Glu Gly
        195                 200                 205
Leu Asp Trp Cys Asn Ala Gly Trp Leu Gln Asp Ala Thr Val Gln Tyr
    210                 215                 220
Pro Ile Met Leu Pro Arg Gln Pro Cys Gly Gly Pro Gly Leu Ala Pro
225                 230                 235                 240
Gly Val Arg Ser Tyr Gly Pro Arg His Arg Arg Leu His Arg Tyr Asp
                245                 250                 255
Val Phe Cys Phe Ala Thr Ala Leu Lys Gly Arg Val Tyr Tyr Leu Glu
            260                 265                 270
His Pro Glu Lys Leu Thr Leu Thr Glu Ala Arg Glu Ala Cys Gln Glu
        275                 280                 285
Asp Asp Ala Thr Ile Ala Lys Val Gly Gln Leu Phe Ala Ala Trp Lys
    290                 295                 300
Phe His Gly Leu Asp Arg Cys Asp Ala Gly Trp Leu Ala Asp Gly Ser
305                 310                 315                 320
Val Arg Tyr Pro Val Val His Pro His Pro Asn Cys Gly Pro Pro Glu
                325                 330                 335
Pro Gly Val Arg Ser Phe Gly Phe Pro Asp Pro Gln Ser Arg Leu Tyr
            340                 345                 350
Gly Val Tyr Cys Tyr Arg Gln His
        355                 360


<210> 232
<211> 402
<212> PRT
<213> Homo sapiens

<220>
<223> HAPLN4 Hyaluronan and proteoglycan link protein 4
      Q86UW8


<400> 232
Met Val Cys Ala Arg Ala Ala Leu Gly Pro Gly Ala Leu Trp Ala Ala
 1               5                  10                  15
Ala Trp Gly Val Leu Leu Leu Thr Ala Pro Ala Gly Ala Gln Arg Gly
            20                  25                  30
Arg Lys Lys Val Val His Val Leu Glu Gly Glu Ser Gly Ser Val Val
        35                  40                  45
Val Gln Thr Ala Pro Gly Gln Val Val Ser His Arg Gly Gly Thr Ile
    50                  55                  60
Val Leu Pro Cys Arg Tyr His Tyr Glu Ala Ala Ala His Gly His Asp
65                  70                  75                  80
Gly Val Arg Leu Lys Trp Thr Lys Val Val Asp Pro Leu Ala Phe Thr
                85                  90                  95
Asp Val Phe Val Ala Leu Gly Pro Gln His Arg Ala Phe Gly Ser Tyr
            100                 105                 110
Arg Gly Arg Ala Glu Leu Gln Gly Asp Gly Pro Gly Asp Ala Ser Leu
        115                 120                 125
```

```
Val Leu Arg Asn Val Thr Leu Gln Asp Tyr Gly Arg Tyr Glu Cys Glu
    130                 135                 140
Val Thr Asn Glu Leu Glu Asp Asp Ala Gly Met Val Lys Leu Asp Leu
145                 150                 155                 160
Glu Gly Val Val Phe Pro Tyr His Pro Arg Gly Gly Arg Tyr Lys Leu
                165                 170                 175
Thr Phe Ala Glu Ala Gln Arg Ala Cys Ala Glu Gln Asp Gly Ile Leu
            180                 185                 190
Ala Ser Ala Glu Gln Leu His Ala Ala Trp Arg Asp Gly Leu Asp Trp
        195                 200                 205
Cys Asn Ala Gly Trp Leu Arg Asp Gly Ser Val Gln Tyr Pro Val Asn
    210                 215                 220
Arg Pro Arg Glu Pro Cys Gly Gly Leu Gly Gly Thr Gly Ser Ala Gly
225                 230                 235                 240
Gly Gly Gly Asp Ala Asn Gly Gly Leu Arg Asn Tyr Gly Tyr Arg His
                245                 250                 255
Asn Ala Glu Glu Arg Tyr Asp Ala Phe Cys Phe Thr Ser Asn Leu Pro
            260                 265                 270
Gly Arg Val Phe Phe Leu Lys Pro Leu Arg Pro Val Pro Phe Ser Gly
        275                 280                 285
Ala Ala Arg Ala Cys Ala Ala Arg Gly Ala Ala Val Ala Lys Val Gly
    290                 295                 300
Gln Leu Phe Ala Ala Trp Lys Leu Gln Leu Leu Asp Arg Cys Thr Ala
305                 310                 315                 320
Gly Trp Leu Ala Asp Gly Ser Ala Arg Tyr Pro Ile Val Asn Pro Arg
                325                 330                 335
Ala Arg Cys Gly Gly Arg Arg Pro Gly Val Arg Ser Leu Gly Phe Pro
            340                 345                 350
Asp Ala Thr Arg Arg Leu Phe Gly Val Tyr Cys Tyr Arg Ala Pro Gly
        355                 360                 365
Ala Pro Asp Pro Ala Pro Gly Gly Trp Gly Trp Gly Trp Ala Gly Gly
    370                 375                 380
Gly Gly Trp Ala Gly Gly Ala Arg Asp Pro Ala Ala Trp Thr Pro Leu
385                 390                 395                 400
His Val
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<210> 233
<211> 2431
<212> PRT
<213> Homo sapiens

<220>
<223> human Aggrecan protein P16112

<400> 233

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 1               5                  10                  15
Ala Val Thr Val Glu Thr Ser Asp His Asp Asn Ser Leu Ser Val Ser
            20                  25                  30
Ile Pro Gln Pro Ser Pro Leu Arg Val Leu Leu Gly Thr Ser Leu Thr
        35                  40                  45
Ile Pro Cys Tyr Phe Ile Asp Pro Met His Pro Val Thr Thr Ala Pro
    50                  55                  60
Ser Thr Ala Pro Leu Ala Pro Arg Ile Lys Trp Ser Arg Val Ser Lys
65                  70                  75                  80
Glu Lys Glu Val Val Leu Leu Val Ala Thr Glu Gly Arg Val Arg Val
```

```
                85                  90                  95
Asn Ser Ala Tyr Gln Asp Lys Val Ser Leu Pro Asn Tyr Pro Ala Ile
            100                 105                 110
Pro Ser Asp Ala Thr Leu Glu Val Gln Ser Leu Arg Ser Asn Asp Ser
        115                 120                 125
Gly Val Tyr Arg Cys Glu Val Met His Gly Ile Glu Asp Ser Glu Ala
    130                 135                 140
Thr Leu Glu Val Val Val Lys Gly Ile Val Phe His Tyr Arg Ala Ile
145                 150                 155                 160
Ser Thr Arg Tyr Thr Leu Asp Phe Asp Arg Ala Gln Arg Ala Cys Leu
                165                 170                 175
Gln Asn Ser Ala Ile Ile Ala Thr Pro Glu Gln Leu Gln Ala Ala Tyr
            180                 185                 190
Glu Asp Gly Phe His Gln Cys Asp Ala Gly Trp Leu Ala Asp Gln Thr
        195                 200                 205
Val Arg Tyr Pro Ile His Thr Pro Arg Glu Gly Cys Tyr Gly Asp Lys
    210                 215                 220
Asp Glu Phe Pro Gly Val Arg Thr Tyr Gly Ile Arg Asp Thr Asn Glu
225                 230                 235                 240
Thr Tyr Asp Val Tyr Cys Phe Ala Glu Glu Met Glu Gly Glu Val Phe
                245                 250                 255
Tyr Ala Thr Ser Pro Glu Lys Phe Thr Phe Gln Glu Ala Ala Asn Glu
            260                 265                 270
Cys Arg Arg Leu Gly Ala Arg Leu Ala Thr Thr Gly Gln Leu Tyr Leu
        275                 280                 285
Ala Trp Gln Ala Gly Met Asp Met Cys Ser Ala Gly Trp Leu Ala Asp
    290                 295                 300
Arg Ser Val Arg Tyr Pro Ile Ser Lys Ala Arg Pro Asn Cys Gly Gly
305                 310                 315                 320
Asn Leu Leu Gly Val Arg Thr Val Tyr Val His Ala Asn Gln Thr Gly
                325                 330                 335
Tyr Pro Asp Pro Ser Ser Arg Tyr Asp Ala Ile Cys Tyr Thr Gly Glu
            340                 345                 350
Asp Phe Val Asp Ile Pro Glu Asn Phe Phe Gly Val Gly Gly Glu Glu
        355                 360                 365
Asp Ile Thr Val Gln Thr Val Thr Trp Pro Asp Met Glu Leu Pro Leu
    370                 375                 380
Pro Arg Asn Ile Thr Glu Gly Glu Ala Arg Gly Ser Val Ile Leu Thr
385                 390                 395                 400
Val Lys Pro Ile Phe Glu Val Ser Pro Ser Pro Leu Glu Pro Glu Glu
                405                 410                 415
Pro Phe Thr Phe Ala Pro Glu Ile Gly Ala Thr Ala Phe Ala Glu Val
            420                 425                 430
Glu Asn Glu Thr Gly Glu Ala Thr Arg Pro Trp Gly Phe Pro Thr Pro
        435                 440                 445
Gly Leu Gly Pro Ala Thr Ala Phe Thr Ser Glu Asp Leu Val Val Gln
    450                 455                 460
Val Thr Ala Val Pro Gly Gln Pro His Leu Pro Gly Gly Val Val Phe
465                 470                 475                 480
His Tyr Arg Pro Gly Pro Thr Arg Tyr Ser Leu Thr Phe Glu Glu Ala
                485                 490                 495
Gln Gln Ala Cys Leu Arg Thr Gly Ala Val Ile Ala Ser Pro Glu Gln
            500                 505                 510
Leu Gln Ala Ala Tyr Glu Ala Gly Tyr Glu Gln Cys Asp Ala Gly Trp
        515                 520                 525
Leu Arg Asp Gln Thr Val Arg Tyr Pro Ile Val Ser Pro Arg Thr Pro
    530                 535                 540
Cys Val Gly Asp Lys Asp Ser Ser Pro Gly Val Arg Thr Tyr Gly Val
```

```
545                 550                 555                 560
Arg Pro Ser Thr Glu Thr Tyr Asp Val Tyr Cys Phe Val Asp Arg Leu
                565                 570                 575
Glu Gly Glu Val Phe Phe Ala Thr Arg Leu Glu Gln Phe Thr Phe Gln
            580                 585                 590
Glu Ala Leu Glu Phe Cys Glu Ser His Asn Ala Thr Leu Ala Thr Thr
        595                 600                 605
Gly Gln Leu Tyr Ala Ala Trp Ser Arg Gly Leu Asp Lys Cys Tyr Ala
    610                 615                 620
Gly Trp Leu Ala Asp Gly Ser Leu Arg Tyr Pro Ile Val Thr Pro Arg
625                 630                 635                 640
Pro Ala Cys Gly Gly Asp Lys Pro Gly Val Arg Thr Val Tyr Leu Tyr
                645                 650                 655
Pro Asn Gln Thr Gly Leu Pro Asp Pro Leu Ser Arg His His Ala Phe
            660                 665                 670
Cys Phe Arg Gly Ile Ser Ala Val Pro Ser Pro Gly Glu Glu Glu Gly
        675                 680                 685
Gly Thr Pro Thr Ser Pro Ser Gly Val Glu Glu Trp Ile Val Thr Gln
    690                 695                 700
Val Val Pro Gly Val Ala Ala Val Pro Val Glu Glu Glu Thr Thr Ala
705                 710                 715                 720
Val Pro Ser Gly Glu Thr Thr Ala Ile Leu Glu Phe Thr Thr Glu Pro
                725                 730                 735
Glu Asn Gln Thr Glu Trp Glu Pro Ala Tyr Thr Pro Val Gly Thr Ser
            740                 745                 750
Pro Leu Pro Gly Ile Leu Pro Thr Trp Pro Pro Thr Gly Ala Ala Thr
        755                 760                 765
Glu Glu Ser Thr Glu Gly Pro Ser Ala Thr Glu Val Pro Ser Ala Ser
    770                 775                 780
Glu Glu Pro Ser Pro Ser Glu Val Pro Phe Pro Ser Glu Glu Pro Ser
785                 790                 795                 800
Pro Ser Glu Glu Pro Phe Pro Ser Val Arg Pro Phe Pro Ser Val Glu
                805                 810                 815
Leu Phe Pro Ser Glu Glu Pro Phe Pro Ser Lys Glu Pro Ser Pro Ser
            820                 825                 830
Glu Glu Pro Ser Ala Ser Glu Glu Pro Tyr Thr Pro Ser Pro Pro Val
        835                 840                 845
Pro Ser Trp Thr Glu Leu Pro Ser Ser Gly Glu Glu Ser Gly Ala Pro
    850                 855                 860
Asp Val Ser Gly Asp Phe Thr Gly Ser Gly Asp Val Ser Gly His Leu
865                 870                 875                 880
Asp Phe Ser Gly Gln Leu Ser Gly Asp Arg Ala Ser Gly Leu Pro Ser
                885                 890                 895
Gly Asp Leu Asp Ser Ser Gly Leu Thr Ser Thr Val Gly Ser Gly Leu
            900                 905                 910
Pro Val Glu Ser Gly Leu Pro Ser Gly Asp Glu Glu Arg Ile Glu Trp
        915                 920                 925
Pro Ser Thr Pro Thr Val Gly Glu Leu Pro Ser Gly Ala Glu Ile Leu
    930                 935                 940
Glu Gly Ser Ala Ser Gly Val Gly Asp Leu Ser Gly Leu Pro Ser Gly
945                 950                 955                 960
Glu Val Leu Glu Thr Ser Ala Ser Gly Val Gly Asp Leu Ser Gly Leu
                965                 970                 975
Pro Ser Gly Glu Val Leu Glu Thr Thr Ala Pro Gly Val Glu Asp Ile
            980                 985                 990
Ser Gly Leu Pro Ser Gly Glu Val Leu Glu Thr Thr Ala Pro Gly Val
        995                 1000                1005
Glu Asp Ile Ser Gly Leu Pro Ser Gly Glu Val Leu Glu Thr Thr Ala
```

```
    1010                1015                1020
Pro Gly Val Glu Asp Ile Ser Gly Leu Pro Ser Gly Glu Val Leu Glu
1025                1030                1035                1040
Thr Thr Ala Pro Gly Val Glu Asp Ile Ser Gly Leu Pro Ser Gly Glu
                1045                1050                1055
Val Leu Glu Thr Thr Ala Pro Gly Val Glu Asp Ile Ser Gly Leu Pro
            1060                1065                1070
Ser Gly Glu Val Leu Glu Thr Thr Ala Pro Gly Val Glu Asp Ile Ser
        1075                1080                1085
Gly Leu Pro Ser Gly Glu Val Leu Glu Thr Ala Ala Pro Gly Val Glu
    1090                1095                1100
Asp Ile Ser Gly Leu Pro Ser Gly Glu Val Leu Glu Thr Ala Ala Pro
1105                1110                1115                1120
Gly Val Glu Asp Ile Ser Gly Leu Pro Ser Gly Glu Val Leu Glu Thr
                1125                1130                1135
Ala Ala Pro Gly Val Glu Asp Ile Ser Gly Leu Pro Ser Gly Glu Val
            1140                1145                1150
Leu Glu Thr Ala Ala Pro Gly Val Glu Asp Ile Ser Gly Leu Pro Ser
        1155                1160                1165
Gly Glu Val Leu Glu Thr Ala Ala Pro Gly Val Glu Asp Ile Ser Gly
    1170                1175                1180
Leu Pro Ser Gly Glu Val Leu Glu Thr Ala Ala Pro Gly Val Glu Asp
1185                1190                1195                1200
Ile Ser Gly Leu Pro Ser Gly Glu Val Leu Glu Thr Ala Ala Pro Gly
                1205                1210                1215
Val Glu Asp Ile Ser Gly Leu Pro Ser Gly Glu Val Leu Glu Thr Ala
            1220                1225                1230
Ala Pro Gly Val Glu Asp Ile Ser Gly Leu Pro Ser Gly Glu Val Leu
        1235                1240                1245
Glu Thr Ala Ala Pro Gly Val Glu Asp Ile Ser Gly Leu Pro Ser Gly
    1250                1255                1260
Glu Val Leu Glu Thr Ala Ala Pro Gly Val Glu Asp Ile Ser Gly Leu
1265                1270                1275                1280
Pro Ser Gly Glu Val Leu Glu Thr Ala Ala Pro Gly Val Glu Asp Ile
                1285                1290                1295
Ser Gly Leu Pro Ser Gly Glu Val Leu Glu Thr Ala Ala Pro Gly Val
            1300                1305                1310
Glu Asp Ile Ser Gly Leu Pro Ser Gly Glu Val Leu Glu Thr Ala Ala
        1315                1320                1325
Pro Gly Val Glu Asp Ile Ser Gly Leu Pro Ser Gly Glu Val Leu Glu
    1330                1335                1340
Thr Ala Ala Pro Gly Val Glu Asp Ile Ser Gly Leu Pro Ser Gly Glu
1345                1350                1355                1360
Val Leu Glu Thr Ala Ala Pro Gly Val Glu Asp Ile Ser Gly Leu Pro
                1365                1370                1375
Ser Gly Glu Val Leu Glu Thr Ala Ala Pro Gly Val Glu Asp Ile Ser
            1380                1385                1390
Gly Leu Pro Ser Gly Glu Val Leu Glu Thr Thr Ala Pro Gly Val Glu
        1395                1400                1405
Glu Ile Ser Gly Leu Pro Ser Gly Glu Val Leu Glu Thr Thr Ala Pro
    1410                1415                1420
Gly Val Asp Glu Ile Ser Gly Leu Pro Ser Gly Glu Val Leu Glu Thr
1425                1430                1435                1440
Thr Ala Pro Gly Val Glu Glu Ile Ser Gly Leu Pro Ser Gly Glu Val
                1445                1450                1455
Leu Glu Thr Ser Thr Ser Ala Val Gly Asp Leu Ser Gly Leu Pro Ser
            1460                1465                1470
Gly Gly Glu Val Leu Glu Ile Ser Val Ser Gly Val Glu Asp Ile Ser
```

```
        1475                1480                1485
Gly Leu Pro Ser Gly Glu Val Val Glu Thr Ser Ala Ser Gly Ile Glu
    1490                1495                1500
Asp Val Ser Glu Leu Pro Ser Gly Glu Gly Leu Glu Thr Ser Ala Ser
1505                1510                1515                1520
Gly Val Glu Asp Leu Ser Arg Leu Pro Ser Gly Glu Glu Val Leu Glu
                1525                1530                1535
Ile Ser Ala Ser Gly Phe Gly Asp Leu Ser Gly Leu Pro Ser Gly Gly
            1540                1545                1550
Glu Gly Leu Glu Thr Ser Ala Ser Glu Val Gly Thr Asp Leu Ser Gly
        1555                1560                1565
Leu Pro Ser Gly Arg Glu Gly Leu Glu Thr Ser Ala Ser Gly Ala Glu
    1570                1575                1580
Asp Leu Ser Gly Leu Pro Ser Gly Lys Glu Asp Leu Val Gly Ser Ala
1585                1590                1595                1600
Ser Gly Asp Leu Asp Leu Gly Lys Leu Pro Ser Gly Thr Leu Gly Ser
                1605                1610                1615
Gly Gln Ala Pro Glu Thr Ser Gly Leu Pro Ser Gly Phe Ser Gly Glu
            1620                1625                1630
Tyr Ser Gly Val Asp Leu Gly Ser Gly Pro Pro Ser Gly Leu Pro Asp
        1635                1640                1645
Phe Ser Gly Leu Pro Ser Gly Phe Pro Thr Val Ser Leu Val Asp Ser
    1650                1655                1660
Thr Leu Val Glu Val Val Thr Ala Ser Thr Ala Ser Glu Leu Glu Gly
1665                1670                1675                1680
Arg Gly Thr Ile Gly Ile Ser Gly Ala Gly Glu Ile Ser Gly Leu Pro
                1685                1690                1695
Ser Ser Glu Leu Asp Ile Ser Gly Arg Ala Ser Gly Leu Pro Ser Gly
            1700                1705                1710
Thr Glu Leu Ser Gly Gln Ala Ser Gly Ser Pro Asp Val Ser Gly Glu
        1715                1720                1725
Ile Pro Gly Leu Phe Gly Val Ser Gly Gln Pro Ser Gly Phe Pro Asp
    1730                1735                1740
Thr Ser Gly Glu Thr Ser Gly Val Thr Glu Leu Ser Gly Leu Ser Ser
1745                1750                1755                1760
Gly Gln Pro Gly Ile Ser Gly Glu Ala Ser Gly Val Leu Tyr Gly Thr
                1765                1770                1775
Ser Gln Pro Phe Gly Ile Thr Asp Leu Ser Gly Glu Thr Ser Gly Val
            1780                1785                1790
Pro Asp Leu Ser Gly Gln Pro Ser Gly Leu Pro Gly Phe Ser Gly Ala
        1795                1800                1805
Thr Ser Gly Val Pro Asp Leu Val Ser Gly Thr Thr Ser Gly Ser Gly
    1810                1815                1820
Glu Ser Ser Gly Ile Thr Phe Val Asp Thr Ser Leu Val Glu Val Ala
1825                1830                1835                1840
Pro Thr Thr Phe Lys Glu Glu Glu Gly Leu Gly Ser Val Glu Leu Ser
                1845                1850                1855
Gly Leu Pro Ser Gly Glu Ala Asp Leu Ser Gly Lys Ser Gly Met Val
            1860                1865                1870
Asp Val Ser Gly Gln Phe Ser Gly Thr Val Asp Ser Ser Gly Phe Thr
        1875                1880                1885
Ser Gln Thr Pro Glu Phe Ser Gly Leu Pro Ser Gly Ile Ala Glu Val
    1890                1895                1900
Ser Gly Glu Ser Ser Arg Ala Glu Ile Gly Ser Ser Leu Pro Ser Gly
1905                1910                1915                1920
Ala Tyr Tyr Gly Ser Gly Thr Pro Ser Ser Phe Pro Thr Val Ser Leu
                1925                1930                1935
Val Asp Arg Thr Leu Val Glu Ser Val Thr Gln Ala Pro Thr Ala Gln
```

```
            1940                1945                1950
Glu Ala Gly Glu Gly Pro Ser Gly Ile Leu Glu Leu Ser Gly Ala His
        1955                1960                1965
Ser Gly Ala Pro Asp Met Ser Gly Glu His Ser Gly Phe Leu Asp Leu
    1970                1975                1980
Ser Gly Leu Gln Ser Gly Leu Ile Glu Pro Ser Gly Glu Pro Pro Gly
1985                1990                1995                2000
Thr Pro Tyr Phe Ser Gly Asp Phe Ala Ser Thr Thr Asn Val Ser Gly
                2005                2010                2015
Glu Ser Ser Val Ala Met Gly Thr Ser Gly Glu Ala Ser Gly Leu Pro
            2020                2025                2030
Glu Val Thr Leu Ile Thr Ser Glu Phe Val Glu Gly Val Thr Glu Pro
        2035                2040                2045
Thr Ile Ser Gln Glu Leu Gly Gln Arg Pro Pro Val Thr His Thr Pro
    2050                2055                2060
Gln Leu Phe Glu Ser Ser Gly Lys Val Ser Thr Ala Gly Asp Ile Ser
2065                2070                2075                2080
Gly Ala Thr Pro Val Leu Pro Gly Ser Gly Val Glu Val Ser Ser Val
                2085                2090                2095
Pro Glu Ser Ser Ser Glu Thr Ser Ala Tyr Pro Glu Ala Gly Phe Gly
            2100                2105                2110
Ala Ser Ala Ala Pro Glu Ala Ser Arg Glu Asp Ser Gly Ser Pro Asp
        2115                2120                2125
Leu Ser Glu Thr Thr Ser Ala Phe His Glu Ala Asn Leu Glu Arg Ser
    2130                2135                2140
Ser Gly Leu Gly Val Ser Gly Ser Thr Leu Thr Phe Gln Glu Gly Glu
2145                2150                2155                2160
Ala Ser Ala Ala Pro Glu Val Ser Gly Glu Ser Thr Thr Thr Ser Asp
                2165                2170                2175
Val Gly Thr Glu Ala Pro Gly Leu Pro Ser Ala Thr Pro Thr Ala Ser
            2180                2185                2190
Gly Asp Arg Thr Glu Ile Ser Gly Asp Leu Ser Gly His Thr Ser Gln
        2195                2200                2205
Leu Gly Val Val Ile Ser Thr Ser Ile Pro Glu Ser Glu Trp Thr Gln
    2210                2215                2220
Gln Thr Gln Arg Pro Ala Glu Thr His Leu Glu Ile Glu Ser Ser Ser
2225                2230                2235                2240
Leu Leu Tyr Ser Gly Glu Glu Thr His Thr Val Glu Thr Ala Thr Ser
                2245                2250                2255
Pro Thr Asp Ala Ser Ile Pro Ala Ser Pro Glu Trp Lys Arg Glu Ser
            2260                2265                2270
Glu Ser Thr Ala Ala Asp Gln Glu Val Cys Glu Glu Gly Trp Asn Lys
        2275                2280                2285
Tyr Gln Gly His Cys Tyr Arg His Phe Pro Asp Arg Glu Thr Trp Val
    2290                2295                2300
Asp Ala Glu Arg Arg Cys Arg Glu Gln Gln Ser His Leu Ser Ser Ile
2305                2310                2315                2320
Val Thr Pro Glu Glu Gln Glu Phe Val Asn Asn Asn Ala Gln Asp Tyr
                2325                2330                2335
Gln Trp Ile Gly Leu Asn Asp Arg Thr Ile Glu Gly Asp Phe Arg Trp
            2340                2345                2350
Ser Asp Gly His Pro Met Gln Phe Glu Asn Trp Arg Pro Asn Gln Pro
        2355                2360                2365
Asp Asn Phe Phe Ala Ala Gly Glu Asp Cys Val Val Met Ile Trp His
    2370                2375                2380
Glu Lys Gly Glu Trp Asn Asp Val Pro Cys Asn Tyr His Leu Pro Phe
2385                2390                2395                2400
Thr Cys Lys Lys Gly Thr Ala Thr Thr Tyr Lys Arg Arg Leu Gln Lys
```

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                2405                2410                2415
Arg Ser Ser Arg His Pro Arg Arg Ser Arg Pro Ser Thr Ala His
            2420                2425                2430


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<211> 911
<212> PRT
<213> Homo sapiens

<220>
<223> human Brevican protein Q96GW7


<400> 234
Met Ala Gln Leu Phe Leu Pro Leu Leu Ala Ala Leu Val Leu Ala Gln
 1               5                  10                  15
Ala Pro Ala Ala Leu Ala Asp Val Leu Glu Gly Asp Ser Ser Glu Asp
            20                  25                  30
Arg Ala Phe Arg Val Arg Ile Ala Gly Asp Ala Pro Leu Gln Gly Val
        35                  40                  45
Leu Gly Gly Ala Leu Thr Ile Pro Cys His Val His Tyr Leu Arg Pro
    50                  55                  60
Pro Pro Ser Arg Arg Ala Val Leu Gly Ser Pro Arg Val Lys Trp Thr
65                  70                  75                  80
Phe Leu Ser Arg Gly Arg Glu Ala Glu Val Leu Val Ala Arg Gly Val
                85                  90                  95
Arg Val Lys Val Asn Glu Ala Tyr Arg Phe Arg Val Ala Leu Pro Ala
            100                 105                 110
Tyr Pro Ala Ser Leu Thr Asp Val Ser Leu Ala Leu Ser Glu Leu Arg
        115                 120                 125
Pro Asn Asp Ser Gly Ile Tyr Arg Cys Glu Val Gln His Gly Ile Asp
    130                 135                 140
Asp Ser Ser Asp Ala Val Glu Val Lys Val Lys Gly Val Val Phe Leu
145                 150                 155                 160
Tyr Arg Glu Gly Ser Ala Arg Tyr Ala Phe Ser Phe Ser Gly Ala Gln
                165                 170                 175
Glu Ala Cys Ala Arg Ile Gly Ala His Ile Ala Thr Pro Glu Gln Leu
            180                 185                 190
Tyr Ala Ala Tyr Leu Gly Gly Tyr Glu Gln Cys Asp Ala Gly Trp Leu
        195                 200                 205
Ser Asp Gln Thr Val Arg Tyr Pro Ile Gln Thr Pro Arg Glu Ala Cys
    210                 215                 220
Tyr Gly Asp Met Asp Gly Phe Pro Gly Val Arg Asn Tyr Gly Val Val
225                 230                 235                 240
Asp Pro Asp Asp Leu Tyr Asp Val Tyr Cys Tyr Ala Glu Asp Leu Asn
                245                 250                 255
Gly Glu Leu Phe Leu Gly Asp Pro Pro Glu Lys Leu Thr Leu Glu Glu
            260                 265                 270
Ala Arg Ala Tyr Cys Gln Glu Arg Gly Ala Glu Ile Ala Thr Thr Gly
        275                 280                 285
Gln Leu Tyr Ala Ala Trp Asp Gly Gly Leu Asp His Cys Ser Pro Gly
    290                 295                 300
Trp Leu Ala Asp Gly Ser Val Arg Tyr Pro Ile Val Thr Pro Ser Gln
305                 310                 315                 320
Arg Cys Gly Gly Gly Leu Pro Gly Val Lys Thr Leu Phe Leu Phe Pro
                325                 330                 335
Asn Gln Thr Gly Phe Pro Asn Lys His Ser Arg Phe Asn Val Tyr Cys
```

```
            340                 345                 350
Phe Arg Asp Ser Ala Gln Pro Ser Ala Ile Pro Glu Ala Ser Asn Pro
        355                 360                 365
Ala Ser Asn Pro Ala Ser Asp Gly Leu Glu Ala Ile Val Thr Val Thr
    370                 375                 380
Glu Thr Leu Glu Glu Leu Gln Leu Pro Gln Glu Ala Thr Glu Ser Glu
385                 390                 395                 400
Ser Arg Gly Ala Ile Tyr Ser Ile Pro Ile Met Glu Asp Gly Gly Gly
                405                 410                 415
Gly Ser Ser Thr Pro Glu Asp Pro Ala Glu Ala Pro Arg Thr Leu Leu
            420                 425                 430
Glu Phe Glu Thr Gln Ser Met Val Pro Pro Thr Gly Phe Ser Glu Glu
        435                 440                 445
Glu Gly Lys Ala Leu Glu Glu Glu Glu Lys Tyr Glu Asp Glu Glu Glu
    450                 455                 460
Lys Glu Glu Glu Glu Glu Glu Glu Glu Val Glu Asp Glu Ala Leu Trp
465                 470                 475                 480
Ala Trp Pro Ser Glu Leu Ser Ser Pro Gly Pro Glu Ala Ser Leu Pro
                485                 490                 495
Thr Glu Pro Ala Ala Gln Glu Glu Ser Leu Ser Gln Ala Pro Ala Arg
            500                 505                 510
Ala Val Leu Gln Pro Gly Ala Ser Pro Leu Pro Asp Gly Glu Ser Glu
        515                 520                 525
Ala Ser Arg Pro Pro Arg Val His Gly Pro Pro Thr Glu Thr Leu Pro
    530                 535                 540
Thr Pro Arg Glu Arg Asn Leu Ala Ser Pro Ser Pro Ser Thr Leu Val
545                 550                 555                 560
Glu Ala Arg Glu Val Gly Glu Ala Thr Gly Gly Pro Glu Leu Ser Gly
                565                 570                 575
Val Pro Arg Gly Glu Ser Glu Glu Thr Gly Ser Ser Glu Gly Ala Pro
            580                 585                 590
Ser Leu Leu Pro Ala Thr Arg Ala Pro Glu Gly Thr Arg Glu Leu Glu
        595                 600                 605
Ala Pro Ser Glu Asp Asn Ser Gly Arg Thr Ala Pro Ala Gly Thr Ser
    610                 615                 620
Val Gln Ala Gln Pro Val Leu Pro Thr Asp Ser Ala Ser Arg Gly Gly
625                 630                 635                 640
Val Ala Val Val Pro Ala Ser Gly Asp Cys Val Pro Ser Pro Cys His
                645                 650                 655
Asn Gly Gly Thr Cys Leu Glu Glu Glu Glu Gly Val Arg Cys Leu Cys
            660                 665                 670
Leu Pro Gly Tyr Gly Gly Asp Leu Cys Asp Val Gly Leu Arg Phe Cys
        675                 680                 685
Asn Pro Gly Trp Asp Ala Phe Gln Gly Ala Cys Tyr Lys His Phe Ser
    690                 695                 700
Thr Arg Arg Ser Trp Glu Glu Ala Glu Thr Gln Cys Arg Met Tyr Gly
705                 710                 715                 720
Ala His Leu Ala Ser Ile Ser Thr Pro Glu Glu Gln Asp Phe Ile Asn
                725                 730                 735
Asn Arg Tyr Arg Glu Tyr Gln Trp Ile Gly Leu Asn Asp Arg Thr Ile
            740                 745                 750
Glu Gly Asp Phe Leu Trp Ser Asp Gly Val Pro Leu Leu Tyr Glu Asn
        755                 760                 765
Trp Asn Pro Gly Gln Pro Asp Ser Tyr Phe Leu Ser Gly Glu Asn Cys
    770                 775                 780
Val Val Met Val Trp His Asp Gln Gly Gln Trp Ser Asp Val Pro Cys
785                 790                 795                 800
Asn Tyr His Leu Ser Tyr Thr Cys Lys Met Gly Leu Val Ser Cys Gly
```

```
                805                 810                 815
Pro Pro Pro Glu Leu Pro Leu Ala Gln Val Phe Gly Arg Pro Arg Leu
            820                 825                 830
Arg Tyr Glu Val Asp Thr Val Leu Arg Tyr Arg Cys Arg Glu Gly Leu
        835                 840                 845
Ala Gln Arg Asn Leu Pro Leu Ile Arg Cys Gln Glu Asn Gly Arg Trp
    850                 855                 860
Glu Ala Pro Gln Ile Ser Cys Val Pro Arg Arg Pro Ala Arg Ala Leu
865                 870                 875                 880
His Pro Glu Glu Asp Pro Glu Gly Arg Gln Gly Arg Leu Leu Gly Arg
                885                 890                 895
Trp Lys Ala Leu Leu Ile Pro Pro Ser Ser Pro Met Pro Gly Pro
            900                 905                 910


<210> 235
<211> 2376
<212> PRT
<213> Homo sapiens

<220>
<223> human Versican protein P13611



<400> 235
Met Phe Ile Asn Ile Lys Ser Ile Leu Trp Met Cys Ser Thr Leu Ile
 1               5                  10                  15
Val Thr His Ala Leu His Lys Val Lys Val Gly Lys Ser Pro Pro Val
            20                  25                  30
Arg Gly Ser Leu Ser Gly Lys Val Ser Leu Pro Cys His Phe Ser Thr
        35                  40                  45
Met Pro Thr Leu Pro Pro Ser Tyr Asn Thr Ser Glu Phe Leu Arg Ile
    50                  55                  60
Lys Trp Ser Lys Ile Glu Val Asp Lys Asn Gly Lys Asp Leu Lys Glu
65                  70                  75                  80
Thr Thr Val Leu Val Ala Gln Asn Gly Asn Ile Lys Ile Gly Gln Asp
                85                  90                  95
Tyr Lys Gly Arg Val Ser Val Pro Thr His Pro Glu Ala Val Gly Asp
            100                 105                 110
Ala Ser Leu Thr Val Val Lys Leu Leu Ala Ser Asp Ala Gly Leu Tyr
        115                 120                 125
Arg Cys Asp Val Met Tyr Gly Ile Glu Asp Thr Gln Asp Thr Val Ser
    130                 135                 140
Leu Thr Val Asp Gly Val Val Phe His Tyr Arg Ala Ala Thr Ser Arg
145                 150                 155                 160
Tyr Thr Leu Asn Phe Glu Ala Ala Gln Lys Ala Cys Leu Asp Val Gly
                165                 170                 175
Ala Val Ile Ala Thr Pro Glu Gln Leu Phe Ala Ala Tyr Glu Asp Gly
            180                 185                 190
Phe Glu Gln Cys Asp Ala Gly Trp Leu Ala Asp Gln Thr Val Arg Tyr
        195                 200                 205
Pro Ile Arg Ala Pro Arg Val Gly Cys Tyr Gly Asp Lys Met Gly Lys
    210                 215                 220
Ala Gly Val Arg Thr Tyr Gly Phe Arg Ser Pro Gln Glu Thr Tyr Asp
225                 230                 235                 240
Val Tyr Cys Tyr Val Asp His Leu Asp Gly Asp Val Phe His Leu Thr
                245                 250                 255
```

```
Val Pro Ser Lys Phe Thr Phe Glu Glu Ala Ala Lys Glu Cys Glu Asn
            260                 265                 270
Gln Asp Ala Arg Leu Ala Thr Val Gly Glu Leu Gln Ala Ala Trp Arg
        275                 280                 285
Asn Gly Phe Asp Gln Cys Asp Tyr Gly Trp Leu Ser Asp Ala Ser Val
    290                 295                 300
Arg His Pro Val Thr Val Ala Arg Ala Gln Cys Gly Gly Gly Leu Leu
305                 310                 315                 320
Gly Val Arg Thr Leu Tyr Arg Phe Glu Asn Gln Thr Gly Phe Pro Pro
                325                 330                 335
Pro Asp Ser Arg Phe Asp Ala Tyr Cys Phe Lys Pro Lys Glu Ala Thr
            340                 345                 350
Thr Ile Asp Leu Ser Ile Leu Ala Ile Asp Leu Tyr His Ser Glu Glu
        355                 360                 365
Asn Glu Glu Glu Glu Glu Glu Cys Ala Asn Ala Thr Asp Val Thr Thr
    370                 375                 380
Thr Pro Ser Val Gln Tyr Ile Asn Gly Lys His Leu Val Thr Thr Val
385                 390                 395                 400
Pro Lys Asp Pro Glu Ala Ala Glu Ala Arg Arg Gly Gln Phe Glu Ser
                405                 410                 415
Val Ala Pro Ser Gln Asn Phe Ser Asp Ser Ser Glu Ser Asp Thr His
            420                 425                 430
Pro Phe Val Ile Ala Lys Thr Glu Leu Ser Thr Ala Val Gln Pro Asn
        435                 440                 445
Glu Ser Thr Glu Thr Thr Glu Ser Leu Glu Val Thr Trp Lys Pro Glu
    450                 455                 460
Thr Tyr Pro Glu Thr Ser Glu His Phe Ser Gly Gly Glu Pro Asp Val
465                 470                 475                 480
Phe Pro Thr Val Pro Phe His Glu Glu Phe Glu Ser Gly Thr Ala Lys
                485                 490                 495
Lys Gly Ala Glu Ser Val Thr Glu Arg Asp Thr Glu Val Gly His Gln
            500                 505                 510
Ala His Glu His Thr Glu Pro Val Ser Leu Phe Pro Glu Glu Ser Ser
        515                 520                 525
Gly Glu Ile Ala Ile Asp Gln Glu Ser Gln Lys Ile Ala Phe Ala Arg
    530                 535                 540
Ala Thr Glu Val Thr Phe Gly Glu Glu Val Glu Lys Ser Thr Ser Val
545                 550                 555                 560
Thr Tyr Thr Pro Thr Ile Val Pro Ser Ser Ala Ser Ala Tyr Val Ser
                565                 570                 575
Glu Glu Glu Ala Val Thr Leu Ile Gly Asn Pro Trp Pro Asp Asp Leu
            580                 585                 590
Leu Ser Thr Lys Glu Ser Trp Val Glu Ala Thr Pro Arg Gln Val Val
        595                 600                 605
Glu Leu Ser Gly Ser Ser Ser Ile Pro Ile Thr Glu Gly Ser Gly Glu
    610                 615                 620
Ala Glu Glu Asp Glu Asp Thr Met Phe Thr Met Val Thr Asp Leu Ser
625                 630                 635                 640
Gln Arg Asn Thr Thr Asp Thr Leu Ile Thr Leu Asp Thr Ser Arg Ile
                645                 650                 655
Ile Thr Glu Ser Phe Phe Glu Val Pro Ala Thr Thr Ile Tyr Pro Val
            660                 665                 670
Ser Glu Gln Pro Ser Ala Lys Val Val Pro Thr Lys Phe Val Ser Glu
        675                 680                 685
Thr Asp Thr Ser Glu Trp Ile Ser Ser Thr Thr Val Glu Glu Lys Lys
    690                 695                 700
Arg Lys Glu Glu Glu Gly Thr Thr Gly Thr Ala Ser Thr Phe Glu Val
705                 710                 715                 720
```

```
Tyr Ser Ser Thr Gln Arg Ser Asp Gln Leu Ile Leu Pro Phe Glu Leu
                725                 730                 735
Glu Ser Pro Asn Val Ala Thr Ser Ser Asp Ser Gly Thr Arg Lys Ser
            740                 745                 750
Phe Met Ser Leu Thr Thr Pro Thr Gln Ser Glu Arg Glu Met Thr Asp
        755                 760                 765
Ser Thr Pro Val Phe Thr Glu Thr Asn Thr Leu Glu Asn Leu Gly Ala
    770                 775                 780
Gln Thr Thr Glu His Ser Ser Ile His Gln Pro Gly Val Gln Glu Gly
785                 790                 795                 800
Leu Thr Thr Leu Pro Arg Ser Pro Ala Ser Val Phe Met Glu Gln Gly
                805                 810                 815
Ser Gly Glu Ala Ala Ala Asp Pro Glu Thr Thr Thr Val Ser Ser Phe
            820                 825                 830
Ser Leu Asn Val Glu Tyr Ala Ile Gln Ala Glu Lys Glu Val Ala Gly
        835                 840                 845
Thr Leu Ser Pro His Val Glu Thr Thr Phe Ser Thr Glu Pro Thr Gly
    850                 855                 860
Leu Val Leu Ser Thr Val Met Asp Arg Val Val Ala Glu Asn Ile Thr
865                 870                 875                 880
Gln Thr Ser Arg Glu Ile Val Ile Ser Glu Arg Leu Gly Glu Pro Asn
                885                 890                 895
Tyr Gly Ala Glu Ile Arg Gly Phe Ser Thr Gly Phe Pro Leu Glu Glu
            900                 905                 910
Asp Phe Ser Gly Asp Phe Arg Glu Tyr Ser Thr Val Ser His Pro Ile
        915                 920                 925
Ala Lys Glu Glu Thr Val Met Met Glu Gly Ser Gly Asp Ala Ala Phe
    930                 935                 940
Arg Asp Thr Gln Thr Ser Pro Ser Thr Val Pro Thr Ser Val His Ile
945                 950                 955                 960
Ser His Ile Ser Asp Ser Glu Gly Pro Ser Ser Thr Met Val Ser Thr
                965                 970                 975
Ser Ala Phe Pro Trp Glu Glu Phe Thr Ser Ser Ala Glu Gly Ser Gly
            980                 985                 990
Glu Gln Leu Val Thr Val Ser Ser Ser Val Val Pro Val Leu Pro Ser
        995                 1000                1005
Ala Val Gln Lys Phe Ser Gly Thr Ala Ser Ser Ile Ile Asp Glu Gly
    1010                1015                1020
Leu Gly Glu Val Gly Thr Val Asn Glu Ile Asp Arg Arg Ser Thr Ile
1025                1030                1035                1040
Leu Pro Thr Ala Glu Val Glu Gly Thr Lys Ala Pro Val Glu Lys Glu
                1045                1050                1055
Glu Val Lys Val Ser Gly Thr Val Ser Thr Asn Phe Pro Gln Thr Ile
            1060                1065                1070
Glu Pro Ala Lys Leu Trp Ser Arg Gln Glu Val Asn Pro Val Arg Gln
        1075                1080                1085
Glu Ile Glu Ser Glu Thr Thr Ser Glu Glu Gln Ile Gln Glu Glu Lys
    1090                1095                1100
Ser Phe Glu Ser Pro Gln Asn Ser Pro Ala Thr Glu Gln Thr Ile Phe
1105                1110                1115                1120
Asp Ser Gln Thr Phe Thr Glu Thr Glu Leu Lys Thr Thr Asp Tyr Ser
                1125                1130                1135
Val Leu Thr Thr Lys Lys Thr Tyr Ser Asp Asp Lys Glu Met Lys Glu
            1140                1145                1150
Glu Asp Thr Ser Leu Val Asn Met Ser Thr Pro Asp Pro Asp Ala Asn
        1155                1160                1165
Gly Leu Glu Ser Tyr Thr Thr Leu Pro Glu Ala Thr Glu Lys Ser His
    1170                1175                1180
```

```
Phe Phe Leu Ala Thr Ala Leu Val Thr Glu Ser Ile Pro Ala Glu His
1185                1190                1195                1200
Val Val Thr Asp Ser Pro Ile Lys Lys Glu Glu Ser Thr Lys His Phe
                1205                1210                1215
Pro Lys Gly Met Arg Pro Thr Ile Gln Glu Ser Asp Thr Glu Leu Leu
            1220                1225                1230
Phe Ser Gly Leu Gly Ser Gly Glu Glu Val Leu Pro Thr Leu Pro Thr
        1235                1240                1245
Glu Ser Val Asn Phe Thr Glu Val Glu Gln Ile Asn Asn Thr Leu Tyr
    1250                1255                1260
Pro His Thr Ser Gln Val Glu Ser Thr Ser Ser Asp Lys Ile Glu Asp
1265                1270                1275                1280
Phe Asn Arg Met Glu Asn Val Ala Lys Glu Val Gly Pro Leu Val Ser
                1285                1290                1295
Gln Thr Asp Ile Phe Glu Gly Ser Gly Ser Val Thr Ser Thr Thr Leu
            1300                1305                1310
Ile Glu Ile Leu Ser Asp Thr Gly Ala Glu Gly Pro Thr Val Ala Pro
        1315                1320                1325
Leu Pro Phe Ser Thr Asp Ile Gly His Pro Gln Asn Gln Thr Val Arg
    1330                1335                1340
Trp Ala Glu Glu Ile Gln Thr Ser Arg Pro Gln Thr Ile Thr Glu Gln
1345                1350                1355                1360
Asp Ser Asn Lys Asn Ser Ser Thr Ala Glu Ile Asn Glu Thr Thr Thr
                1365                1370                1375
Ser Ser Thr Asp Phe Leu Ala Arg Ala Tyr Gly Phe Glu Met Ala Lys
            1380                1385                1390
Glu Phe Val Thr Ser Ala Pro Lys Pro Ser Asp Leu Tyr Tyr Glu Pro
        1395                1400                1405
Ser Gly Glu Gly Ser Gly Glu Val Asp Ile Val Asp Ser Phe His Thr
    1410                1415                1420
Ser Ala Thr Thr Gln Ala Thr Arg Gln Glu Ser Ser Thr Thr Phe Val
1425                1430                1435                1440
Ser Asp Gly Ser Leu Glu Lys His Pro Glu Val Pro Ser Ala Lys Ala
                1445                1450                1455
Val Thr Ala Asp Gly Phe Pro Thr Val Ser Val Met Leu Pro Leu His
            1460                1465                1470
Ser Glu Gln Asn Lys Ser Ser Pro Asp Pro Thr Ser Thr Leu Ser Asn
        1475                1480                1485
Thr Val Ser Tyr Glu Arg Ser Thr Asp Gly Ser Phe Gln Asp Arg Phe
    1490                1495                1500
Arg Glu Phe Glu Asp Ser Thr Leu Lys Pro Asn Arg Lys Lys Pro Thr
1505                1510                1515                1520
Glu Asn Ile Ile Ile Asp Leu Asp Lys Glu Asp Lys Asp Leu Ile Leu
                1525                1530                1535
Thr Ile Thr Glu Ser Thr Ile Leu Glu Ile Leu Pro Glu Leu Thr Ser
            1540                1545                1550
Asp Lys Asn Thr Ile Ile Asp Ile Asp His Thr Lys Pro Val Tyr Glu
        1555                1560                1565
Asp Ile Leu Gly Met Gln Thr Asp Ile Asp Thr Glu Val Pro Ser Glu
    1570                1575                1580
Pro His Asp Ser Asn Asp Glu Ser Asn Asp Asp Ser Thr Gln Val Gln
1585                1590                1595                1600
Glu Ile Tyr Glu Ala Ala Val Asn Leu Ser Leu Thr Glu Glu Thr Phe
                1605                1610                1615
Glu Gly Ser Ala Asp Val Leu Ala Ser Tyr Thr Gln Ala Thr His Asp
            1620                1625                1630
Glu Ser Met Thr Tyr Glu Asp Arg Ser Gln Leu Asp His Met Gly Phe
        1635                1640                1645
```

```
His Phe Thr Thr Gly Ile Pro Ala Pro Ser Thr Glu Thr Glu Leu Asp
    1650                1655                1660
Val Leu Leu Pro Thr Ala Thr Ser Leu Pro Ile Pro Arg Lys Ser Ala
1665                1670                1675                1680
Thr Val Ile Pro Glu Ile Glu Gly Ile Lys Ala Glu Ala Lys Ala Leu
                1685                1690                1695
Asp Asp Met Phe Glu Ser Ser Thr Leu Ser Asp Gly Gln Ala Ile Ala
            1700                1705                1710
Asp Gln Ser Glu Ile Ile Pro Thr Leu Gly Gln Phe Glu Arg Thr Gln
        1715                1720                1725
Glu Glu Tyr Glu Asp Lys Lys His Ala Gly Pro Ser Phe Gln Pro Glu
    1730                1735                1740
Phe Ser Ser Gly Ala Glu Glu Ala Leu Val Asp His Thr Pro Tyr Leu
1745                1750                1755                1760
Ser Ile Ala Thr Thr His Leu Met Asp Gln Ser Val Thr Glu Val Pro
                1765                1770                1775
Asp Val Met Glu Gly Ser Asn Pro Pro Tyr Tyr Thr Asp Thr Thr Leu
            1780                1785                1790
Ala Val Ser Thr Phe Ala Lys Leu Ser Ser Gln Thr Pro Ser Ser Pro
        1795                1800                1805
Leu Thr Ile Tyr Ser Gly Ser Glu Ala Ser Gly His Thr Glu Ile Pro
    1810                1815                1820
Gln Pro Ser Ala Leu Pro Gly Ile Asp Val Gly Ser Ser Val Met Ser
1825                1830                1835                1840
Pro Gln Asp Ser Phe Lys Glu Ile His Val Asn Ile Glu Ala Thr Phe
                1845                1850                1855
Lys Pro Ser Ser Glu Glu Tyr Leu His Ile Thr Glu Pro Pro Ser Leu
            1860                1865                1870
Ser Pro Asp Thr Lys Leu Glu Pro Ser Glu Asp Asp Gly Lys Pro Glu
        1875                1880                1885
Leu Leu Glu Glu Met Glu Ala Ser Pro Thr Glu Leu Ile Ala Val Glu
    1890                1895                1900
Gly Thr Glu Ile Leu Gln Asp Phe Gln Asn Lys Thr Asp Gly Gln Val
1905                1910                1915                1920
Ser Gly Glu Ala Ile Lys Met Phe Pro Thr Ile Lys Thr Pro Glu Ala
                1925                1930                1935
Gly Thr Val Ile Thr Thr Ala Asp Glu Ile Glu Leu Glu Gly Ala Thr
            1940                1945                1950
Gln Trp Pro His Ser Thr Ser Ala Ser Ala Thr Tyr Gly Val Glu Ala
        1955                1960                1965
Gly Val Val Pro Trp Leu Ser Pro Gln Thr Ser Glu Arg Pro Thr Leu
    1970                1975                1980
Ser Ser Ser Pro Glu Ile Asn Pro Glu Thr Gln Ala Ala Leu Ile Arg
1985                1990                1995                2000
Gly Gln Asp Ser Thr Ile Ala Ala Ser Glu Gln Gln Val Ala Ala Arg
                2005                2010                2015
Ile Leu Asp Ser Asn Asp Gln Ala Thr Val Asn Pro Val Glu Phe Asn
            2020                2025                2030
Thr Glu Val Ala Thr Pro Pro Phe Ser Leu Leu Glu Thr Ser Asn Glu
        2035                2040                2045
Thr Asp Phe Leu Ile Gly Ile Asn Glu Glu Ser Val Glu Gly Thr Ala
    2050                2055                2060
Ile Tyr Leu Pro Gly Pro Asp Arg Cys Lys Met Asn Pro Cys Leu Asn
2065                2070                2075                2080
Gly Gly Thr Cys Tyr Pro Thr Glu Thr Ser Tyr Val Cys Thr Cys Val
                2085                2090                2095
Pro Gly Tyr Ser Gly Asp Gln Cys Glu Leu Asp Phe Asp Glu Cys His
            2100                2105                2110
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Ser Asn Pro Cys Arg Asn Gly Ala Thr Cys Val Asp Gly Phe Asn Thr
2115 2120 2125
Phe Arg Cys Leu Cys Leu Pro Ser Tyr Val Gly Ala Leu Cys Glu Gln
2130 2135 2140
Asp Thr Glu Thr Cys Asp Tyr Gly Trp His Lys Phe Gln Gly Gln Cys
2145 2150 2155 2160
Tyr Lys Tyr Phe Ala His Arg Arg Thr Trp Asp Ala Ala Glu Arg Glu
2165 2170 2175
Cys Arg Leu Gln Gly Ala His Leu Thr Ser Ile Leu Ser His Glu Glu
2180 2185 2190
Gln Met Phe Val Asn Arg Val Gly His Asp Tyr Gln Trp Ile Gly Leu
2195 2200 2205
Asn Asp Lys Met Phe Glu His Asp Phe Arg Trp Thr Asp Gly Ser Thr
2210 2215 2220
Leu Gln Tyr Glu Asn Trp Arg Pro Asn Gln Pro Asp Ser Phe Phe Ser
2225 2230 2235 2240
Ala Gly Glu Asp Cys Val Val Ile Ile Trp His Glu Asn Gly Gln Trp
2245 2250 2255
Asn Asp Val Pro Cys Asn Tyr His Leu Thr Tyr Thr Cys Lys Lys Gly
2260 2265 2270
Thr Val Ala Cys Gly Gln Pro Pro Val Val Glu Asn Ala Lys Thr Phe
2275 2280 2285
Gly Lys Met Lys Pro Arg Tyr Glu Ile Asn Ser Leu Ile Arg Tyr His
2290 2295 2300
Cys Lys Asp Gly Phe Ile Gln Arg His Leu Pro Thr Ile Arg Cys Leu
2305 2310 2315 2320
Gly Asn Gly Arg Trp Ala Ile Pro Lys Ile Thr Cys Met Asn Pro Ser
2325 2330 2335
Ala Tyr Gln Arg Thr Tyr Ser Met Lys Tyr Phe Lys Asn Ser Ser Ser
2340 2345 2350
Ala Lys Asp Asn Ser Ile Asn Thr Ser Lys His Asp His Arg Trp Ser
2355 2360 2365
Arg Arg Trp Gln Glu Ser Arg Arg
2370 2375

<210> 236
<211> 1321
<212> PRT
<213> Homo sapiens

<220>
<223> human Neurocan protein O15494

<400> 236
Met Gly Ala Pro Phe Val Trp Ala Leu Gly Leu Leu Met Leu Gln Met
1 5 10 15
Leu Leu Phe Val Ala Gly Glu Gln Gly Thr Gln Asp Ile Thr Asp Ala
20 25 30
Ser Glu Arg Gly Leu His Met Gln Lys Leu Gly Ser Gly Ser Val Gln
35 40 45
Ala Ala Leu Ala Glu Leu Val Ala Leu Pro Cys Leu Phe Thr Leu Gln
50 55 60
Pro Arg Pro Ser Ala Ala Arg Asp Ala Pro Arg Ile Lys Trp Thr Lys
65 70 75 80
Val Arg Thr Ala Ser Gly Gln Arg Gln Asp Leu Pro Ile Leu Val Ala

```
                85                  90                  95
Lys Asp Asn Val Val Arg Val Ala Lys Ser Trp Gln Gly Arg Val Ser
            100                 105                 110
Leu Pro Ser Tyr Pro Arg Arg Arg Ala Asn Ala Thr Leu Leu Leu Gly
        115                 120                 125
Pro Leu Arg Ala Ser Asp Ser Gly Leu Tyr Arg Cys Gln Val Val Arg
    130                 135                 140
Gly Ile Glu Asp Glu Gln Asp Leu Val Pro Leu Glu Val Thr Gly Val
145                 150                 155                 160
Val Phe His Tyr Arg Ser Ala Arg Asp Arg Tyr Ala Leu Thr Phe Ala
                165                 170                 175
Glu Ala Gln Glu Ala Cys Arg Leu Ser Ser Ala Ile Ile Ala Ala Pro
            180                 185                 190
Arg His Leu Gln Ala Ala Phe Glu Asp Gly Phe Asp Asn Cys Asp Ala
        195                 200                 205
Gly Trp Leu Ser Asp Arg Thr Val Arg Tyr Pro Ile Thr Gln Ser Arg
    210                 215                 220
Pro Gly Cys Tyr Gly Asp Arg Ser Ser Leu Pro Gly Val Arg Ser Tyr
225                 230                 235                 240
Gly Arg Arg Asn Pro Gln Glu Leu Tyr Asp Val Tyr Cys Phe Ala Arg
                245                 250                 255
Glu Leu Gly Gly Glu Val Phe Tyr Val Gly Pro Ala Arg Arg Leu Thr
            260                 265                 270
Leu Ala Gly Ala Arg Ala Gln Cys Arg Arg Gln Gly Ala Ala Leu Ala
        275                 280                 285
Ser Val Gly Gln Leu His Leu Ala Trp His Glu Gly Leu Asp Gln Cys
    290                 295                 300
Asp Pro Gly Trp Leu Ala Asp Gly Ser Val Arg Tyr Pro Ile Gln Thr
305                 310                 315                 320
Pro Arg Arg Arg Cys Gly Gly Pro Ala Pro Gly Val Arg Thr Val Tyr
                325                 330                 335
Arg Phe Ala Asn Arg Thr Gly Phe Pro Ser Pro Ala Glu Arg Phe Asp
            340                 345                 350
Ala Tyr Cys Phe Arg Ala His His Pro Thr Ser Gln His Gly Asp Leu
        355                 360                 365
Glu Thr Pro Ser Ser Gly Asp Glu Gly Glu Ile Leu Ser Ala Glu Gly
    370                 375                 380
Pro Pro Val Arg Glu Leu Glu Pro Thr Leu Glu Glu Glu Glu Val Val
385                 390                 395                 400
Thr Pro Asp Phe Gln Glu Pro Leu Val Ser Ser Gly Glu Glu Glu Thr
                405                 410                 415
Leu Ile Leu Glu Glu Lys Gln Glu Ser Gln Gln Thr Leu Ser Pro Thr
            420                 425                 430
Pro Gly Asp Pro Met Leu Ala Ser Trp Pro Thr Gly Glu Val Trp Leu
        435                 440                 445
Ser Thr Val Ala Pro Ser Pro Ser Asp Met Gly Ala Gly Thr Ala Ala
    450                 455                 460
Ser Ser His Thr Glu Val Ala Pro Thr Asp Pro Met Pro Arg Arg Arg
465                 470                 475                 480
Gly Arg Phe Lys Gly Leu Asn Gly Arg Tyr Phe Gln Gln Gln Glu Pro
                485                 490                 495
Glu Pro Gly Leu Gln Gly Gly Met Glu Ala Ser Ala Gln Pro Pro Thr
            500                 505                 510
Ser Glu Ala Ala Val Asn Gln Met Glu Pro Pro Leu Ala Met Ala Val
        515                 520                 525
Thr Glu Met Leu Gly Ser Gly Gln Ser Arg Ser Pro Trp Ala Asp Leu
    530                 535                 540
Thr Asn Glu Val Asp Met Pro Gly Ala Gly Ser Ala Gly Gly Lys Ser
```

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545                 550                 555                 560
Ser Pro Glu Pro Trp Leu Trp Pro Pro Thr Met Val Pro Pro Ser Ile
                565                 570                 575
Ser Gly His Ser Arg Ala Pro Val Leu Glu Leu Glu Lys Ala Glu Gly
            580                 585                 590
Pro Ser Ala Arg Pro Ala Thr Pro Asp Leu Phe Trp Ser Pro Leu Glu
        595                 600                 605
Ala Thr Val Ser Ala Pro Ser Pro Ala Pro Trp Glu Ala Phe Pro Val
    610                 615                 620
Ala Thr Ser Pro Asp Leu Pro Met Met Ala Met Leu Arg Gly Pro Lys
625                 630                 635                 640
Glu Trp Met Leu Pro His Pro Thr Pro Ile Ser Thr Glu Ala Asn Arg
                645                 650                 655
Val Glu Ala His Gly Glu Ala Thr Ala Thr Ala Pro Pro Ser Pro Ala
            660                 665                 670
Ala Glu Thr Lys Val Tyr Ser Leu Pro Leu Ser Leu Thr Pro Thr Gly
        675                 680                 685
Gln Gly Gly Glu Ala Met Pro Thr Thr Pro Glu Ser Pro Arg Ala Asp
    690                 695                 700
Phe Arg Glu Thr Gly Glu Thr Ser Pro Ala Gln Val Asn Lys Ala Glu
705                 710                 715                 720
His Ser Ser Ser Ser Pro Trp Pro Ser Val Asn Arg Asn Val Ala Val
                725                 730                 735
Gly Phe Val Pro Thr Glu Thr Ala Thr Glu Pro Thr Gly Leu Arg Gly
            740                 745                 750
Ile Pro Gly Ser Glu Ser Gly Val Phe Asp Thr Ala Glu Ser Pro Thr
        755                 760                 765
Ser Gly Leu Gln Ala Thr Val Asp Glu Val Gln Asp Pro Trp Pro Ser
    770                 775                 780
Val Tyr Ser Lys Gly Leu Asp Ala Ser Ser Pro Ser Ala Pro Leu Gly
785                 790                 795                 800
Ser Pro Gly Val Phe Leu Val Pro Lys Val Thr Pro Asn Leu Glu Pro
                805                 810                 815
Trp Val Ala Thr Asp Glu Gly Pro Thr Val Asn Pro Met Asp Ser Thr
            820                 825                 830
Val Thr Pro Ala Pro Ser Asp Ala Ser Gly Ile Trp Glu Pro Gly Ser
        835                 840                 845
Gln Val Phe Glu Glu Ala Glu Ser Thr Thr Leu Ser Pro Gln Val Ala
    850                 855                 860
Leu Asp Thr Ser Ile Val Thr Pro Leu Thr Thr Leu Glu Gln Gly Asp
865                 870                 875                 880
Lys Val Gly Val Pro Ala Met Ser Thr Leu Gly Ser Ser Ser Ser Gln
                885                 890                 895
Pro His Pro Glu Pro Glu Asp Gln Val Glu Thr Gln Gly Thr Ser Gly
            900                 905                 910
Ala Ser Val Pro Pro His Gln Ser Ser Pro Leu Gly Lys Pro Ala Val
        915                 920                 925
Pro Pro Gly Thr Pro Thr Ala Ala Ser Val Gly Glu Ser Ala Ser Val
    930                 935                 940
Ser Ser Gly Glu Pro Thr Val Pro Trp Asp Pro Ser Ser Thr Leu Leu
945                 950                 955                 960
Pro Val Thr Leu Gly Ile Glu Asp Phe Glu Leu Glu Val Leu Ala Gly
                965                 970                 975
Ser Pro Gly Val Glu Ser Phe Trp Glu Glu Val Ala Ser Gly Glu Glu
            980                 985                 990
Pro Ala Leu Pro Gly Thr Pro Met Asn Ala Gly Ala Glu Glu Val His
        995                 1000                1005
Ser Asp Pro Cys Glu Asn Asn Pro Cys Leu His Gly Gly Thr Cys Asn
```

```
    1010                1015                1020
Ala Asn Gly Thr Met Tyr Gly Cys Ser Cys Asp Gln Gly Phe Ala Gly
1025                1030                1035                1040
Glu Asn Cys Glu Ile Asp Ile Asp Asp Cys Leu Cys Ser Pro Cys Glu
                1045                1050                1055
Asn Gly Gly Thr Cys Ile Asp Glu Val Asn Gly Phe Val Cys Leu Cys
            1060                1065                1070
Leu Pro Ser Tyr Gly Gly Ser Phe Cys Glu Lys Asp Thr Glu Gly Cys
        1075                1080                1085
Asp Arg Gly Trp His Lys Phe Gln Gly His Cys Tyr Arg Tyr Phe Ala
    1090                1095                1100
His Arg Arg Ala Trp Glu Asp Ala Glu Lys Asp Cys Arg Arg Arg Ser
1105                1110                1115                1120
Gly His Leu Thr Ser Val His Ser Pro Glu Glu His Ser Phe Ile Asn
                1125                1130                1135
Ser Phe Gly His Glu Asn Thr Trp Ile Gly Leu Asn Asp Arg Ile Val
            1140                1145                1150
Glu Arg Asp Phe Gln Trp Thr Asp Asn Thr Gly Leu Gln Phe Glu Asn
        1155                1160                1165
Trp Arg Glu Asn Gln Pro Asp Asn Phe Phe Ala Gly Gly Glu Asp Cys
    1170                1175                1180
Val Val Met Val Ala His Glu Ser Gly Arg Trp Asn Asp Val Pro Cys
1185                1190                1195                1200
Asn Tyr Asn Leu Pro Tyr Val Cys Lys Lys Gly Thr Val Leu Cys Gly
                1205                1210                1215
Pro Pro Pro Ala Val Glu Asn Ala Ser Leu Ile Gly Ala Arg Lys Ala
            1220                1225                1230
Lys Tyr Asn Val His Ala Thr Val Arg Tyr Gln Cys Asn Glu Gly Phe
        1235                1240                1245
Ala Gln His His Val Ala Thr Ile Arg Cys Arg Ser Asn Gly Lys Trp
    1250                1255                1260
Asp Arg Pro Gln Ile Val Cys Thr Lys Pro Arg Arg Ser His Arg Met
1265                1270                1275                1280
Arg Arg His His His His His Gln His His His Gln His His His His
                1285                1290                1295
Lys Ser Arg Lys Glu Arg Arg Lys His Lys Lys His Pro Thr Glu Asp
            1300                1305                1310
Trp Glu Lys Asp Glu Gly Asn Phe Cys
        1315                1320


<210> 237
<211> 2316
<212> PRT
<213> Rattus norvegicus

<220>
<223> rat Phosphacan Q62656


<400> 237
Met Arg Ile Leu Gln Ser Phe Leu Ala Cys Val Gln Leu Leu Cys Val
 1               5                  10                  15
Cys Arg Leu Asp Trp Ala Tyr Gly Tyr Tyr Arg Gln Gln Arg Lys Leu
            20                  25                  30
Val Glu Glu Ile Gly Trp Ser Tyr Thr Gly Ala Leu Asn Gln Lys Asn
        35                  40                  45
Trp Gly Lys Lys Tyr Pro Ile Cys Asn Ser Pro Lys Gln Ser Pro Ile
```

```
    50                  55                  60
Asn Ile Asp Glu Asp Leu Thr Gln Val Asn Val Asn Leu Lys Lys Leu
65                  70                  75                  80
Lys Phe Gln Gly Trp Glu Lys Pro Ser Leu Glu Asn Thr Phe Ile His
                85                  90                  95
Asn Thr Gly Lys Thr Val Glu Ile Asn Leu Thr Asn Asp Tyr Tyr Leu
            100                 105                 110
Ser Gly Gly Leu Ser Glu Lys Val Phe Lys Ala Ser Lys Met Thr Phe
        115                 120                 125
His Trp Gly Lys Cys Asn Val Ser Ser Glu Gly Ser Glu His Ser Leu
    130                 135                 140
Glu Gly Gln Lys Phe Pro Leu Glu Met Gln Ile Tyr Cys Phe Asp Ala
145                 150                 155                 160
Asp Arg Phe Ser Ser Phe Glu Glu Thr Val Lys Gly Lys Gly Arg Leu
                165                 170                 175
Arg Ala Leu Ser Ile Leu Phe Glu Ile Gly Val Glu Glu Asn Leu Asp
            180                 185                 190
Tyr Lys Ala Ile Ile Asp Gly Thr Glu Ser Val Ser Arg Phe Gly Lys
        195                 200                 205
Gln Ala Ala Leu Asp Pro Phe Ile Leu Gln Asn Leu Leu Pro Asn Ser
    210                 215                 220
Thr Asp Lys Tyr Tyr Ile Tyr Asn Gly Ser Leu Thr Ser Pro Pro Cys
225                 230                 235                 240
Thr Asp Thr Val Glu Trp Ile Val Phe Lys Asp Thr Val Ser Ile Ser
                245                 250                 255
Glu Ser Gln Leu Ala Val Phe Cys Glu Val Leu Thr Met Gln Gln Ser
            260                 265                 270
Gly Tyr Val Met Leu Met Asp Tyr Leu Gln Asn Asn Phe Arg Glu Gln
        275                 280                 285
Gln Tyr Lys Phe Ser Arg Gln Val Phe Ser Ser Tyr Thr Gly Lys Glu
    290                 295                 300
Glu Ile His Glu Ala Val Cys Ser Ser Glu Pro Glu Asn Val Gln Ala
305                 310                 315                 320
Asp Pro Glu Asn Tyr Thr Ser Leu Leu Ile Thr Trp Glu Arg Pro Arg
                325                 330                 335
Val Val Tyr Asp Thr Met Ile Glu Lys Phe Ala Val Leu Tyr Gln Pro
            340                 345                 350
Leu Glu Gly Asn Asp Gln Thr Lys His Glu Phe Leu Thr Asp Gly Tyr
        355                 360                 365
Gln Asp Leu Gly Ala Ile Leu Asn Asn Leu Ile Pro Asn Met Ser Tyr
    370                 375                 380
Val Leu Gln Ile Val Ala Ile Cys Ser Asn Gly Leu Tyr Gly Lys Tyr
385                 390                 395                 400
Ser Asp Gln Leu Ile Val Asp Met Pro Thr Glu Asp Ala Glu Leu Asp
                405                 410                 415
Leu Phe Pro Glu Leu Ile Gly Thr Glu Glu Ile Ile Lys Glu Glu Asn
            420                 425                 430
Tyr Gly Lys Gly Asn Glu Glu Asp Thr Gly Leu Asn Pro Gly Arg Asp
        435                 440                 445
Ser Ala Thr Asn Gln Ile Arg Lys Lys Glu Pro Gln Val Ser Thr Thr
    450                 455                 460
Thr His Tyr Asn His Met Gly Thr Lys Tyr Asn Glu Ala Lys Thr Asn
465                 470                 475                 480
Arg Ser Pro Thr Arg Gly Ser Glu Phe Ser Gly Lys Ser Asp Val Leu
                485                 490                 495
Asn Thr Ser Leu Asn Pro Thr Ser Gln Gln Val Ala Glu Phe Asn Pro
            500                 505                 510
Glu Arg Glu Met Ser Leu Pro Ser Gln Ile Gly Thr Asn Leu Pro Pro
```

```
        515                 520                 525
His Ser Val Glu Gly Thr Ser Ala Ser Leu Asn Ser Gly Ser Lys Thr
    530                 535                 540
Leu Leu Val Phe Pro Gln Met Asn Leu Ser Gly Thr Ala Glu Ser Leu
545                 550                 555                 560
Asn Met Val Ser Ile Thr Glu Tyr Lys Glu Val Ser Ala Asp Leu Ser
                565                 570                 575
Glu Glu Glu Asn Leu Leu Thr Asp Phe Lys Leu Asp Ser Gly Ala Asp
            580                 585                 590
Asp Ser Ser Gly Ser Ser Pro Ala Ser Ser Thr Val Pro Phe Ser Thr
        595                 600                 605
Asp Asn Leu Ser His Gly Tyr Thr Ser Ser Ser Asp Thr Pro Glu Ala
    610                 615                 620
Val Thr Tyr Asp Val Leu Arg Pro Glu Ser Thr Arg Asn Ala Leu Glu
625                 630                 635                 640
Asp Ser Ala Pro Ser Gly Ser Glu Glu Ser Leu Lys Asp Pro Ser Leu
                645                 650                 655
Glu Gly Ser Val Trp Phe Pro Gly Ser Thr Asp Leu Thr Thr Gln Ser
            660                 665                 670
Glu Thr Gly Ser Gly Arg Glu Gly Phe Leu Gln Val Asn Ser Thr Asp
        675                 680                 685
Phe Gln Val Asp Glu Ser Arg Glu Thr Thr Glu Thr Phe Ser Pro Asp
    690                 695                 700
Ala Thr Ala Ser Arg Gly Pro Ser Val Thr Asp Met Glu Met Pro His
705                 710                 715                 720
Tyr Ser Thr Phe Ala Tyr Pro Pro Thr Glu Val Thr Ser His Ala Phe
                725                 730                 735
Thr Pro Ser Ser Arg Pro Leu Asp Leu Ala Pro Thr Ser Asn Ile Leu
            740                 745                 750
His Ser Gln Thr Thr Gln Pro Val Tyr Asn Gly Glu Thr Pro Leu Gln
        755                 760                 765
Pro Ser Tyr Ser Ser Glu Val Phe Pro Leu Val Thr Pro Leu Leu Leu
    770                 775                 780
Asp Asn Gln Thr Leu Asn Thr Thr Pro Ala Ala Ser Ser Ser Asp Ser
785                 790                 795                 800
Ala Leu His Ala Thr Pro Val Phe Pro Ser Val Gly Val Ser Phe Asp
                805                 810                 815
Ser Ile Leu Ser Ser Tyr Asp Asp Ala Pro Leu Leu Pro Phe Ser Ser
            820                 825                 830
Ala Ser Phe Ser Ser Asp Leu Phe His His Leu His Thr Val Ser Gln
        835                 840                 845
Thr Leu Pro Gln Val Thr Ser Ala Ala Glu Arg Asp Glu Leu Ser Leu
    850                 855                 860
His Ala Ser Leu Leu Val Ala Gly Gly Asp Leu Leu Leu Glu Pro Ser
865                 870                 875                 880
Leu Val Gln Tyr Ser Asp Val Met Ser His Gln Val Thr Ile His Ala
                885                 890                 895
Ala Ser Asp Thr Leu Glu Phe Gly Ser Glu Ser Ala Val Leu Tyr Lys
            900                 905                 910
Thr Ser Met Val Ser Gln Ile Glu Ser Pro Ser Ser Asp Val Val Met
        915                 920                 925
His Ala Tyr Ser Ser Gly Pro Glu Thr Ser Tyr Ala Ile Glu Gly Ser
    930                 935                 940
His His Val Leu Thr Val Ser Ser Ser Ser Ala Ile Pro Val His Asp
945                 950                 955                 960
Ser Val Gly Val Ala Asp Gln Gly Ser Leu Leu Ile Asn Pro Ser His
                965                 970                 975
Ile Ser Leu Pro Glu Ser Ser Phe Ile Thr Pro Thr Ala Ser Leu Leu
```

```
            980                 985                 990
Gln Leu Pro Pro Ala Leu Ser Gly Asp Gly Glu Trp Ser Gly Ala Ser
        995                 1000                1005
Ser Asp Ser Glu Leu Leu Leu Pro Asp Thr Asp Gly Leu Arg Thr Leu
    1010                1015                1020
Asn Met Ser Ser Pro Val Ser Val Ala Asp Phe Thr Tyr Thr Thr Ser
1025                1030                1035                1040
Val Ser Gly Asp Asp Ile Lys Pro Leu Ser Lys Gly Glu Met Met Tyr
                1045                1050                1055
Gly Asn Glu Thr Glu Leu Lys Met Ser Ser Phe Ser Asp Met Ala Tyr
            1060                1065                1070
Pro Ser Lys Ser Thr Val Val Pro Lys Met Ser Asp Ile Val Asn Lys
        1075                1080                1085
Trp Ser Glu Ser Leu Lys Glu Thr Ser Val Ser Val Ser Ser Ile Asn
    1090                1095                1100
Ser Val Phe Thr Glu Ser Leu Val Tyr Pro Ile Thr Lys Val Phe Asp
1105                1110                1115                1120
Gln Glu Ile Ser Arg Val Pro Glu Ile Ile Phe Pro Val Lys Pro Thr
                1125                1130                1135
His Thr Ala Ser Gln Ala Ser Gly Asp Thr Trp Leu Lys Pro Gly Leu
            1140                1145                1150
Ser Thr Asn Ser Glu Pro Ala Leu Ser Asp Thr Ala Ser Ser Glu Val
        1155                1160                1165
Ser His Pro Ser Thr Gln Pro Leu Leu Tyr Glu Ala Ala Ser Pro Phe
    1170                1175                1180
Asn Thr Glu Ala Leu Leu Gln Pro Ser Phe Pro Ala Ser Asp Val Asp
1185                1190                1195                1200
Thr Leu Leu Lys Thr Ala Leu Pro Ser Gly Pro Arg Asp Pro Val Leu
                1205                1210                1215
Thr Glu Thr Pro Met Val Glu Gln Ser Ser Ser Ser Val Ser Leu Pro
            1220                1225                1230
Leu Ala Ser Glu Ser Ala Ser Ser Lys Ser Thr Leu His Phe Thr Ser
        1235                1240                1245
Val Pro Val Leu Asn Met Ser Pro Ser Asp Val His Pro Thr Ser Leu
    1250                1255                1260
Gln Arg Leu Thr Val Pro His Ser Arg Glu Glu Tyr Phe Glu Gln Gly
1265                1270                1275                1280
Leu Leu Lys Ser Lys Ser Pro Gln Gln Val Leu Pro Ser Leu His Ser
                1285                1290                1295
His Asp Glu Phe Phe Gln Thr Ala His Leu Asp Ile Ser Gln Ala Tyr
            1300                1305                1310
Pro Pro Lys Gly Arg His Ala Phe Ala Thr Pro Ile Leu Ser Ile Asn
        1315                1320                1325
Glu Pro Gln Asn Thr Leu Ile Asn Arg Leu Val Tyr Ser Glu Asp Ile
    1330                1335                1340
Phe Met His Pro Glu Ile Ser Ile Thr Asp Lys Ala Leu Thr Gly Leu
1345                1350                1355                1360
Pro Thr Thr Val Ser Asp Val Leu Ile Ala Thr Asp His Ser Val Pro
                1365                1370                1375
Leu Gly Ser Gly Pro Ile Ser Met Thr Thr Val Ser Pro Asn Arg Asp
            1380                1385                1390
Asp Ser Val Thr Thr Thr Lys Leu Leu Leu Pro Ser Lys Ala Thr Ser
        1395                1400                1405
Lys Pro Thr His Ser Ala Arg Ser Asp Ala Asp Leu Val Gly Gly Gly
    1410                1415                1420
Glu Asp Gly Asp Asp Tyr Asp Asp Asp Asp Tyr Asp Asp Ile Asp Ser
1425                1430                1435                1440
Asp Arg Phe Pro Val Asn Lys Cys Met Ser Cys Ser Pro Tyr Arg Glu
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                1445                1450                1455
Ser Gln Glu Lys Val Met Asn Asp Ser Asp Thr Gln Glu Ser Ser Leu
            1460                1465                1470
Val Asp Gln Ser Asp Pro Ile Ser His Leu Leu Ser Glu Asn Thr Glu
        1475                1480                1485
Glu Glu Asn Gly Gly Thr Gly Val Thr Arg Val Asp Lys Ser Pro Asp
    1490                1495                1500
Lys Ser Pro Pro Pro Ser Met Leu Pro Gln Lys His Asn Asp Gly Arg
1505                1510                1515                1520
Glu Asp Arg Asp Ile Gln Met Gly Ser Ala Val Leu Pro His Thr Pro
                1525                1530                1535
Gly Ser Lys Ala Trp Ala Val Leu Thr Ser Asp Glu Glu Ser Gly Ser
            1540                1545                1550
Gly Gln Gly Thr Ser Asp Ser Leu Asn Asp Asn Glu Thr Ser Thr Asp
        1555                1560                1565
Phe Ser Phe Pro Asp Val Asn Glu Lys Asp Ala Asp Gly Val Leu Glu
    1570                1575                1580
Ala Asp Asp Thr Gly Ile Ala Pro Gly Ser Pro Arg Ser Ser Thr Pro
1585                1590                1595                1600
Ser Val Thr Ser Gly His Ser Gly Val Ser Asn Ser Ser Glu Ala Glu
                1605                1610                1615
Ala Ser Asn Ser Ser His Glu Ser Arg Ile Gly Leu Ala Glu Gly Leu
            1620                1625                1630
Glu Ser Glu Lys Lys Ala Val Ile Pro Leu Val Ile Val Ser Ala Leu
        1635                1640                1645
Thr Phe Ile Cys Leu Val Val Leu Val Gly Ile Leu Ile Tyr Trp Arg
    1650                1655                1660
Lys Cys Phe Gln Thr Ala His Phe Tyr Leu Glu Asp Asn Thr Ser Pro
1665                1670                1675                1680
Arg Val Ile Ser Thr Pro Pro Thr Pro Ile Phe Pro Ile Ser Asp Asp
                1685                1690                1695
Ile Gly Ala Ile Pro Ile Lys His Phe Pro Lys His Val Ala Asp Leu
            1700                1705                1710
His Ala Ser Asn Gly Phe Thr Glu Glu Phe Glu Thr Leu Lys Glu Phe
        1715                1720                1725
Tyr Gln Glu Val Gln Ser Cys Thr Val Asp Leu Gly Ile Thr Ala Asp
    1730                1735                1740
Ser Ser Asn His Pro Asp Asn Lys His Lys Asn Arg Tyr Val Asn Ile
1745                1750                1755                1760
Val Ala Tyr Asp His Ser Arg Val Lys Leu Thr Gln Leu Ala Glu Lys
                1765                1770                1775
Asp Gly Lys Leu Thr Asp Tyr Ile Asn Ala Asn Tyr Val Asp Gly Tyr
            1780                1785                1790
Asn Arg Pro Lys Ala Tyr Ile Ala Ala Gln Gly Pro Leu Lys Ser Thr
        1795                1800                1805
Ala Glu Asp Phe Trp Arg Met Ile Trp Glu His Asn Val Glu Val Ile
    1810                1815                1820
Val Met Ile Thr Asn Leu Val Glu Lys Gly Arg Arg Lys Cys Asp Gln
1825                1830                1835                1840
Tyr Trp Pro Thr Asp Gly Ser Glu Glu Tyr Gly Ser Phe Leu Val Asn
                1845                1850                1855
Gln Lys Asn Val Gln Val Leu Ala Tyr Tyr Thr Val Arg Asn Phe Thr
            1860                1865                1870
Leu Arg Asn Thr Lys Ile Lys Lys Gly Ser Gln Lys Gly Arg Ser Ser
        1875                1880                1885
Gly Arg Leu Val Thr Gln Tyr His Tyr Thr Gln Trp Pro Asp Met Gly
    1890                1895                1900
Val Pro Glu Tyr Ser Leu Pro Val Leu Ala Phe Val Arg Lys Thr Ala
```

1905 1910 1915 1920
Gln Ala Lys Arg His Ala Val Gly Pro Val Val Val His Cys Ser Ala
1925 1930 1935
Gly Val Gly Arg Thr Gly Thr Tyr Ile Val Leu Asp Ser Met Leu Gln
1940 1945 1950
Gln Ile Gln His Glu Gly Thr Val Asn Ile Phe Gly Phe Leu Lys His
1955 1960 1965
Ile Arg Ser Gln Arg Asn Tyr Leu Val Gln Thr Glu Glu Gln Tyr Val
1970 1975 1980
Phe Ile His Asp Thr Leu Val Glu Ala Ile Leu Ser Lys Glu Thr Glu
1985 1990 1995 2000
Val Pro Asp Ser His Ile His Ser Tyr Val Asn Thr Leu Leu Ile Pro
2005 2010 2015
Gly Pro Ser Gly Lys Thr Lys Leu Glu Lys Gln Phe Gln Leu Leu Ser
2020 2025 2030
Gln Ser Asn Ile Leu Gln Ser Asp Tyr Ser Thr Ala Leu Lys Gln Cys
2035 2040 2045
Asn Arg Glu Lys Asn Arg Thr Ser Ser Ile Ile Pro Val Glu Arg Ser
2050 2055 2060
Arg Val Gly Ile Ser Ser Leu Ser Gly Glu Gly Thr Asp Tyr Ile Asn
2065 2070 2075 2080
Ala Ser Tyr Ile Met Gly Tyr Tyr Gln Ser Asn Glu Phe Ile Ile Thr
2085 2090 2095
Gln His Pro Leu Leu His Thr Ile Lys Asp Phe Trp Arg Met Ile Trp
2100 2105 2110
Asp His Asn Ala Gln Leu Val Val Met Ile Pro Asp Gly Gln Asn Met
2115 2120 2125
Ala Glu Asp Glu Phe Val Tyr Trp Pro Asn Lys Asp Glu Pro Ile Asn
2130 2135 2140
Cys Glu Ser Phe Lys Val Thr Leu Met Ser Glu Glu His Lys Cys Leu
2145 2150 2155 2160
Ser Asn Glu Glu Lys Leu Ile Val Gln Asp Phe Ile Leu Glu Ala Thr
2165 2170 2175
Gln Asp Asp Tyr Val Leu Glu Val Arg His Phe Gln Cys Pro Lys Trp
2180 2185 2190
Pro Asn Pro Asp Ser Pro Ile Ser Lys Thr Phe Glu Leu Ile Ser Ile
2195 2200 2205
Ile Lys Glu Glu Ala Ala Asn Arg Asp Gly Pro Met Ile Val His Asp
2210 2215 2220
Glu His Gly Gly Val Thr Ala Gly Thr Phe Cys Ala Leu Thr Thr Leu
2225 2230 2235 2240
Met His Gln Leu Glu Lys Glu Asn Ser Met Asp Val Tyr Gln Val Ala
2245 2250 2255
Lys Met Ile Asn Leu Met Arg Pro Gly Val Phe Thr Asp Ile Glu Gln
2260 2265 2270
Tyr Gln Phe Leu Tyr Lys Val Val Leu Ser Leu Val Ser Thr Arg Gln
2275 2280 2285
Glu Glu Asn Pro Ser Thr Ser Leu Asp Ser Asn Gly Ala Ala Leu Pro
2290 2295 2300
Asp Gly Asn Ile Ala Glu Ser Leu Glu Ser Leu Val
2305 2310 2315

<210> 238
<211> 382
<212> PRT
<213> Homo sapiens

<220>
<223> Layilin Isoform 1 Q6UX15

<400> 238
Met Arg Pro Gly Thr Ala Leu Gln Ala Val Leu Leu Ala Val Leu Leu
 1   5   10   15
Val Gly Leu Arg Ala Ala Thr Gly Arg Leu Leu Ser Ala Ser Asp Leu
            20   25   30
Asp Leu Arg Gly Gly Gln Pro Val Cys Arg Gly Gly Thr Gln Arg Pro
        35   40   45
Cys Tyr Lys Val Ile Tyr Phe His Asp Thr Ser Arg Arg Leu Asn Phe
    50   55   60
Glu Glu Ala Lys Glu Ala Cys Arg Arg Asp Gly Gly Gln Leu Val Ser
65   70   75   80
Ile Glu Ser Glu Asp Glu Gln Lys Leu Ile Glu Lys Phe Ile Glu Asn
                85   90   95
Leu Leu Pro Ser Asp Gly Asp Phe Trp Ile Gly Leu Arg Arg Arg Glu
            100   105   110
Glu Lys Gln Ser Asn Ser Thr Ala Cys Gln Asp Leu Tyr Ala Trp Thr
        115   120   125
Asp Gly Ser Ile Ser Gln Phe Arg Asn Trp Tyr Val Asp Glu Pro Ser
    130   135   140
Cys Gly Ser Glu Val Cys Val Val Met Tyr His Gln Pro Ser Ala Pro
145   150   155   160
Ala Gly Ile Gly Gly Pro Tyr Met Phe Gln Trp Asn Asp Asp Arg Cys
                165   170   175
Asn Met Lys Asn Asn Phe Ile Cys Lys Tyr Ser Asp Glu Lys Pro Ala
            180   185   190
Val Pro Ser Arg Glu Ala Glu Gly Glu Glu Thr Glu Leu Thr Thr Pro
        195   200   205
Val Leu Pro Glu Glu Thr Gln Glu Glu Asp Ala Lys Lys Thr Phe Lys
    210   215   220
Glu Ser Arg Glu Ala Ala Leu Asn Leu Ala Tyr Ile Leu Ile Pro Ser
225   230   235   240
Ile Pro Leu Leu Leu Leu Leu Val Val Thr Thr Val Val Cys Trp Val
                245   250   255
Trp Ile Cys Arg Lys Arg Lys Arg Glu Gln Pro Asp Pro Ser Thr Lys
            260   265   270
Lys Gln His Thr Ile Trp Pro Ser Pro His Gln Gly Asn Ser Pro Asp
        275   280   285
Leu Glu Val Tyr Asn Val Ile Arg Lys Gln Ser Glu Ala Asp Leu Ala
    290   295   300
Glu Thr Arg Pro Asp Leu Lys Asn Ile Ser Phe Arg Val Cys Ser Gly
305   310   315   320
Glu Ala Thr Pro Asp Asp Met Ser Cys Asp Tyr Asp Asn Met Ala Val
                325   330   335
Asn Pro Ser Glu Ser Gly Phe Val Thr Leu Val Ser Val Glu Ser Gly
            340   345   350
Phe Val Thr Asn Asp Ile Tyr Glu Phe Ser Pro Asp Gln Met Gly Arg
        355   360   365
Ser Lys Glu Ser Gly Trp Val Glu Asn Glu Ile Tyr Gly Tyr
    370   375   380

<210> 239
<211> 374
<212> PRT

<213> Homo sapiens

<220>
<223> Layilin Isoform 2 NP_849156

<400> 239
Met Arg Pro Gly Thr Ala Leu Gln Ala Val Leu Leu Ala Val Leu Leu
 1   5   10   15
Val Gly Leu Arg Ala Ala Thr Gly Arg Leu Leu Ser Gly Gln Pro Val
            20   25   30
Cys Arg Gly Gly Thr Gln Arg Pro Cys Tyr Lys Val Ile Tyr Phe His
        35   40   45
Asp Thr Ser Arg Arg Leu Asn Phe Glu Glu Ala Lys Glu Ala Cys Arg
    50   55   60
Arg Asp Gly Gly Gln Leu Val Ser Ile Glu Ser Glu Asp Glu Gln Lys
65   70   75   80
Leu Ile Glu Lys Phe Ile Glu Asn Leu Leu Pro Ser Asp Gly Asp Phe
                85   90   95
Trp Ile Gly Leu Arg Arg Arg Glu Glu Lys Gln Ser Asn Ser Thr Ala
            100   105   110
Cys Gln Asp Leu Tyr Ala Trp Thr Asp Gly Ser Ile Ser Gln Phe Arg
        115   120   125
Asn Trp Tyr Val Asp Glu Pro Ser Cys Gly Ser Glu Val Cys Val Val
    130   135   140
Met Tyr His Gln Pro Ser Ala Pro Ala Gly Ile Gly Gly Pro Tyr Met
145   150   155   160
Phe Gln Trp Asn Asp Asp Arg Cys Asn Met Lys Asn Asn Phe Ile Cys
                165   170   175
Lys Tyr Ser Asp Glu Lys Pro Ala Val Pro Ser Arg Glu Ala Glu Gly
            180   185   190
Glu Glu Thr Glu Leu Thr Thr Pro Val Leu Pro Glu Glu Thr Gln Glu
        195   200   205
Glu Asp Ala Lys Lys Thr Phe Lys Glu Ser Arg Glu Ala Ala Leu Asn
    210   215   220
Leu Ala Tyr Ile Leu Ile Pro Ser Ile Pro Leu Leu Leu Leu Leu Val
225   230   235   240
Val Thr Thr Val Val Cys Trp Val Trp Ile Cys Arg Lys Arg Lys Arg
                245   250   255
Glu Gln Pro Asp Pro Ser Thr Lys Lys Gln His Thr Ile Trp Pro Ser
            260   265   270
Pro His Gln Gly Asn Ser Pro Asp Leu Glu Val Tyr Asn Val Ile Arg
        275   280   285
Lys Gln Ser Glu Ala Asp Leu Ala Glu Thr Arg Pro Asp Leu Lys Asn
    290   295   300
Ile Ser Phe Arg Val Cys Ser Gly Glu Ala Thr Pro Asp Asp Met Ser
305   310   315   320
Cys Asp Tyr Asp Asn Met Ala Val Asn Pro Ser Glu Ser Gly Phe Val
                325   330   335
Thr Leu Val Ser Val Glu Ser Gly Phe Val Thr Asn Asp Ile Tyr Glu
            340   345   350
Phe Ser Pro Asp Gln Met Gly Arg Ser Lys Glu Ser Gly Trp Val Glu
        355   360   365
Asn Glu Ile Tyr Gly Tyr
    370

<210> 240

<211> 282
<212> PRT
<213> Homo sapiens

<220>
<223> HABP1/C1QBP Q07021

<400> 240
Met Leu Pro Leu Leu Arg Cys Val Pro Arg Val Leu Gly Ser Ser Val
 1   5   10   15
Ala Gly Leu Arg Ala Ala Ala Pro Ala Ser Pro Phe Arg Gln Leu Leu
            20   25   30
Gln Pro Ala Pro Arg Leu Cys Thr Arg Pro Phe Gly Leu Leu Ser Val
        35   40   45
Arg Ala Gly Ser Glu Arg Arg Pro Gly Leu Leu Arg Pro Arg Gly Pro
    50   55   60
Cys Ala Cys Gly Cys Gly Cys Gly Ser Leu His Thr Asp Gly Asp Lys
65   70   75   80
Ala Phe Val Asp Phe Leu Ser Asp Glu Ile Lys Glu Glu Arg Lys Ile
                85   90   95
Gln Lys His Lys Thr Leu Pro Lys Met Ser Gly Gly Trp Glu Leu Glu
            100   105   110
Leu Asn Gly Thr Glu Ala Lys Leu Val Arg Lys Val Ala Gly Glu Lys
        115   120   125
Ile Thr Val Thr Phe Asn Ile Asn Asn Ser Ile Pro Pro Thr Phe Asp
    130   135   140
Gly Glu Glu Glu Pro Ser Gln Gly Gln Lys Val Glu Glu Gln Glu Pro
145   150   155   160
Glu Leu Thr Ser Thr Pro Asn Phe Val Val Glu Val Ile Lys Asn Asp
                165   170   175
Asp Gly Lys Lys Ala Leu Val Leu Asp Cys His Tyr Pro Glu Asp Glu
            180   185   190
Val Gly Gln Glu Asp Glu Ala Glu Ser Asp Ile Phe Ser Ile Arg Glu
        195   200   205
Val Ser Phe Gln Ser Thr Gly Glu Ser Glu Trp Lys Asp Thr Asn Tyr
    210   215   220
Thr Leu Asn Thr Asp Ser Leu Asp Trp Ala Leu Tyr Asp His Leu Met
225   230   235   240
Asp Phe Leu Ala Asp Arg Gly Val Asp Asn Thr Phe Ala Asp Glu Leu
                245   250   255
Val Glu Leu Ser Thr Ala Leu Glu His Gln Glu Tyr Ile Thr Phe Leu
            260   265   270
Glu Asp Leu Lys Ser Phe Val Lys Ser Gln
        275   280

<210> 241
<211> 12
<212> PRT
<213> Homo sapiens

<220>
<223> PEP-1

<400> 241
Gly Ala His Trp Gln Phe Asn Ala Leu Thr Val Arg
 1   5   10

<210> 242
<211> 724
<212> PRT
<213> Homo sapiens

<220>
<223> human Rhamm protein O75330

<400> 242
Met Ser Phe Pro Lys Ala Pro Leu Lys Arg Phe Asn Asp Pro Ser Gly
 1   5   10   15
Cys Ala Pro Ser Pro Gly Ala Tyr Asp Val Lys Thr Leu Glu Val Leu
            20   25   30
Lys Gly Pro Val Ser Phe Gln Lys Ser Gln Arg Phe Lys Gln Gln Lys
        35   40   45
Glu Ser Lys Gln Asn Leu Asn Val Asp Lys Asp Thr Thr Leu Pro Ala
    50   55   60
Ser Ala Arg Lys Val Lys Ser Ser Glu Ser Lys Glu Ser Gln Lys Asn
65   70   75   80
Asp Lys Asp Leu Lys Ile Leu Glu Lys Glu Ile Arg Val Leu Leu Gln
                85   90   95
Glu Arg Gly Ala Gln Asp Arg Arg Ile Gln Asp Leu Glu Thr Glu Leu
            100   105   110
Glu Lys Met Glu Ala Arg Leu Asn Ala Ala Leu Arg Glu Lys Thr Ser
        115   120   125
Leu Ser Ala Asn Asn Ala Thr Leu Glu Lys Gln Leu Ile Glu Leu Thr
    130   135   140
Arg Thr Asn Glu Leu Leu Lys Ser Lys Phe Ser Glu Asn Gly Asn Gln
145   150   155   160
Lys Asn Leu Arg Ile Leu Ser Leu Glu Leu Met Lys Leu Arg Asn Lys
                165   170   175
Arg Glu Thr Lys Met Arg Gly Met Met Ala Lys Gln Glu Gly Met Glu
            180   185   190
Met Lys Leu Gln Val Thr Gln Arg Ser Leu Glu Glu Ser Gln Gly Lys
        195   200   205
Ile Ala Gln Leu Glu Gly Lys Leu Val Ser Ile Glu Lys Glu Lys Ile
    210   215   220
Asp Glu Lys Ser Glu Thr Glu Lys Leu Leu Glu Tyr Ile Glu Glu Ile
225   230   235   240
Ser Cys Ala Ser Asp Gln Val Glu Lys Tyr Lys Leu Asp Ile Ala Gln
                245   250   255
Leu Glu Glu Asn Leu Lys Glu Lys Asn Asp Glu Ile Leu Ser Leu Lys
            260   265   270
Gln Ser Leu Glu Glu Asn Ile Val Ile Leu Ser Lys Gln Val Glu Asp
        275   280   285
Leu Asn Val Lys Cys Gln Leu Leu Glu Lys Glu Lys Glu Asp His Val
    290   295   300
Asn Arg Asn Arg Glu His Asn Glu Asn Leu Asn Ala Glu Met Gln Asn
305   310   315   320
Leu Lys Gln Lys Phe Ile Leu Glu Gln Gln Glu Arg Glu Lys Leu Gln
                325   330   335
Gln Lys Glu Leu Gln Ile Asp Ser Leu Leu Gln Gln Glu Lys Glu Leu
            340   345   350
Ser Ser Ser Leu His Gln Lys Leu Cys Ser Phe Gln Glu Glu Met Val
        355   360   365

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Lys Glu Lys Asn Leu Phe Glu Glu Glu Leu Lys Gln Thr Leu Asp Glu
    370                 375                 380
Leu Asp Lys Leu Gln Gln Lys Glu Glu Gln Ala Glu Arg Leu Val Lys
385                 390                 395                 400
Gln Leu Glu Glu Glu Ala Lys Ser Arg Ala Glu Glu Leu Lys Leu Leu
                405                 410                 415
Glu Glu Lys Leu Lys Gly Lys Glu Ala Glu Leu Glu Lys Ser Ser Ala
            420                 425                 430
Ala His Thr Gln Ala Thr Leu Leu Leu Gln Glu Lys Tyr Asp Ser Met
        435                 440                 445
Val Gln Ser Leu Glu Asp Val Thr Ala Gln Phe Glu Ser Tyr Lys Ala
    450                 455                 460
Leu Thr Ala Ser Glu Ile Glu Asp Leu Lys Leu Glu Asn Ser Ser Leu
465                 470                 475                 480
Gln Glu Lys Ala Ala Lys Ala Gly Lys Asn Ala Glu Asp Val Gln His
                485                 490                 495
Gln Ile Leu Ala Thr Glu Ser Ser Asn Gln Glu Tyr Val Arg Met Leu
            500                 505                 510
Leu Asp Leu Gln Thr Lys Ser Ala Leu Lys Glu Thr Glu Ile Lys Glu
        515                 520                 525
Ile Thr Val Ser Phe Leu Gln Lys Ile Thr Asp Leu Gln Asn Gln Leu
    530                 535                 540
Lys Gln Gln Glu Glu Asp Phe Arg Lys Gln Leu Glu Asp Glu Glu Gly
545                 550                 555                 560
Arg Lys Ala Glu Lys Glu Asn Thr Thr Ala Glu Leu Thr Glu Glu Ile
                565                 570                 575
Asn Lys Trp Arg Leu Leu Tyr Glu Glu Leu Tyr Asn Lys Thr Lys Pro
            580                 585                 590
Phe Gln Leu Gln Leu Asp Ala Phe Glu Val Glu Lys Gln Ala Leu Leu
        595                 600                 605
Asn Glu His Gly Ala Ala Gln Glu Gln Leu Asn Lys Ile Arg Asp Ser
    610                 615                 620
Tyr Ala Lys Leu Leu Gly His Gln Asn Leu Lys Gln Lys Ile Lys His
625                 630                 635                 640
Val Val Lys Leu Lys Asp Glu Asn Ser Gln Leu Lys Ser Glu Val Ser
                645                 650                 655
Lys Leu Arg Cys Gln Leu Ala Lys Lys Lys Gln Ser Glu Thr Lys Leu
            660                 665                 670
Gln Glu Glu Leu Asn Lys Val Leu Gly Ile Lys His Phe Asp Pro Ser
        675                 680                 685
Lys Ala Phe His His Glu Ser Lys Glu Asn Phe Ala Leu Lys Thr Pro
    690                 695                 700
Leu Lys Glu Gly Asn Thr Asn Cys Tyr Arg Ala Pro Met Glu Cys Gln
705                 710                 715                 720
Glu Ser Trp Lys
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<210> 243
<211> 911
<212> PRT
<213> Homo sapiens

<220>
<223> Inter alpha trypsin inhibitor heavy chain 1
P19827

<400> 243
Met Asp Gly Ala Met Gly Pro Arg Gly Leu Leu Leu Cys Met Tyr Leu
 1   5   10   15
Val Ser Leu Leu Ile Leu Gln Ala Met Pro Ala Leu Gly Ser Ala Thr
            20   25   30
Gly Arg Ser Lys Ser Ser Glu Lys Arg Gln Ala Val Asp Thr Ala Val
        35   40   45
Asp Gly Val Phe Ile Arg Ser Leu Lys Val Asn Cys Lys Val Thr Ser
    50   55   60
Arg Phe Ala His Tyr Val Val Thr Ser Gln Val Val Asn Thr Ala Asn
65   70   75   80
Glu Ala Arg Glu Val Ala Phe Asp Leu Glu Ile Pro Lys Thr Ala Phe
                85   90   95
Ile Ser Asp Phe Ala Val Thr Ala Asp Gly Asn Ala Phe Ile Gly Asp
            100   105   110
Ile Lys Asp Lys Val Thr Ala Trp Lys Gln Tyr Arg Lys Ala Ala Ile
        115   120   125
Ser Gly Glu Asn Ala Gly Leu Val Arg Ala Ser Gly Arg Thr Met Glu
    130   135   140
Gln Phe Thr Ile His Leu Thr Val Asn Pro Gln Ser Lys Val Thr Phe
145   150   155   160
Gln Leu Thr Tyr Glu Glu Val Leu Lys Arg Asn His Met Gln Tyr Glu
                165   170   175
Ile Val Ile Lys Val Lys Pro Lys Gln Leu Val His His Phe Glu Ile
            180   185   190
Asp Val Asp Ile Phe Glu Pro Gln Gly Ile Ser Lys Leu Asp Ala Gln
        195   200   205
Ala Ser Phe Leu Pro Lys Glu Leu Ala Ala Gln Thr Ile Lys Lys Ser
    210   215   220
Phe Ser Gly Lys Lys Gly His Val Leu Phe Arg Pro Thr Val Ser Gln
225   230   235   240
Gln Gln Ser Cys Pro Thr Cys Ser Thr Ser Leu Leu Asn Gly His Phe
                245   250   255
Lys Val Thr Tyr Asp Val Ser Arg Asp Lys Ile Cys Asp Leu Leu Val
            260   265   270
Ala Asn Asn His Phe Ala His Phe Phe Ala Pro Gln Asn Leu Thr Asn
        275   280   285
Met Asn Lys Asn Val Val Phe Val Ile Asp Ile Ser Gly Ser Met Arg
    290   295   300
Gly Gln Lys Val Lys Gln Thr Lys Glu Ala Leu Leu Lys Ile Leu Gly
305   310   315   320
Asp Met Gln Pro Gly Asp Tyr Phe Asp Leu Val Leu Phe Gly Thr Arg
                325   330   335
Val Gln Ser Trp Lys Gly Ser Leu Val Gln Ala Ser Glu Ala Asn Leu
            340   345   350
Gln Ala Ala Gln Asp Phe Val Arg Gly Phe Ser Leu Asp Glu Ala Thr
        355   360   365
Asn Leu Asn Gly Gly Leu Leu Arg Gly Ile Glu Ile Leu Asn Gln Val
    370   375   380
Gln Glu Ser Leu Pro Glu Leu Ser Asn His Ala Ser Ile Leu Ile Met
385   390   395   400
Leu Thr Asp Gly Asp Pro Thr Glu Gly Val Thr Asp Arg Ser Gln Ile
                405   410   415
Leu Lys Asn Val Arg Asn Ala Ile Arg Gly Arg Phe Pro Leu Tyr Asn
            420   425   430
Leu Gly Phe Gly His Asn Val Asp Phe Asn Phe Leu Glu Val Met Ser
        435   440   445
Met Glu Asn Asn Gly Arg Ala Gln Arg Ile Tyr Glu Asp His Asp Ala

```
    450                 455                 460
Thr Gln Gln Leu Gln Gly Phe Tyr Ser Gln Val Ala Lys Pro Leu Leu
465                 470                 475                 480
Val Asp Val Asp Leu Gln Tyr Pro Gln Asp Ala Val Leu Ala Leu Thr
                485                 490                 495
Gln Asn His His Lys Gln Tyr Tyr Glu Gly Ser Glu Ile Val Val Ala
            500                 505                 510
Gly Arg Ile Ala Asp Asn Lys Gln Ser Ser Phe Lys Ala Asp Val Gln
        515                 520                 525
Ala His Gly Glu Gly Gln Glu Phe Ser Ile Thr Cys Leu Val Asp Glu
    530                 535                 540
Glu Glu Met Lys Lys Leu Leu Arg Glu Arg Gly His Met Leu Glu Asn
545                 550                 555                 560
His Val Glu Arg Leu Trp Ala Tyr Leu Thr Ile Gln Glu Leu Leu Ala
                565                 570                 575
Lys Arg Met Lys Val Asp Arg Glu Glu Arg Ala Asn Leu Ser Ser Gln
            580                 585                 590
Ala Leu Gln Met Ser Leu Asp Tyr Gly Phe Val Thr Pro Leu Thr Ser
        595                 600                 605
Met Ser Ile Arg Gly Met Ala Asp Gln Asp Gly Leu Lys Pro Thr Ile
    610                 615                 620
Asp Lys Pro Ser Glu Asp Ser Pro Pro Leu Glu Met Leu Gly Pro Arg
625                 630                 635                 640
Arg Thr Phe Val Leu Ser Ala Leu Gln Pro Ser Pro Thr His Ser Ser
                645                 650                 655
Ser Asn Thr Gln Arg Leu Pro Asp Arg Val Thr Gly Val Asp Thr Asp
            660                 665                 670
Pro His Phe Ile Ile His Val Pro Gln Lys Glu Asp Thr Leu Cys Phe
        675                 680                 685
Asn Ile Asn Glu Glu Pro Gly Val Ile Leu Ser Leu Val Gln Asp Pro
    690                 695                 700
Asn Thr Gly Phe Ser Val Asn Gly Gln Leu Ile Gly Asn Lys Ala Arg
705                 710                 715                 720
Ser Pro Gly Gln His Asp Gly Thr Tyr Phe Gly Arg Leu Gly Ile Ala
                725                 730                 735
Asn Pro Ala Thr Asp Phe Gln Leu Glu Val Thr Pro Gln Asn Ile Thr
            740                 745                 750
Leu Asn Pro Gly Phe Gly Gly Pro Val Phe Ser Trp Arg Asp Gln Ala
        755                 760                 765
Val Leu Arg Gln Asp Gly Val Val Val Thr Ile Asn Lys Lys Arg Asn
    770                 775                 780
Leu Val Val Ser Val Asp Asp Gly Gly Thr Phe Glu Val Val Leu His
785                 790                 795                 800
Arg Val Trp Lys Gly Ser Ser Val His Gln Asp Phe Leu Gly Phe Tyr
                805                 810                 815
Val Leu Asp Ser His Arg Met Ser Ala Arg Thr His Gly Leu Leu Gly
            820                 825                 830
Gln Phe Phe His Pro Ile Gly Phe Glu Val Ser Asp Ile His Pro Gly
        835                 840                 845
Ser Asp Pro Thr Lys Pro Asp Ala Thr Met Val Val Arg Asn Arg Arg
    850                 855                 860
Leu Thr Val Thr Arg Gly Leu Gln Lys Asp Tyr Ser Lys Asp Pro Trp
865                 870                 875                 880
His Gly Ala Glu Val Ser Cys Trp Phe Ile His Asn Asn Gly Ala Gly
                885                 890                 895
Leu Ile Asp Gly Ala Tyr Thr Asp Tyr Ile Val Pro Asp Ile Phe
            900                 905                 910
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<210> 244
<211> 946
<212> PRT
<213> Homo sapiens

<220>
<223> Inter alpha trypsin inhibitor heavy chain 2
P19823

<400> 244
Met Lys Arg Leu Thr Cys Phe Phe Ile Cys Phe Phe Leu Ser Glu Val
 1   5   10   15
Ser Gly Phe Glu Ile Pro Ile Asn Gly Leu Ser Glu Phe Val Asp Tyr
            20   25   30
Glu Asp Leu Val Glu Leu Ala Pro Gly Lys Phe Gln Leu Val Ala Glu
        35   40   45
Asn Arg Arg Tyr Gln Arg Ser Leu Pro Gly Glu Ser Glu Glu Met Met
    50   55   60
Glu Glu Val Asp Gln Val Thr Leu Tyr Ser Tyr Lys Val Gln Ser Thr
65   70   75   80
Ile Thr Ser Arg Met Ala Thr Thr Met Ile Gln Ser Lys Val Val Asn
                85   90   95
Asn Ser Pro Gln Pro Gln Asn Val Val Phe Asp Val Gln Ile Pro Lys
            100   105   110
Gly Ala Phe Ile Ser Asn Phe Ser Met Thr Val Asp Gly Lys Thr Phe
        115   120   125
Arg Ser Ser Ile Lys Glu Lys Thr Val Gly Arg Ala Leu Tyr Ala Gln
    130   135   140
Ala Arg Ala Lys Gly Lys Thr Ala Gly Leu Val Arg Ser Ser Ala Leu
145   150   155   160
Asp Met Glu Asn Phe Arg Thr Glu Val Asn Val Leu Pro Gly Ala Lys
                165   170   175
Val Gln Phe Glu Leu His Tyr Gln Glu Val Lys Trp Arg Lys Leu Gly
            180   185   190
Ser Tyr Glu His Arg Ile Tyr Leu Gln Pro Gly Arg Leu Ala Lys His
        195   200   205
Leu Glu Val Asp Val Trp Val Ile Glu Pro Gln Gly Leu Arg Phe Leu
    210   215   220
His Val Pro Asp Thr Phe Glu Gly His Phe Asp Gly Val Pro Val Ile
225   230   235   240
Ser Lys Gly Gln Gln Lys Ala His Val Ser Phe Lys Pro Thr Val Ala
                245   250   255
Gln Gln Arg Ile Cys Pro Asn Cys Arg Glu Thr Ala Val Asp Gly Glu
            260   265   270
Leu Val Val Leu Tyr Asp Val Lys Arg Glu Glu Lys Ala Gly Glu Leu
        275   280   285
Glu Val Phe Asn Gly Tyr Phe Val His Phe Phe Ala Pro Asp Asn Leu
    290   295   300
Asp Pro Ile Pro Lys Asn Ile Leu Phe Val Ile Asp Val Ser Gly Ser
305   310   315   320
Met Trp Gly Val Lys Met Lys Gln Thr Val Glu Ala Met Lys Thr Ile
                325   330   335
Leu Asp Asp Leu Arg Ala Glu Asp His Phe Ser Val Ile Asp Phe Asn
            340   345   350
Gln Asn Ile Arg Thr Trp Arg Asn Asp Leu Ile Ser Ala Thr Lys Thr
        355   360   365

```
Gln Val Ala Asp Ala Lys Arg Tyr Ile Glu Lys Ile Gln Pro Ser Gly
    370                 375                 380
Gly Thr Asn Ile Asn Glu Ala Leu Leu Arg Ala Ile Phe Ile Leu Asn
385                 390                 395                 400
Glu Ala Asn Asn Leu Gly Leu Leu Asp Pro Asn Ser Val Ser Leu Ile
                405                 410                 415
Ile Leu Val Ser Asp Gly Asp Pro Thr Val Gly Glu Leu Lys Leu Ser
            420                 425                 430
Lys Ile Gln Lys Asn Val Lys Glu Asn Ile Gln Asp Asn Ile Ser Leu
        435                 440                 445
Phe Ser Leu Gly Met Gly Phe Asp Val Asp Tyr Asp Phe Leu Lys Arg
    450                 455                 460
Leu Ser Asn Glu Asn His Gly Ile Ala Gln Arg Ile Tyr Gly Asn Gln
465                 470                 475                 480
Asp Thr Ser Ser Gln Leu Lys Lys Phe Tyr Asn Gln Val Ser Thr Pro
                485                 490                 495
Leu Leu Arg Asn Val Gln Phe Asn Tyr Pro His Thr Ser Val Thr Asp
            500                 505                 510
Val Thr Gln Asn Asn Phe His Asn Tyr Phe Gly Gly Ser Glu Ile Val
        515                 520                 525
Val Ala Gly Lys Phe Asp Pro Ala Lys Leu Asp Gln Ile Glu Ser Val
    530                 535                 540
Ile Thr Ala Thr Ser Ala Asn Thr Gln Leu Val Leu Glu Thr Leu Ala
545                 550                 555                 560
Gln Met Asp Asp Leu Gln Asp Phe Leu Ser Lys Asp Lys His Ala Asp
                565                 570                 575
Pro Asp Phe Thr Arg Lys Leu Trp Ala Tyr Leu Thr Ile Asn Gln Leu
            580                 585                 590
Leu Ala Glu Arg Ser Leu Ala Pro Thr Ala Ala Ala Lys Arg Arg Ile
        595                 600                 605
Thr Arg Ser Ile Leu Gln Met Ser Leu Asp His His Ile Val Thr Pro
    610                 615                 620
Leu Thr Ser Leu Val Ile Glu Asn Glu Ala Gly Asp Glu Arg Met Leu
625                 630                 635                 640
Ala Asp Ala Pro Pro Gln Asp Pro Ser Cys Cys Ser Gly Ala Leu Tyr
                645                 650                 655
Tyr Gly Ser Lys Val Val Pro Asp Ser Thr Pro Ser Trp Ala Asn Pro
            660                 665                 670
Ser Pro Thr Pro Val Ile Ser Met Leu Ala Gln Gly Ser Gln Val Leu
        675                 680                 685
Glu Ser Thr Pro Pro Pro His Val Met Arg Val Glu Asn Asp Pro His
    690                 695                 700
Phe Ile Ile Tyr Leu Pro Lys Ser Gln Lys Asn Ile Cys Phe Asn Ile
705                 710                 715                 720
Asp Ser Glu Pro Gly Lys Ile Leu Asn Leu Val Ser Asp Pro Glu Ser
                725                 730                 735
Gly Ile Val Val Asn Gly Gln Leu Val Gly Ala Lys Lys Pro Asn Asn
            740                 745                 750
Gly Lys Leu Ser Thr Tyr Phe Gly Lys Leu Gly Phe Tyr Phe Gln Ser
        755                 760                 765
Glu Asp Ile Lys Ile Glu Ile Ser Thr Glu Thr Ile Thr Leu Ser His
    770                 775                 780
Gly Ser Ser Thr Phe Ser Leu Ser Trp Ser Asp Thr Ala Gln Val Thr
785                 790                 795                 800
Asn Gln Arg Val Gln Ile Ser Val Lys Lys Glu Lys Val Val Thr Ile
                805                 810                 815
Thr Leu Asp Lys Glu Met Ser Phe Ser Val Leu Leu His Arg Val Trp
            820                 825                 830
```

Lys Lys His Pro Val Asn Val Asp Phe Leu Gly Ile Tyr Ile Pro Pro
        835   840   845
Thr Asn Lys Phe Ser Pro Lys Ala His Gly Leu Ile Gly Gln Phe Met
    850   855   860
Gln Glu Pro Lys Ile His Ile Phe Asn Glu Arg Pro Gly Lys Asp Pro
865   870   875   880
Glu Lys Pro Glu Ala Ser Met Glu Val Lys Gly Gln Lys Leu Ile Ile
                885   890   895
Thr Arg Gly Leu Gln Lys Asp Tyr Arg Thr Asp Leu Val Phe Gly Thr
            900   905   910
Asp Val Thr Cys Trp Phe Val His Asn Ser Gly Lys Gly Phe Ile Asp
        915   920   925
Gly His Tyr Lys Asp Tyr Phe Val Pro Gln Leu Tyr Ser Phe Leu Lys
    930   935   940
Arg Pro
945

<210> 245
<211> 890
<212> PRT
<213> Homo sapiens

<220>
<223> Inter alpha trypsin inhibitor heavy chain 3
      Q06033

<400> 245
Met Ala Phe Ala Trp Trp Pro Cys Leu Ile Leu Ala Leu Leu Ser Ser
 1   5   10   15
Leu Ala Ala Ser Gly Phe Pro Arg Ser Pro Phe Arg Leu Leu Gly Lys
            20   25   30
Arg Ser Leu Pro Glu Gly Val Ala Asn Gly Ile Glu Val Tyr Ser Thr
        35   40   45
Lys Ile Asn Ser Lys Val Thr Ser Arg Phe Ala His Asn Val Val Thr
    50   55   60
Met Arg Ala Val Asn Arg Ala Asp Thr Ala Lys Glu Val Ser Phe Asp
65   70   75   80
Val Glu Leu Pro Lys Thr Ala Phe Ile Thr Asn Phe Thr Leu Thr Ile
                85   90   95
Asp Gly Val Thr Tyr Pro Gly Asn Val Lys Glu Lys Glu Val Ala Lys
            100   105   110
Lys Gln Tyr Glu Lys Ala Val Ser Gln Gly Lys Thr Ala Gly Leu Val
        115   120   125
Lys Ala Ser Gly Arg Lys Leu Glu Lys Phe Thr Val Ser Val Asn Val
    130   135   140
Ala Ala Gly Ser Lys Val Thr Phe Glu Leu Thr Tyr Glu Glu Leu Leu
145   150   155   160
Lys Arg His Lys Gly Lys Tyr Glu Met Tyr Leu Lys Val Gln Pro Lys
                165   170   175
Gln Leu Val Lys His Phe Glu Ile Glu Val Asp Ile Phe Glu Pro Gln
            180   185   190
Gly Ile Ser Met Leu Asp Ala Glu Ala Ser Phe Ile Thr Asn Asp Leu
        195   200   205
Leu Gly Ser Ala Leu Thr Lys Ser Phe Ser Gly Lys Lys Gly His Val
    210   215   220
Ser Phe Lys Pro Ser Leu Asp Gln Gln Arg Ser Cys Pro Thr Cys Thr

```
225                 230                 235                 240
Asp Ser Leu Leu Asn Gly Asp Phe Thr Ile Thr Tyr Asp Val Asn Arg
                245                 250                 255
Glu Ser Pro Gly Asn Val Gln Ile Val Asn Gly Tyr Phe Val His Phe
            260                 265                 270
Phe Ala Pro Gln Gly Leu Pro Val Val Pro Lys Asn Val Ala Phe Val
        275                 280                 285
Ile Asp Ile Ser Gly Ser Met Ala Gly Arg Lys Leu Glu Gln Thr Lys
    290                 295                 300
Glu Ala Leu Leu Arg Ile Leu Glu Asp Met Gln Glu Glu Asp Tyr Leu
305                 310                 315                 320
Asn Phe Ile Leu Phe Ser Gly Asp Val Ser Thr Trp Lys Glu His Leu
                325                 330                 335
Val Gln Ala Thr Pro Glu Asn Leu Gln Glu Ala Arg Thr Phe Val Lys
            340                 345                 350
Ser Met Glu Asp Lys Gly Met Thr Asn Ile Asn Asp Gly Leu Leu Arg
        355                 360                 365
Gly Ile Ser Met Leu Asn Lys Ala Arg Glu Glu His Arg Ile Pro Glu
    370                 375                 380
Arg Ser Thr Ser Ile Val Ile Met Leu Thr Asp Gly Asp Ala Asn Val
385                 390                 395                 400
Gly Glu Ser Arg Pro Glu Lys Ile Gln Glu Asn Val Arg Asn Ala Ile
                405                 410                 415
Gly Gly Lys Phe Pro Leu Tyr Asn Leu Gly Phe Gly Asn Asn Leu Asn
            420                 425                 430
Tyr Asn Phe Leu Glu Asn Met Ala Leu Glu Asn His Gly Phe Ala Arg
        435                 440                 445
Arg Ile Tyr Glu Asp Ser Asp Ala Asp Leu Gln Leu Gln Gly Phe Tyr
    450                 455                 460
Glu Glu Val Ala Asn Pro Leu Leu Thr Gly Val Glu Met Glu Tyr Pro
465                 470                 475                 480
Glu Asn Ala Ile Leu Asp Leu Thr Gln Asn Thr Tyr Gln His Phe Tyr
                485                 490                 495
Asp Gly Ser Glu Ile Val Val Ala Gly Arg Leu Val Asp Glu Asp Met
            500                 505                 510
Asn Ser Phe Lys Ala Asp Val Lys Gly His Gly Ala Thr Asn Asp Leu
        515                 520                 525
Thr Phe Thr Glu Glu Val Asp Met Lys Glu Met Glu Lys Ala Leu Gln
    530                 535                 540
Glu Arg Asp Tyr Ile Phe Gly Asn Tyr Ile Glu Arg Leu Trp Ala Tyr
545                 550                 555                 560
Leu Thr Ile Glu Gln Leu Leu Glu Lys Arg Lys Asn Ala His Gly Glu
                565                 570                 575
Glu Lys Glu Asn Leu Thr Ala Arg Ala Leu Asp Leu Ser Leu Lys Tyr
            580                 585                 590
His Phe Val Thr Pro Leu Thr Ser Met Val Val Thr Lys Pro Glu Asp
        595                 600                 605
Asn Glu Asp Glu Arg Ala Ile Ala Asp Lys Pro Gly Glu Asp Ala Glu
    610                 615                 620
Ala Thr Pro Val Ser Pro Ala Met Ser Tyr Leu Thr Ser Tyr Gln Pro
625                 630                 635                 640
Pro Gln Asn Pro Tyr Tyr Tyr Val Asp Gly Asp Pro His Phe Ile Ile
                645                 650                 655
Gln Ile Pro Glu Lys Asp Asp Ala Leu Cys Phe Asn Ile Asp Glu Ala
            660                 665                 670
Pro Gly Thr Val Leu Arg Leu Ile Gln Asp Ala Val Thr Gly Leu Thr
        675                 680                 685
Val Asn Gly Gln Ile Thr Gly Asp Lys Arg Gly Ser Pro Asp Ser Lys
```

```
    690                 695                 700
Thr Arg Lys Thr Tyr Phe Gly Lys Leu Gly Ile Ala Asn Ala Gln Met
705                 710                 715                 720
Asp Phe Gln Val Glu Val Thr Thr Glu Lys Ile Thr Leu Trp Asn Arg
                725                 730                 735
Ala Val Pro Ser Thr Phe Ser Trp Leu Asp Thr Val Thr Val Thr Gln
            740                 745                 750
Asp Gly Leu Ser Met Met Ile Asn Arg Lys Asn Met Val Val Ser Phe
        755                 760                 765
Gly Asp Gly Val Thr Phe Val Val Val Leu His Gln Val Trp Lys Lys
    770                 775                 780
His Pro Val His Arg Asp Phe Leu Gly Phe Tyr Val Val Asp Ser His
785                 790                 795                 800
Arg Met Ser Ala Gln Thr His Gly Leu Leu Gly Gln Phe Phe Gln Pro
                805                 810                 815
Phe Asp Phe Lys Val Ser Asp Ile Arg Pro Gly Ser Asp Pro Thr Lys
            820                 825                 830
Pro Asp Ala Thr Leu Val Val Lys Asn His Gln Leu Ile Val Thr Arg
        835                 840                 845
Gly Ser Gln Lys Asp Tyr Arg Lys Asp Ala Ser Ile Gly Thr Lys Val
    850                 855                 860
Val Cys Trp Phe Val His Asn Asn Gly Glu Gly Leu Ile Asp Gly Val
865                 870                 875                 880
His Thr Asp Tyr Ile Val Pro Asn Leu Phe
                885                 890
```

<210> 246
<211> 797
<212> PRT
<213> Homo sapiens

<220>
<223> human SPACR protein Q17R60

<400> 246

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Met Tyr Leu Glu Thr Arg Arg Ala Ile Phe Val Phe Trp Ile Phe Leu
 1               5                  10                  15
Gln Val Gln Gly Thr Lys Asp Ile Ser Ile Asn Ile Tyr His Ser Glu
            20                  25                  30
Thr Lys Asp Ile Asp Asn Pro Pro Arg Asn Glu Thr Thr Glu Ser Thr
        35                  40                  45
Glu Lys Met Tyr Lys Met Ser Thr Met Arg Arg Ile Phe Asp Leu Ala
    50                  55                  60
Lys His Arg Thr Lys Arg Ser Ala Phe Phe Pro Thr Gly Val Lys Val
65                  70                  75                  80
Cys Pro Gln Glu Ser Met Lys Gln Ile Leu Asp Ser Leu Gln Ala Tyr
                85                  90                  95
Tyr Arg Leu Arg Val Cys Gln Glu Ala Val Trp Glu Ala Tyr Arg Ile
            100                 105                 110
Phe Leu Asp Arg Ile Pro Asp Thr Gly Glu Tyr Gln Asp Trp Val Ser
        115                 120                 125
Ile Cys Gln Gln Glu Thr Phe Cys Leu Phe Asp Ile Gly Lys Asn Phe
    130                 135                 140
Ser Asn Ser Gln Glu His Leu Asp Leu Leu Gln Gln Arg Ile Lys Gln
145                 150                 155                 160
Arg Ser Phe Pro Asp Arg Lys Asp Glu Ile Ser Ala Glu Lys Thr Leu
```

```
                165                 170                 175
Gly Glu Pro Gly Glu Thr Ile Val Ile Ser Thr Asp Val Ala Asn Val
            180                 185                 190
Ser Leu Gly Pro Phe Pro Leu Thr Pro Asp Asp Thr Leu Leu Asn Glu
        195                 200                 205
Ile Leu Asp Asn Thr Leu Asn Asp Thr Lys Met Pro Thr Thr Glu Arg
    210                 215                 220
Glu Thr Glu Phe Ala Val Leu Glu Glu Gln Arg Val Glu Leu Ser Val
225                 230                 235                 240
Ser Leu Val Asn Gln Lys Phe Lys Ala Glu Leu Ala Asp Ser Gln Ser
                245                 250                 255
Pro Tyr Tyr Gln Glu Leu Ala Gly Lys Ser Gln Leu Gln Met Gln Lys
            260                 265                 270
Ile Phe Lys Lys Leu Pro Gly Phe Lys Lys Ile His Val Leu Gly Phe
        275                 280                 285
Arg Pro Lys Lys Glu Lys Asp Gly Ser Ser Ser Thr Glu Met Gln Leu
    290                 295                 300
Thr Ala Ile Phe Lys Arg His Ser Ala Glu Ala Lys Ser Pro Ala Ser
305                 310                 315                 320
Asp Leu Leu Ser Phe Asp Ser Asn Lys Ile Glu Ser Glu Glu Val Tyr
                325                 330                 335
His Gly Thr Met Glu Glu Asp Lys Gln Pro Glu Ile Tyr Leu Thr Ala
            340                 345                 350
Thr Asp Leu Lys Arg Leu Ile Ser Lys Ala Leu Glu Glu Glu Gln Ser
        355                 360                 365
Leu Asp Val Gly Thr Ile Gln Phe Thr Asp Glu Ile Ala Gly Ser Leu
    370                 375                 380
Pro Ala Phe Gly Pro Asp Thr Gln Ser Glu Leu Pro Thr Ser Phe Ala
385                 390                 395                 400
Val Ile Thr Glu Asp Ala Thr Leu Ser Pro Glu Leu Pro Pro Val Glu
                405                 410                 415
Pro Gln Leu Glu Thr Val Asp Gly Ala Glu His Gly Leu Pro Asp Thr
            420                 425                 430
Ser Trp Ser Pro Pro Ala Met Ala Ser Thr Ser Leu Ser Glu Ala Pro
        435                 440                 445
Pro Phe Phe Met Ala Ser Ser Ile Phe Ser Leu Thr Asp Gln Gly Thr
    450                 455                 460
Thr Asp Thr Met Ala Thr Asp Gln Thr Met Leu Val Pro Gly Leu Thr
465                 470                 475                 480
Ile Pro Thr Ser Asp Tyr Ser Ala Ile Ser Gln Leu Ala Leu Gly Ile
                485                 490                 495
Ser His Pro Pro Ala Ser Ser Asp Asp Ser Arg Ser Ser Ala Gly Gly
            500                 505                 510
Glu Asp Met Val Arg His Leu Asp Glu Met Asp Leu Ser Asp Thr Pro
        515                 520                 525
Ala Pro Ser Glu Val Pro Glu Leu Ser Glu Tyr Val Ser Val Pro Asp
    530                 535                 540
His Phe Leu Glu Asp Thr Thr Pro Val Ser Ala Leu Gln Tyr Ile Thr
545                 550                 555                 560
Thr Ser Ser Met Thr Ile Ala Pro Lys Gly Arg Glu Leu Val Val Phe
                565                 570                 575
Phe Ser Leu Arg Val Ala Asn Met Ala Phe Ser Asn Asp Leu Phe Asn
            580                 585                 590
Lys Ser Ser Leu Glu Tyr Arg Ala Leu Glu Gln Gln Phe Thr Gln Leu
        595                 600                 605
Leu Val Pro Tyr Leu Arg Ser Asn Leu Thr Gly Phe Lys Gln Leu Glu
    610                 615                 620
Ile Leu Asn Phe Arg Asn Gly Ser Val Ile Val Asn Ser Lys Met Lys
```

625 630 635 640
Phe Ala Lys Ser Val Pro Tyr Asn Leu Thr Lys Ala Val His Gly Val
645 650 655
Leu Glu Asp Phe Arg Ser Ala Ala Ala Gln Gln Leu His Leu Glu Ile
660 665 670
Asp Ser Tyr Ser Leu Asn Ile Glu Pro Ala Asp Gln Ala Asp Pro Cys
675 680 685
Lys Phe Leu Ala Cys Gly Glu Phe Ala Gln Cys Val Lys Asn Glu Arg
690 695 700
Thr Glu Glu Ala Glu Cys Arg Cys Lys Pro Gly Tyr Asp Ser Gln Gly
705 710 715 720
Ser Leu Asp Gly Leu Glu Pro Gly Leu Cys Gly Pro Gly Thr Lys Glu
725 730 735
Cys Glu Val Leu Gln Gly Lys Gly Ala Pro Cys Arg Leu Pro Asp His
740 745 750
Ser Glu Asn Gln Ala Tyr Lys Thr Ser Val Lys Lys Phe Gln Asn Gln
755 760 765
Gln Asn Asn Lys Val Ile Ser Lys Arg Asn Ser Glu Leu Leu Thr Val
770 775 780
Glu Tyr Glu Glu Phe Asn His Gln Asp Trp Glu Gly Asn
785 790 795

<210> 247
<211> 1241
<212> PRT
<213> Homo sapiens

<220>
<223> human SPACRCAN protein Q9BZV3

<400> 247
Met Ile Met Phe Pro Leu Phe Gly Lys Ile Ser Leu Gly Ile Leu Ile
1 5 10 15
Phe Val Leu Ile Glu Gly Asp Phe Pro Ser Leu Thr Ala Gln Thr Tyr
20 25 30
Leu Ser Ile Glu Glu Ile Gln Glu Pro Lys Ser Ala Val Ser Phe Leu
35 40 45
Leu Pro Glu Glu Ser Thr Asp Leu Ser Leu Ala Thr Lys Lys Lys Gln
50 55 60
Pro Leu Asp Arg Arg Glu Thr Glu Arg Gln Trp Leu Ile Arg Arg Arg
65 70 75 80
Arg Ser Ile Leu Phe Pro Asn Gly Val Lys Ile Cys Pro Asp Glu Ser
85 90 95
Val Ala Glu Ala Val Ala Asn His Val Lys Tyr Phe Lys Val Arg Val
100 105 110
Cys Gln Glu Ala Val Trp Glu Ala Phe Arg Thr Phe Trp Asp Arg Leu
115 120 125
Pro Gly Arg Glu Glu Tyr His Tyr Trp Met Asn Leu Cys Glu Asp Gly
130 135 140
Val Thr Ser Ile Phe Glu Met Gly Thr Asn Phe Ser Glu Ser Val Glu
145 150 155 160
His Arg Ser Leu Ile Met Lys Lys Leu Thr Tyr Ala Lys Glu Thr Val
165 170 175
Ser Ser Ser Glu Leu Ser Ser Pro Val Pro Val Gly Asp Thr Ser Thr
180 185 190
Leu Gly Asp Thr Thr Leu Ser Val Pro His Pro Glu Val Asp Ala Tyr
195 200 205

```
Glu Gly Ala Ser Glu Ser Ser Leu Glu Arg Pro Glu Glu Ser Ile Ser
    210                 215                 220
Asn Glu Ile Glu Asn Val Ile Glu Glu Ala Thr Lys Pro Ala Gly Glu
225                 230                 235                 240
Gln Ile Ala Glu Phe Ser Ile His Leu Leu Gly Lys Gln Tyr Arg Glu
                245                 250                 255
Glu Leu Gln Asp Ser Ser Ser Phe His His Gln His Leu Glu Glu Glu
            260                 265                 270
Phe Ile Ser Glu Val Glu Asn Ala Phe Thr Gly Leu Pro Gly Tyr Lys
        275                 280                 285
Glu Ile Arg Val Leu Glu Phe Arg Ser Pro Lys Glu Asn Asp Ser Gly
    290                 295                 300
Val Asp Val Tyr Tyr Ala Val Thr Phe Asn Gly Glu Ala Ile Ser Asn
305                 310                 315                 320
Thr Thr Trp Asp Leu Ile Ser Leu His Ser Asn Lys Val Glu Asn His
                325                 330                 335
Gly Leu Val Glu Leu Asp Asp Lys Pro Thr Val Val Tyr Thr Ile Ser
            340                 345                 350
Asn Phe Arg Asp Tyr Ile Ala Glu Thr Leu Gln Gln Asn Phe Leu Leu
        355                 360                 365
Gly Asn Ser Ser Leu Asn Pro Asp Pro Asp Ser Leu Gln Leu Ile Asn
    370                 375                 380
Val Arg Gly Val Leu Arg His Gln Thr Glu Asp Leu Val Trp Asn Thr
385                 390                 395                 400
Gln Ser Ser Ser Leu Gln Ala Thr Pro Ser Ser Ile Leu Asp Asn Thr
                405                 410                 415
Phe Gln Ala Ala Trp Pro Ser Ala Asp Glu Ser Ile Thr Ser Ser Ile
            420                 425                 430
Pro Pro Leu Asp Phe Ser Ser Gly Pro Pro Ser Ala Thr Gly Arg Glu
        435                 440                 445
Leu Trp Ser Glu Ser Pro Leu Gly Asp Leu Val Ser Thr His Lys Leu
    450                 455                 460
Ala Phe Pro Ser Lys Met Gly Leu Ser Ser Ser Pro Glu Val Leu Glu
465                 470                 475                 480
Val Ser Ser Leu Thr Leu His Ser Val Thr Pro Ala Val Leu Gln Thr
                485                 490                 495
Gly Leu Pro Val Ala Ser Glu Glu Arg Thr Ser Gly Ser His Leu Val
            500                 505                 510
Glu Asp Gly Leu Ala Asn Val Glu Glu Ser Glu Asp Phe Leu Ser Ile
        515                 520                 525
Asp Ser Leu Pro Ser Ser Ser Phe Thr Gln Pro Val Pro Lys Glu Thr
    530                 535                 540
Ile Pro Ser Met Glu Asp Ser Asp Val Ser Leu Thr Ser Ser Pro Tyr
545                 550                 555                 560
Leu Thr Ser Ser Ile Pro Phe Gly Leu Asp Ser Leu Thr Ser Lys Val
                565                 570                 575
Lys Asp Gln Leu Lys Val Ser Pro Phe Leu Pro Asp Ala Ser Met Glu
            580                 585                 590
Lys Glu Leu Ile Phe Asp Gly Gly Leu Gly Ser Gly Ser Gly Gln Lys
        595                 600                 605
Val Asp Leu Ile Thr Trp Pro Trp Ser Glu Thr Ser Ser Glu Lys Ser
    610                 615                 620
Ala Glu Pro Leu Ser Lys Pro Trp Leu Glu Asp Asp Asp Ser Leu Leu
625                 630                 635                 640
Pro Ala Glu Ile Glu Asp Lys Lys Leu Val Leu Val Asp Lys Met Asp
                645                 650                 655
Ser Thr Asp Gln Ile Ser Lys His Ser Lys Tyr Glu His Asp Asp Arg
            660                 665                 670
```

```
Ser Thr His Phe Pro Glu Glu Glu Pro Leu Ser Gly Pro Ala Val Pro
        675                 680                 685
Ile Phe Ala Asp Thr Ala Ala Glu Ser Ala Ser Leu Thr Leu Pro Lys
    690                 695                 700
His Ile Ser Glu Val Pro Gly Val Asp Asp Tyr Ser Val Thr Lys Ala
705                 710                 715                 720
Pro Leu Ile Leu Thr Ser Val Ala Ile Ser Ala Ser Thr Asp Lys Ser
                725                 730                 735
Asp Gln Ala Asp Ala Ile Leu Arg Glu Asp Met Glu Gln Ile Thr Glu
            740                 745                 750
Ser Ser Asn Tyr Glu Trp Phe Asp Ser Glu Val Ser Met Val Lys Pro
        755                 760                 765
Asp Met Gln Thr Leu Trp Thr Ile Leu Pro Glu Ser Glu Arg Val Trp
    770                 775                 780
Thr Arg Thr Ser Ser Leu Glu Lys Leu Ser Arg Asp Ile Leu Ala Ser
785                 790                 795                 800
Thr Pro Gln Ser Ala Asp Arg Leu Trp Leu Ser Val Thr Gln Ser Thr
                805                 810                 815
Lys Leu Pro Pro Thr Thr Ile Ser Thr Leu Leu Glu Asp Glu Val Ile
            820                 825                 830
Met Gly Val Gln Asp Ile Ser Leu Glu Leu Asp Arg Ile Gly Thr Asp
        835                 840                 845
Tyr Tyr Gln Pro Glu Gln Val Gln Glu Gln Asn Gly Lys Val Gly Ser
    850                 855                 860
Tyr Val Glu Met Ser Thr Ser Val His Ser Thr Glu Met Val Ser Val
865                 870                 875                 880
Ala Trp Pro Thr Glu Gly Gly Asp Asp Leu Ser Tyr Thr Gln Thr Ser
                885                 890                 895
Gly Ala Leu Val Val Phe Phe Ser Leu Arg Val Thr Asn Met Met Phe
            900                 905                 910
Ser Glu Asp Leu Phe Asn Lys Asn Ser Leu Glu Tyr Lys Ala Leu Glu
        915                 920                 925
Gln Arg Phe Leu Glu Leu Leu Val Pro Tyr Leu Gln Ser Asn Leu Thr
    930                 935                 940
Gly Phe Gln Asn Leu Glu Ile Leu Asn Phe Arg Asn Gly Ser Ile Val
945                 950                 955                 960
Val Asn Ser Arg Met Lys Phe Ala Asn Ser Val Pro Pro Asn Val Asn
                965                 970                 975
Asn Ala Val Tyr Met Ile Leu Glu Asp Phe Cys Thr Thr Ala Tyr Asn
            980                 985                 990
Thr Met Asn Leu Ala Ile Asp Lys Tyr Ser Leu Asp Val Glu Ser Gly
        995                 1000                1005
Asp Glu Ala Asn Pro Cys Lys Phe Gln Ala Cys Asn Glu Phe Ser Glu
    1010                1015                1020
Cys Leu Val Asn Pro Trp Ser Gly Glu Ala Lys Cys Arg Cys Phe Pro
1025                1030                1035                1040
Gly Tyr Leu Ser Val Glu Glu Arg Pro Cys Gln Ser Leu Cys Asp Leu
                1045                1050                1055
Gln Pro Asp Phe Cys Leu Asn Asp Gly Lys Cys Asp Ile Met Pro Gly
            1060                1065                1070
His Gly Ala Ile Cys Arg Cys Arg Val Gly Glu Asn Trp Trp Tyr Arg
        1075                1080                1085
Gly Lys His Cys Glu Glu Phe Val Ser Glu Pro Val Ile Ile Gly Ile
    1090                1095                1100
Thr Ile Ala Ser Val Val Gly Leu Leu Val Ile Phe Ser Ala Ile Ile
1105                1110                1115                1120
Tyr Phe Phe Ile Arg Thr Leu Gln Ala His His Asp Arg Ser Glu Arg
                1125                1130                1135
```

```
Glu Ser Pro Phe Ser Gly Ser Ser Arg Gln Pro Asp Ser Leu Ser Ser
            1140                1145                1150
Ile Glu Asn Ala Val Lys Tyr Asn Pro Val Tyr Glu Ser His Arg Ala
        1155                1160                1165
Gly Cys Glu Lys Tyr Glu Gly Pro Tyr Pro Gln His Pro Phe Tyr Ser
    1170                1175                1180
Ser Ala Ser Gly Asp Val Ile Gly Gly Leu Ser Arg Glu Glu Ile Arg
1185                1190                1195                1200
Gln Met Tyr Glu Ser Ser Glu Leu Ser Arg Glu Glu Ile Gln Glu Arg
                1205                1210                1215
Met Arg Val Leu Glu Leu Tyr Ala Asn Asp Pro Glu Phe Ala Ala Phe
            1220                1225                1230
Val Arg Glu Gln Gln Val Glu Glu Val
        1235                1240


<210> 248
<211> 300
<212> PRT
<213> Homo sapiens

<220>
<223> human CD38 protein P28907


<400> 248
Met Ala Asn Cys Glu Phe Ser Pro Val Ser Gly Asp Lys Pro Cys Cys
 1                5                  10                  15
Arg Leu Ser Arg Arg Ala Gln Leu Cys Leu Gly Val Ser Ile Leu Val
            20                  25                  30
Leu Ile Leu Val Val Val Leu Ala Val Val Val Pro Arg Trp Arg Gln
        35                  40                  45
Gln Trp Ser Gly Pro Gly Thr Thr Lys Arg Phe Pro Glu Thr Val Leu
    50                  55                  60
Ala Arg Cys Val Lys Tyr Thr Glu Ile His Pro Glu Met Arg His Val
65                  70                  75                  80
Asp Cys Gln Ser Val Trp Asp Ala Phe Lys Gly Ala Phe Ile Ser Lys
                85                  90                  95
His Pro Cys Asn Ile Thr Glu Glu Asp Tyr Gln Pro Leu Met Lys Leu
            100                 105                 110
Gly Thr Gln Thr Val Pro Cys Asn Lys Ile Leu Leu Trp Ser Arg Ile
        115                 120                 125
Lys Asp Leu Ala His Gln Phe Thr Gln Val Gln Arg Asp Met Phe Thr
    130                 135                 140
Leu Glu Asp Thr Leu Leu Gly Tyr Leu Ala Asp Asp Leu Thr Trp Cys
145                 150                 155                 160
Gly Glu Phe Asn Thr Ser Lys Ile Asn Tyr Gln Ser Cys Pro Asp Trp
                165                 170                 175
Arg Lys Asp Cys Ser Asn Asn Pro Val Ser Val Phe Trp Lys Thr Val
            180                 185                 190
Ser Arg Arg Phe Ala Glu Ala Ala Cys Asp Val Val His Val Met Leu
        195                 200                 205
Asn Gly Ser Arg Ser Lys Ile Phe Asp Lys Asn Ser Thr Phe Gly Ser
    210                 215                 220
Val Glu Val His Asn Leu Gln Pro Glu Lys Val Gln Thr Leu Glu Ala
225                 230                 235                 240
Trp Val Ile His Gly Gly Arg Glu Asp Ser Arg Asp Leu Cys Gln Asp
                245                 250                 255
```

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Pro Thr Ile Lys Glu Leu Glu Ser Ile Ile Ser Lys Arg Asn Ile Gln
            260                 265                 270
Phe Ser Cys Lys Asn Ile Tyr Arg Pro Asp Lys Phe Leu Gln Cys Val
        275                 280                 285
Lys Asn Pro Glu Asp Ser Ser Cys Thr Ser Glu Ile
    290                 295                 300


<210> 249
<211> 413
<212> PRT
<213> Homo sapiens

<220>
<223> Intracellular hyaluronan-binding protein 4  Q5JVS0


<400> 249
Met Lys Gly Ala Leu Gly Ser Pro Val Ala Ala Ala Gly Ala Ala Met
 1               5                  10                  15
Gln Glu Ser Phe Gly Cys Val Val Ala Asn Arg Phe His Gln Leu Leu
            20                  25                  30
Asp Asp Glu Ser Asp Pro Phe Asp Ile Leu Arg Glu Ala Glu Arg Arg
        35                  40                  45
Arg Gln Gln Gln Leu Gln Arg Lys Arg Arg Asp Glu Ala Ala Ala Ala
    50                  55                  60
Ala Gly Ala Gly Pro Arg Gly Gly Arg Ser Pro Ala Gly Ala Ser Gly
65                  70                  75                  80
His Arg Ala Gly Ala Gly Gly Arg Arg Glu Ser Gln Lys Glu Arg Lys
                85                  90                  95
Ser Leu Pro Ala Pro Val Ala Gln Arg Pro Asp Ser Pro Gly Gly Gly
            100                 105                 110
Leu Gln Ala Pro Gly Gln Lys Arg Thr Pro Arg Arg Gly Glu Gln Gln
        115                 120                 125
Gly Trp Asn Asp Ser Arg Gly Pro Glu Gly Met Leu Glu Arg Ala Glu
    130                 135                 140
Arg Arg Ser Tyr Arg Glu Tyr Arg Pro Tyr Glu Thr Glu Arg Gln Ala
145                 150                 155                 160
Asp Phe Thr Ala Glu Lys Phe Pro Asp Glu Lys Pro Gly Asp Arg Phe
                165                 170                 175
Asp Arg Asp Arg Pro Leu Arg Gly Arg Gly Gly Pro Arg Gly Gly Met
            180                 185                 190
Arg Gly Arg Gly Arg Gly Gly Pro Gly Asn Arg Val Phe Asp Ala Phe
        195                 200                 205
Asp Gln Arg Gly Lys Arg Glu Phe Glu Arg Tyr Gly Gly Asn Asp Lys
    210                 215                 220
Ile Ala Val Arg Thr Glu Asp Asn Met Gly Gly Cys Gly Val Arg Thr
225                 230                 235                 240
Trp Gly Ser Gly Lys Asp Thr Ser Asp Val Glu Pro Thr Ala Pro Met
                245                 250                 255
Glu Glu Pro Thr Val Val Glu Glu Ser Gln Gly Thr Pro Glu Glu Glu
            260                 265                 270
Ser Pro Ala Lys Val Pro Glu Leu Glu Val Glu Glu Glu Thr Gln Val
        275                 280                 285
Gln Glu Met Thr Leu Asp Glu Trp Lys Asn Leu Gln Glu Gln Thr Arg
    290                 295                 300
Pro Lys Pro Glu Phe Asn Ile Arg Lys Pro Glu Ser Thr Val Pro Ser
305                 310                 315                 320
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Lys Ala Val Val Ile His Lys Ser Lys Tyr Arg Asp Asp Met Val Lys
                325                 330                 335
Asp Asp Tyr Glu Asp Asp Ser His Val Phe Arg Lys Pro Ala Asn Asp
            340                 345                 350
Ile Thr Ser Gln Leu Glu Ile Asn Phe Gly Asn Leu Pro Arg Pro Gly
        355                 360                 365
Arg Gly Ala Arg Gly Gly Thr Arg Gly Gly Arg Gly Arg Ile Arg Arg
    370                 375                 380
Ala Glu Asn Tyr Gly Pro Arg Ala Glu Val Val Met Gln Asp Val Ala
385                 390                 395                 400
Pro Asn Pro Asp Asp Pro Glu Asp Phe Pro Ala Leu Ser
                405                 410


<210> 250
<211> 378
<212> PRT
<213> Homo sapiens

<220>
<223> human CDC37 protein Q16543

<400> 250
Met Val Asp Tyr Ser Val Trp Asp His Ile Glu Val Ser Asp Asp Glu
 1               5                  10                  15
Asp Glu Thr His Pro Asn Ile Asp Thr Ala Ser Leu Phe Arg Trp Arg
            20                  25                  30
His Gln Ala Arg Val Glu Arg Met Glu Gln Phe Gln Lys Glu Lys Glu
        35                  40                  45
Glu Leu Asp Arg Gly Cys Arg Glu Cys Lys Arg Lys Val Ala Glu Cys
    50                  55                  60
Gln Arg Lys Leu Lys Glu Leu Glu Val Ala Glu Gly Gly Lys Ala Glu
65                  70                  75                  80
Leu Glu Arg Leu Gln Ala Glu Ala Gln Gln Leu Arg Lys Glu Glu Arg
                85                  90                  95
Ser Trp Glu Gln Lys Leu Glu Glu Met Arg Lys Lys Glu Lys Ser Met
            100                 105                 110
Pro Trp Asn Val Asp Thr Leu Ser Lys Asp Gly Phe Ser Lys Ser Met
        115                 120                 125
Val Asn Thr Lys Pro Glu Lys Thr Glu Glu Asp Ser Glu Glu Val Arg
    130                 135                 140
Glu Gln Lys His Lys Thr Phe Val Glu Lys Tyr Glu Lys Gln Ile Lys
145                 150                 155                 160
His Phe Gly Met Leu Arg Arg Trp Asp Asp Ser Gln Lys Tyr Leu Ser
                165                 170                 175
Asp Asn Val His Leu Val Cys Glu Glu Thr Ala Asn Tyr Leu Val Ile
            180                 185                 190
Trp Cys Ile Asp Leu Glu Val Glu Glu Lys Cys Ala Leu Met Glu Gln
        195                 200                 205
Val Ala His Gln Thr Ile Val Met Gln Phe Ile Leu Glu Leu Ala Lys
    210                 215                 220
Ser Leu Lys Val Asp Pro Arg Ala Cys Phe Arg Gln Phe Phe Thr Lys
225                 230                 235                 240
Ile Lys Thr Ala Asp Arg Gln Tyr Met Glu Gly Phe Asn Asp Glu Leu
                245                 250                 255
Glu Ala Phe Lys Glu Arg Val Arg Gly Arg Ala Lys Leu Arg Ile Glu
            260                 265                 270
Lys Ala Met Lys Glu Tyr Glu Glu Glu Glu Arg Lys Lys Arg Leu Gly
```

```
        275                 280                 285
Pro Gly Gly Leu Asp Pro Val Glu Val Tyr Glu Ser Leu Pro Glu Glu
    290                 295                 300
Leu Gln Lys Cys Phe Asp Val Lys Asp Val Gln Met Leu Gln Asp Ala
305                 310                 315                 320
Ile Ser Lys Met Asp Pro Thr Asp Ala Lys Tyr His Met Gln Arg Cys
                325                 330                 335
Ile Asp Ser Gly Leu Trp Val Pro Asn Ser Lys Ala Ser Glu Ala Lys
            340                 345                 350
Glu Gly Glu Glu Ala Gly Pro Gly Asp Pro Leu Leu Glu Ala Val Pro
        355                 360                 365
Lys Thr Gly Asp Glu Lys Asp Val Ser Val
    370                 375


<210> 251
<211> 560
<212> PRT
<213> Homo sapiens

<220>
<223> Hyaluronan-binding protein 2 PHBP  Q14520


<400> 251
Met Phe Ala Arg Met Ser Asp Leu His Val Leu Leu Leu Met Ala Leu
 1               5                  10                  15
Val Gly Lys Thr Ala Cys Gly Phe Ser Leu Met Ser Leu Leu Glu Ser
            20                  25                  30
Leu Asp Pro Asp Trp Thr Pro Asp Gln Tyr Asp Tyr Ser Tyr Glu Asp
        35                  40                  45
Tyr Asn Gln Glu Glu Asn Thr Ser Ser Thr Leu Thr His Ala Glu Asn
    50                  55                  60
Pro Asp Trp Tyr Tyr Thr Glu Asp Gln Ala Asp Pro Cys Gln Pro Asn
65                  70                  75                  80
Pro Cys Glu His Gly Gly Asp Cys Leu Val His Gly Ser Thr Phe Thr
                85                  90                  95
Cys Ser Cys Leu Ala Pro Phe Ser Gly Asn Lys Cys Gln Lys Val Gln
            100                 105                 110
Asn Thr Cys Lys Asp Asn Pro Cys Gly Arg Gly Gln Cys Leu Ile Thr
        115                 120                 125
Gln Ser Pro Pro Tyr Tyr Arg Cys Val Cys Lys His Pro Tyr Thr Gly
    130                 135                 140
Pro Ser Cys Ser Gln Val Val Pro Val Cys Arg Pro Asn Pro Cys Gln
145                 150                 155                 160
Asn Gly Ala Thr Cys Ser Arg His Lys Arg Arg Ser Lys Phe Thr Cys
                165                 170                 175
Ala Cys Pro Asp Gln Phe Lys Gly Lys Phe Cys Glu Ile Gly Ser Asp
            180                 185                 190
Asp Cys Tyr Val Gly Asp Gly Tyr Ser Tyr Arg Gly Lys Met Asn Arg
        195                 200                 205
Thr Val Asn Gln His Ala Cys Leu Tyr Trp Asn Ser His Leu Leu Leu
    210                 215                 220
Gln Glu Asn Tyr Asn Met Phe Met Glu Asp Ala Glu Thr His Gly Ile
225                 230                 235                 240
Gly Glu His Asn Phe Cys Arg Asn Pro Asp Ala Asp Glu Lys Pro Trp
                245                 250                 255
Cys Phe Ile Lys Val Thr Asn Asp Lys Val Lys Trp Glu Tyr Cys Asp
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```
            260                 265                 270
Val Ser Ala Cys Ser Ala Gln Asp Val Ala Tyr Pro Glu Glu Ser Pro
        275                 280                 285
Thr Glu Pro Ser Thr Lys Leu Pro Gly Phe Asp Ser Cys Gly Lys Thr
    290                 295                 300
Glu Ile Ala Glu Arg Lys Ile Lys Arg Ile Tyr Gly Gly Phe Lys Ser
305                 310                 315                 320
Thr Ala Gly Lys His Pro Trp Gln Ala Ser Leu Gln Ser Ser Leu Pro
                325                 330                 335
Leu Thr Ile Ser Met Pro Gln Gly His Phe Cys Gly Gly Ala Leu Ile
            340                 345                 350
His Pro Cys Trp Val Leu Thr Ala Ala His Cys Thr Asp Ile Lys Thr
        355                 360                 365
Arg His Leu Lys Val Val Leu Gly Asp Gln Asp Leu Lys Lys Glu Glu
    370                 375                 380
Phe His Glu Gln Ser Phe Arg Val Glu Lys Ile Phe Lys Tyr Ser His
385                 390                 395                 400
Tyr Asn Glu Arg Asp Glu Ile Pro His Asn Asp Ile Ala Leu Leu Lys
                405                 410                 415
Leu Lys Pro Val Asp Gly His Cys Ala Leu Glu Ser Lys Tyr Val Lys
            420                 425                 430
Thr Val Cys Leu Pro Asp Gly Ser Phe Pro Ser Gly Ser Glu Cys His
        435                 440                 445
Ile Ser Gly Trp Gly Val Thr Glu Thr Gly Lys Gly Ser Arg Gln Leu
    450                 455                 460
Leu Asp Ala Lys Val Lys Leu Ile Ala Asn Thr Leu Cys Asn Ser Arg
465                 470                 475                 480
Gln Leu Tyr Asp His Met Ile Asp Asp Ser Met Ile Cys Ala Gly Asn
                485                 490                 495
Leu Gln Lys Pro Gly Gln Asp Thr Cys Gln Gly Asp Ser Gly Gly Pro
            500                 505                 510
Leu Thr Cys Glu Lys Asp Gly Thr Tyr Tyr Val Tyr Gly Ile Val Ser
        515                 520                 525
Trp Gly Leu Glu Cys Gly Lys Arg Pro Gly Val Tyr Thr Gln Val Thr
    530                 535                 540
Lys Phe Leu Asn Trp Ile Lys Ala Thr Ile Lys Ser Glu Ser Gly Phe
545                 550                 555                 560


<210> 252
<211> 275
<212> PRT
<213> Mus musculus

<220>
<223> Mouse TSG-6  O08859


<400> 252
Met Val Val Leu Leu Cys Leu Cys Val Leu Leu Trp Glu Glu Ala His
 1                5                  10                  15
Gly Trp Gly Phe Lys Asn Gly Ile Phe His Asn Ser Ile Trp Leu Glu
            20                  25                  30
Gln Ala Ala Gly Val Tyr His Arg Glu Ala Arg Ala Gly Arg Tyr Lys
        35                  40                  45
Leu Thr Tyr Ala Glu Ala Lys Ala Val Cys Glu Phe Glu Gly Gly Arg
    50                  55                  60
Leu Ala Thr Tyr Lys Gln Leu Glu Ala Ala Arg Lys Ile Gly Phe His
```

65 70 75 80
Val Cys Ala Ala Gly Trp Met Ala Lys Gly Arg Val Gly Tyr Pro Ile
85 90 95
Val Lys Pro Gly Pro Asn Cys Gly Phe Gly Lys Thr Gly Ile Ile Asp
100 105 110
Tyr Gly Ile Arg Leu Asn Arg Ser Glu Arg Trp Asp Ala Tyr Cys Tyr
115 120 125
Asn Pro His Ala Lys Glu Cys Gly Gly Val Phe Thr Asp Pro Lys Arg
130 135 140
Ile Phe Lys Ser Pro Gly Phe Pro Asn Glu Tyr Asp Asp Asn Gln Val
145 150 155 160
Cys Tyr Trp His Ile Arg Leu Lys Tyr Gly Gln Arg Ile His Leu Ser
165 170 175
Phe Leu Asp Phe Asp Leu Glu His Asp Pro Gly Cys Leu Ala Asp Tyr
180 185 190
Val Glu Ile Tyr Asp Ser Tyr Asp Asp Val His Gly Phe Val Gly Arg
195 200 205
Tyr Cys Gly Asp Glu Leu Pro Glu Asp Ile Ile Ser Thr Gly Asn Val
210 215 220
Met Thr Leu Lys Phe Leu Ser Asp Ala Ser Val Thr Ala Gly Gly Phe
225 230 235 240
Gln Ile Lys Tyr Val Thr Val Asp Pro Ala Ser Lys Ser Ser Gln Ala
245 250 255
Lys Asn Thr Ser Thr Thr Gly Asn Lys Lys Phe Leu Pro Gly Arg Phe
260 265 270
Ser His Leu
275

<210> 253
<211> 276
<212> PRT
<213> Oryctolagus cuniculus

<220>
<223> Rabbit TSG-6 P98065

<400> 253
Met Ile Ile Leu Ile Tyr Leu Phe Val Leu Val Trp Glu Glu Ala Gln
1 5 10 15
Gly Trp Gly Phe Lys Asn Gly Ile Phe His Asn Ser Ile Trp Leu Glu
20 25 30
Gln Ala Ala Gly Val Tyr His Arg Glu Ala Arg Ser Gly Lys Tyr Lys
35 40 45
Leu Thr Tyr Ala Glu Ala Lys Ala Val Cys Glu Phe Glu Gly Gly Arg
50 55 60
Leu Ala Thr Tyr Lys Gln Leu Glu Ala Ala Arg Lys Ile Gly Phe His
65 70 75 80
Val Cys Ala Ala Gly Trp Met Ala Lys Gly Arg Val Gly Tyr Pro Ile
85 90 95
Val Lys Pro Gly Ser Asn Cys Gly Phe Gly Lys Thr Gly Ile Ile Asp
100 105 110
Tyr Gly Ile Arg Leu Asn Arg Ser Glu Arg Trp Asp Ala Tyr Cys Tyr
115 120 125
Asn Pro His Ala Lys Glu Cys Gly Gly Val Phe Thr Asp Pro Lys Arg
130 135 140
Ile Phe Lys Ser Pro Gly Phe Pro Asn Glu Tyr Asp Asp Asn Gln Ile

```
145                 150                 155                 160
Cys Tyr Trp His Ile Arg Leu Lys Tyr Gly Gln Arg Ile His Leu Ser
                165                 170                 175
Phe Leu Asn Phe Asp Leu Glu Tyr Asp Pro Gly Cys Leu Ala Asp Tyr
            180                 185                 190
Val Glu Ile Tyr Asp Ser Tyr Asp Asp Val His Gly Phe Val Gly Arg
        195                 200                 205
Tyr Cys Gly Asp Glu Leu Pro Glu Asp Ile Ile Ser Thr Gly Asn Val
    210                 215                 220
Met Thr Leu Lys Phe Leu Ser Asp Ala Ser Val Thr Ala Gly Gly Phe
225                 230                 235                 240
Gln Ile Lys Tyr Val Thr Val Asp Pro Ala Ser Lys Ser Ser Gln Gly
                245                 250                 255
Lys Asn Thr Ser Thr Val Ser Gly Asn Lys Asn Phe Leu Ala Gly Arg
            260                 265                 270
Phe Ser His Leu
        275


<210> 254
<211> 280
<212> PRT
<213> Bos taurus

<220>
<223> Cow TSG-6  Q5W1C4


<400> 254
Met Ile Ile Leu Ile Tyr Leu Phe Val Leu Leu Trp Glu Glu Ala His
 1               5                  10                  15
Gly Trp Gly Phe Lys Asn Gly Ile Phe His Asn Ser Ile Trp Leu Glu
            20                  25                  30
Gln Ala Ala Gly Val Tyr His Arg Glu Ala Arg Ser Gly Lys Tyr Lys
        35                  40                  45
Leu Thr Tyr Ala Glu Ala Lys Ala Val Cys Glu Tyr Glu Gly Gly His
    50                  55                  60
Leu Ala Thr Tyr Lys Gln Leu Glu Ala Ala Arg Lys Ile Gly Phe His
65                  70                  75                  80
Val Cys Ala Ala Gly Trp Met Ala Lys Gly Arg Val Gly Tyr Pro Ile
                85                  90                  95
Val Lys Pro Gly Pro Asn Cys Gly Phe Gly Lys Thr Gly Ile Ile Asp
            100                 105                 110
Tyr Gly Ile Arg Leu Asn Arg Ser Glu Arg Trp Asp Ala Tyr Cys Tyr
        115                 120                 125
Asn Pro His Ala Lys Glu Cys Gly Gly Val Phe Thr Asp Pro Lys Arg
    130                 135                 140
Ile Phe Lys Ser Pro Gly Phe Pro Asn Glu Tyr Asp Asp Asn Gln Ile
145                 150                 155                 160
Cys Tyr Trp His Ile Arg Leu Lys Tyr Gly Gln Arg Ile His Leu Ser
                165                 170                 175
Phe Leu Asp Phe Asp Leu Glu Asp Asp Pro Ala Cys Leu Ala Asp Tyr
            180                 185                 190
Val Glu Val Tyr Asp Ser Tyr Asp Asp Val His Gly Phe Val Gly Arg
        195                 200                 205
Tyr Cys Gly Asp Glu Leu Pro Glu Asp Ile Ile Ser Thr Gly Asn Val
    210                 215                 220
Met Thr Leu Lys Phe Leu Ser Asp Ala Ser Val Thr Ala Gly Gly Phe
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```
225                 230                 235                 240
Gln Ile Lys Tyr Val Ala Val Asp Pro Val Ser Lys Ser Ser Gln Gly
                245                 250                 255
Lys Asn Ala Ser Thr Thr Ser Thr Thr Ser Thr Gly Asn Lys Asn Phe
            260                 265                 270
Leu Ala Gly Arg Phe Ser His Leu
        275                 280


<210> 255
<211> 2571
<212> PRT
<213> Mus musculus

<220>
<223> Mouse Stabilin-1  Q8R4Y4


<400> 255
Met Ala Glu Pro Arg Thr Leu Leu Leu Leu Cys Val Leu Val Leu Cys
 1               5                  10                  15
Leu Ser Asp Ser Ser Phe Ile Arg Gly Gln Thr Val Arg Ser Lys Arg
            20                  25                  30
Cys Asp Ile His Thr Lys Phe Val Thr His Thr Pro Cys Thr Ala Cys
        35                  40                  45
Ala Ala Ile Arg Arg Gln Leu Cys Pro Trp Gly Trp Ser Arg Asn Phe
    50                  55                  60
Pro Glu Lys Ile Leu Leu Asp Cys Arg Tyr Glu Leu Gln Leu Arg Gly
65                  70                  75                  80
Ala Ala Ile Ser Leu Ser Gly Cys Ser Gln Glu Cys Trp Lys Asp Val
                85                  90                  95
Val Gln Lys Ala Cys Cys Pro Gly Tyr Trp Gly Ser Gln Cys Phe Glu
            100                 105                 110
Cys Pro Gly Gly Pro Ala Thr Pro Cys Ser Gly His Gly Thr Cys Leu
        115                 120                 125
Asp Gly Ile Glu Gly Asn Gly Thr Cys Val Cys Gln Gly Asn Phe Ser
    130                 135                 140
Gly Ser Val Cys Gln Glu Cys Arg Asp Pro Asn Arg Phe Gly Pro Asp
145                 150                 155                 160
Cys Gln Ser Val Cys Asn Cys Val His Gly Val Cys Ser His Gly Pro
                165                 170                 175
Arg Gly Asp Gly Ser Cys Arg Cys Phe Ala Gly Tyr Thr Gly Pro His
            180                 185                 190
Cys Asp Gln Glu Leu Pro Val Cys Gln Ser Leu Lys Cys Pro Gln Asn
        195                 200                 205
Ser Gln Cys Ser Ala Glu Ala Pro Thr Cys Lys Cys Leu Pro Gly Tyr
    210                 215                 220
Thr Gln Gln Asp Asn Val Cys Leu Ala Pro Asp Pro Cys Gln Pro Ser
225                 230                 235                 240
Ala Cys Ser Pro Leu Ala Arg Cys Ser Val Thr Pro Gln Gly Gln Ala
                245                 250                 255
Gln Cys Gln Cys Pro Glu Asn Tyr His Gly Asp Gly Lys Val Cys Leu
            260                 265                 270
Pro Arg Asp Pro Cys Leu Thr Asn Phe Gly Gly Cys Pro Ser Asn Ser
        275                 280                 285
Thr Phe Cys Leu Tyr Arg Gly Pro Gly Lys Ala Thr Cys Met Cys Arg
    290                 295                 300
Pro Gly Met Thr Ser Ile Asn Asn Asn Ala Ser Glu Gly Cys His Val
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305                 310                 315                 320
Ser Cys Lys Pro His Ser Cys Asp Arg Ser Ala Thr Cys Gln Val Thr
                325                 330                 335
Pro Asp Arg Lys Thr Ser Cys Val Cys Lys Asn Asp Glu Val Gly Asp
            340                 345                 350
Gly His Ala Cys Tyr Gly His Leu Leu His Glu Val Arg Arg Ala Asn
        355                 360                 365
Gln Asn Gly Leu Val Phe Leu Arg Leu Arg Ala Ala Ile Ala Met Leu
    370                 375                 380
Glu Gln Gly Cys Gln Glu Ile Leu Thr Thr Ser Gly Pro Phe Thr Val
385                 390                 395                 400
Leu Val Pro Ser Met Phe Ser Val Ser Ser Val Ser Ser Asn Met Asn
                405                 410                 415
Ala Thr Leu Ala Gln Gln Leu Cys Arg Gln His Val Ile Ala Gly Glu
            420                 425                 430
His Met Leu Glu Asn Ala Gly Pro Pro Ser Thr Arg Arg Trp Trp Thr
        435                 440                 445
Leu Ala Gly Gln Glu Val Thr Ile Thr Phe Lys Asn Met Arg Tyr Ala
    450                 455                 460
Tyr Lys Tyr Glu Asp Gln Pro Gln Gln Phe Ser Ile His Lys Ala Asn
465                 470                 475                 480
Tyr Ile Ala Ala Asn Gly Val Phe His Thr Val Thr Ala Leu Arg Trp
                485                 490                 495
Gln Leu Pro Pro Pro Leu Pro Gly Asp Ser Lys Lys Thr Val Gly Gln
            500                 505                 510
Ile Leu Ala Ser Thr Glu Val Phe Thr Arg Phe Glu Thr Ile Leu Glu
        515                 520                 525
Asn Cys Gly Leu Pro Ser Ile Leu Asp Gly Pro Gly Pro Phe Thr Val
    530                 535                 540
Phe Ala Pro Ser Asn Glu Ala Val Asp Ser Leu Arg Asp Gly Arg Leu
545                 550                 555                 560
Ile Tyr Leu Phe Thr Ala Gly Leu Ser Lys Leu Gln Glu Leu Val Arg
                565                 570                 575
Tyr His Ile Tyr Asn His Gly Gln Leu Thr Val Glu Lys Leu Ile Ser
            580                 585                 590
Lys Gly Arg Val Leu Thr Met Ala Asn Gln Val Leu Thr Val Asn Ile
        595                 600                 605
Ser Glu Gly Gly Arg Ile Leu Leu Gly Pro Gly Gly Ile Pro Val Arg
    610                 615                 620
Arg Val Asp Val Pro Ala Ala Asn Gly Val Ile His Met Leu Glu Gly
625                 630                 635                 640
Ile Leu Leu Pro Pro Thr Ile Leu Pro Ile Leu Pro Lys His Cys Asp
                645                 650                 655
Glu Glu Gln His Gln Thr Val Leu Gly Ser Cys Val Asp Cys Gln Ala
            660                 665                 670
Leu Asn Thr Ser Val Cys Pro Pro Asn Ser Val Lys Met Asp Ile Phe
        675                 680                 685
Pro Lys Glu Cys Val Tyr Ile His Asp Pro Asn Gly Leu Asn Val Leu
    690                 695                 700
Lys Lys Gly Cys Ala Asp Tyr Cys Asn Gln Thr Ile Thr Lys Arg Gly
705                 710                 715                 720
Cys Cys Lys Gly Phe Phe Gly Pro Asp Cys Thr Gln Cys Pro Gly Gly
                725                 730                 735
Phe Ser Asn Pro Cys Tyr Gly Lys Gly Asn Cys Ser Asp Gly Val Arg
            740                 745                 750
Gly Asn Gly Ala Cys Leu Cys Phe Pro Asp Tyr Lys Gly Ile Ala Cys
        755                 760                 765
His Ile Cys Ser Asp Pro Lys Lys His Gly Glu Gln Cys Gln Glu Asp
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    770                 775                 780
Cys Gly Cys Val His Gly Leu Cys Asp Asn Arg Pro Gly Ser Gly Gly
785                 790                 795                 800
Val Cys Gln Gln Gly Thr Cys Ala Pro Gly Phe Gln Gly Arg Phe Cys
                805                 810                 815
Asn Glu Ser Met Gly Asn Cys Gly Ser Thr Gly Leu Ala Gln Pro Cys
            820                 825                 830
His Ser Asp Ala His Cys Val Ile Gln Glu Gly Val Ala Arg Cys Val
        835                 840                 845
Cys His Asp Gly Phe Glu Gly Asn Gly Phe Ser Cys Lys Arg Ser Asn
    850                 855                 860
Pro Cys Ser Arg Pro Asp Arg Gly Gly Cys Ser Glu Asn Ala Glu Cys
865                 870                 875                 880
Val Pro Gly Asp Leu Gly Thr His His Cys Ile Cys His Lys Gly Trp
                885                 890                 895
Ser Gly Asp Gly Arg Ile Cys Val Ala Ile Asp Glu Cys Gly Leu Asp
            900                 905                 910
Thr Arg Gly Gly Cys His Ala Asp Ala Leu Cys Ser Tyr Val Gly Pro
        915                 920                 925
Gly Gln Ser Arg Cys Thr Cys Lys Leu Gly Phe Ala Gly Asn Gly Tyr
    930                 935                 940
Glu Cys Ser Pro Ile Asp Pro Cys Arg Val Gly Asn Gly Gly Cys His
945                 950                 955                 960
Gly Leu Ala Thr Cys Lys Ala Val Gly Gly Gly Gln Arg Val Cys Thr
                965                 970                 975
Cys Pro Pro His Phe Gly Gly Asp Gly Phe Ser Cys Tyr Gly Asp Ile
            980                 985                 990
Ile Gln Glu Leu Glu Ala Asn Ala His Phe Ser Ala Phe Ser Gln Trp
        995                 1000                1005
Phe Lys Asn Ser Ser Ile Thr Leu Pro Ala Asp Ser Arg Val Thr Ala
    1010                1015                1020
Leu Val Pro Ser Glu Ser Ala Ile Arg Arg Leu Ser Leu Glu Asp Gln
1025                1030                1035                1040
Ala Phe Trp Leu Gln Pro Lys Met Leu Pro Glu Leu Ala Arg Ala His
                1045                1050                1055
Phe Leu Gln Gly Ala Phe Ser Glu Glu Glu Leu Ala Arg Leu Asn Gly
            1060                1065                1070
Gln Gln Val Ala Thr Leu Ser Ala Thr Thr Arg Trp Gln Ile His Asn
        1075                1080                1085
Ile Ser Gly Lys Val Trp Val Gln Asn Ala Thr Val Asp Val Pro Asp
    1090                1095                1100
Leu Leu Ala Thr Asn Gly Ile Leu His Ile Val Ser Gln Val Leu Leu
1105                1110                1115                1120
Pro Pro Arg Gly Asp Met Gln Thr Gly Pro Gly Leu Leu Gln Gln Leu
                1125                1130                1135
Asp Ser Val Pro Ala Phe Arg Leu Phe Gly Glu Gln Leu Lys His His
            1140                1145                1150
Lys Leu Val Ala Gln Ile Glu Ala Ala Lys Ala Tyr Thr Ile Phe Val
        1155                1160                1165
Pro Thr Asn His Ser Leu Glu Thr Gln Gly Asn Asn Ser Val Leu Gly
    1170                1175                1180
Ile Asp Thr Val Arg His His Val Ile Leu Gly Glu Ala Leu Ser Val
1185                1190                1195                1200
Glu Val Leu Arg Lys Gly Gly His Arg Asn Ser Leu Leu Gly Pro Ala
                1205                1210                1215
His Trp Leu Val Phe Tyr Asn His Ser Gly Gln Pro Glu Val Asn His
            1220                1225                1230
Met Pro Leu Glu Gly Pro Leu Leu Glu Ala Pro Gly Ser Ser Leu Phe
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        1235                1240                1245
Gly Leu Ser Gly Ile Leu Ala Val Gly Ser Ser Arg Cys Leu His Ser
    1250                1255                1260
His Ala Glu Ala Leu Arg Glu Lys Cys Ile Asn Cys Thr Arg Lys Phe
1265                1270                1275                1280
Arg Cys Thr Gln Gly Phe Gln Leu Gln Asp Thr Pro Arg Lys Ser Cys
                1285                1290                1295
Val Tyr Arg Ser Gly Leu Ser Phe Ser Arg Gly Cys Ser Tyr Thr Cys
            1300                1305                1310
Ala Lys Lys Ile Gln Val Pro Asp Cys Cys Pro Gly Phe Phe Gly Thr
        1315                1320                1325
Leu Cys Glu Pro Cys Pro Gly Gly Leu Gly Gly Val Cys Ser Gly His
    1330                1335                1340
Gly Gln Cys Gln Asp Arg Phe Leu Gly Asn Gly Glu Cys Arg Cys Gln
1345                1350                1355                1360
Glu Gly Phe His Gly Thr Ala Cys Glu Met Cys Glu Leu Gly Arg Tyr
                1365                1370                1375
Gly Pro Thr Cys Ser Gly Val Cys Asp Cys Asp His Gly Leu Cys Gln
            1380                1385                1390
Glu Gly Leu Arg Gly Asn Gly Ser Cys Val Cys His Ala Gly Trp Gln
        1395                1400                1405
Gly Leu Arg Cys Asp Gln Lys Ile Thr Asp His Gln Cys Pro Lys Lys
    1410                1415                1420
Cys Asp Pro Asn Ala Asn Cys Ile Gln Asp Ser Ala Gly Ile Pro Ala
1425                1430                1435                1440
Cys Val Cys Ala Ala Gly Tyr Ser Gly Asn Gly Ser Tyr Cys Ser Glu
                1445                1450                1455
Val Asp Pro Cys Ala Ser Gly His Gly Gly Cys Ser Pro Tyr Ala Asn
            1460                1465                1470
Cys Thr Lys Val Ala Pro Gly Gln Arg Thr Cys Thr Cys Gln Asp Gly
        1475                1480                1485
Tyr Thr Gly Asp Gly Glu Leu Cys Gln Glu Ile Asn Ser Cys Leu Val
    1490                1495                1500
His Asn Gly Gly Cys His Val His Ala Glu Cys Ile Pro Thr Gly Pro
1505                1510                1515                1520
Gln Gln Val Ser Cys Ser Cys Arg Glu Gly Tyr Ser Gly Asp Gly Ile
                1525                1530                1535
Gln Thr Cys Lys Leu Leu Asp Pro Cys Ser Gln Asn Asn Gly Gly Cys
            1540                1545                1550
Ser Pro Tyr Ala Val Cys Lys Ser Thr Gly Asp Gly Gln Arg Thr Cys
        1555                1560                1565
Ser Cys Asp Ala Thr His Thr Val Gly Asp Gly Ile Thr Cys His Gly
    1570                1575                1580
Arg Val Gly Leu Glu Leu Leu Arg Asn Lys Tyr Ala Ser Phe Phe Ser
1585                1590                1595                1600
Leu His Leu Leu Glu Tyr Lys Glu Leu Lys Gly Asp Gly Pro Phe Thr
                1605                1610                1615
Val Phe Val Pro His Ala Asp Leu Ile Ser Asn Met Ser Gln Asp Glu
            1620                1625                1630
Leu Ala Arg Ile Arg Ala His Arg Gln Leu Val Phe Arg Tyr His Val
        1635                1640                1645
Val Gly Cys Arg Lys Leu Trp Ser Gln Glu Met Leu Asp Gln Gly Tyr
    1650                1655                1660
Ile Thr Thr Leu Ser Gly His Thr Leu Arg Val Ser Glu Arg Glu Gly
1665                1670                1675                1680
Ser Ile Tyr Leu Asn Asp Phe Ala Arg Val Val Ser Ser Asp Leu Glu
                1685                1690                1695
Val Val Asn Gly Val Leu His Phe Ile Asp His Val Leu Leu Pro Pro
```

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            1700                1705                1710
Asp Val Leu His Trp Glu Ser Gly Ala Ile Pro Ile Pro Gln Arg Asn
        1715                1720                1725
Val Thr Ala Ala Ala Glu Ser Phe Gly Tyr Lys Ile Phe Ser Arg Leu
    1730                1735                1740
Leu Thr Val Ala Gly Leu Leu Pro Met Leu Gln Asp Ala Ser His Arg
1745                1750                1755                1760
Pro Phe Thr Met Leu Trp Pro Thr Asp Ser Ala Leu Gln Ala Leu Pro
                1765                1770                1775
Pro Asp Arg Lys Asn Trp Leu Phe His Glu Asp His Arg Asp Lys Leu
            1780                1785                1790
Ala Ala Ile Leu Arg Gly His Met Ile Arg Asn Ile Glu Ala Leu Ala
        1795                1800                1805
Ser Asp Leu Pro Asn Leu Gly Gln Leu Arg Thr Met His Gly Asn Thr
    1810                1815                1820
Ile Ser Phe Ser Cys Gly Leu Thr Arg Pro Gly Glu Leu Ile Val Gly
1825                1830                1835                1840
Glu Asp Glu Ala His Ile Val Gln Arg His Leu Thr Phe Glu Gly Gly
                1845                1850                1855
Leu Ala Tyr Gly Ile Asp Gln Leu Leu Glu Pro Pro Asp Leu Gly Ala
            1860                1865                1870
Arg Cys Asp Arg Phe Glu Pro Gln Pro Leu Gln Met Lys Thr Cys Ser
        1875                1880                1885
Ile Cys Gly Leu Glu Pro Pro Cys Pro Arg Gly Ser Arg Glu Gln Gly
    1890                1895                1900
Ser Pro Glu Thr Cys Trp Arg His Tyr Ser Lys Phe Trp Thr Thr Pro
1905                1910                1915                1920
Leu His Ser Ile Ser Met Arg Gly Ala Tyr Trp Ile Pro Ser Ser Phe
                1925                1930                1935
Trp Asn Arg Asn His Met Ser Arg Gly Cys His Arg Asn Cys Val Thr
            1940                1945                1950
Thr Val Trp Lys Pro Ser Cys Cys Pro Gly His Tyr Gly Ile Asn Cys
        1955                1960                1965
His Ala Cys Pro Gly Gly Pro Arg Ser Pro Cys Ser Asp His Gly Val
    1970                1975                1980
Cys Leu Asp Gly Ile Arg Gly Ser Gly Gln Cys Asn Cys His Pro Gly
1985                1990                1995                2000
Phe Ala Gly Thr Ala Cys Glu Leu Cys Ala Pro Gly Ala Phe Gly Pro
                2005                2010                2015
Gln Cys Gln Ala Cys Arg Cys Thr Gln His Gly Arg Cys Asp Glu Gly
            2020                2025                2030
Leu Gly Gly Ser Gly Ser Cys Phe Cys Asp Glu Gly Trp Thr Gly Ala
        2035                2040                2045
Arg Cys Glu Val Gln Leu Glu Leu Gln Pro Val Cys Thr Pro Pro Cys
    2050                2055                2060
Ala Pro Gln Ala Val Cys Arg Leu Gly Asn Ser Cys Glu Cys Ser Leu
2065                2070                2075                2080
Gly Tyr Glu Gly Asp Gly Arg Val Cys Thr Val Ala Asp Leu Cys Gln
                2085                2090                2095
Lys Gly His Gly Gly Cys Ser Lys His Ala Asn Cys Ser Gln Val Gly
            2100                2105                2110
Thr Val Val Thr Cys Thr Cys Leu Pro Asp Tyr Glu Gly Asp Gly Trp
        2115                2120                2125
Ser Cys Arg Ala Arg Asp Pro Cys Leu Asp Gly His Arg Gly Gly Cys
    2130                2135                2140
Ser Glu His Ala Asp Cys Leu Asn Thr Gly Pro Asn Thr Arg Arg Cys
2145                2150                2155                2160
Glu Cys His Val Gly Tyr Val Gly Asp Gly Leu Gln Cys Leu Glu Glu
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                2165                2170                2175
Leu Glu Pro Pro Val Asp Arg Cys Leu Gly Gly Ser Ser Pro Cys His
            2180                2185                2190
Thr Asp Ala Leu Cys Thr Asp Leu His Phe Gln Glu Lys Gln Ala Gly
        2195                2200                2205
Val Phe His Ile Gln Ala Thr Ser Gly Pro Tyr Gly Leu Thr Phe Ser
    2210                2215                2220
Glu Ala Lys Glu Ala Cys Glu Gly Gln Gly Ala Val Leu Ala Ser Leu
2225                2230                2235                2240
Pro Gln Leu Ser Ala Ala Gln Gln Leu Gly Phe His Val Cys Phe Val
                2245                2250                2255
Gly Trp Leu Ala Asn Gly Ser Ala Ala His Pro Val Val Thr Pro Ala
            2260                2265                2270
Ala Asp Cys Gly Asn Asn Arg Val Gly Val Val Ser Leu Gly Val Arg
        2275                2280                2285
Lys Asn Leu Ser Glu Leu Trp Asp Ala Tyr Cys Tyr Arg Val Gln Asp
    2290                2295                2300
Val Ala Cys Gln Cys Arg Ala Gly Phe Val Gly Asp Gly Ile Ser Thr
2305                2310                2315                2320
Cys Asn Gly Lys Leu Leu Asp Val Leu Ala Ala Thr Ala Asn Phe Ser
                2325                2330                2335
Thr Phe Tyr Gly Met Leu Leu Gly Tyr Ala Asn Ala Thr Gln Arg Gly
            2340                2345                2350
Leu Glu Phe Met Asp Phe Leu Glu Asp Glu Leu Thr Tyr Lys Thr Leu
        2355                2360                2365
Phe Val Pro Val Asn Lys Gly Phe Val Asp Asn Met Thr Leu Ser Gly
    2370                2375                2380
Pro Asp Leu Glu Leu His Ala Ser Asn Ala Thr Phe Leu Ser Ile Asn
2385                2390                2395                2400
Ala Ser Arg Gly Thr Leu Leu Pro Ala His Ser Gly Leu Ser Leu Phe
                2405                2410                2415
Ile Ser Asp Thr Gly Pro Asp Asn Thr Ser Leu Val Pro Leu Ala Pro
            2420                2425                2430
Gly Ala Val Val Val Ser His Val Ile Val Trp Asp Ile Met Ala Phe
        2435                2440                2445
Asn Gly Ile Ile His Ala Leu Ala Ser Pro Leu Leu Met Pro Pro Gln
    2450                2455                2460
Thr Arg Ala Val Leu Gly Ser Glu Pro Pro Pro Val Ala Leu Ser Leu
2465                2470                2475                2480
Gly Val Val Val Thr Ser Gly Thr Leu Leu Gly Leu Val Ala Gly Ala
                2485                2490                2495
Leu Tyr Leu Arg Ala Arg Gly Lys Pro Pro Gly Phe Ser Phe Ser Ala
            2500                2505                2510
Phe Gln Ala Glu Asp Asn Ala Asp Asp Asp Phe Ser Pro Trp Gln Glu
        2515                2520                2525
Gly Thr Ser Pro Thr Leu Val Ser Val Pro Asn Pro Val Phe Gly Ser
    2530                2535                2540
Ser Asp Ile Phe Cys Glu Pro Phe Asp Asp Ser Val Leu Glu Glu Asp
2545                2550                2555                2560
Phe Pro Asp Thr Gln Arg Val Leu Lys Val Lys
                2565                2570
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<211> 2568
<212> PRT
<213> Bos taurus

<220>
<223> Cow Stabilin-1 NP_001192499

<400> 256
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 1   5   10   15
Leu Ala Gly Pro Ser Phe Phe Gly Glu Gln Lys Val Arg Ser Lys Arg
            20   25   30
Cys Asp Val Lys Thr Lys Phe Val Thr His Ile Pro Cys Thr Pro Cys
        35   40   45
Pro Ala Ile Lys Lys Arg Val Cys Pro Leu Gly Trp Ile Arg Ala Phe
    50   55   60
Pro Glu Lys Ile Ser Gln Asp Cys Arg Tyr Glu Val Gln Leu Gly Asp
65   70   75   80
Ser Leu Leu Ser Met Ser Gly Cys Ser Leu Glu Cys Trp Lys Asp Met
                85   90   95
Val Gln Lys Ala Cys Cys Pro Gly Tyr Trp Gly Ser Gln Cys Tyr Glu
            100   105   110
Cys Pro Gly Gly Ala Glu Thr Pro Cys Ser Gly His Gly Thr Cys Leu
        115   120   125
Asp Gly Leu Asp Gly Asn Gly Thr Cys Val Cys Gln Glu Asn Phe Ser
    130   135   140
Gly Ser Ala Cys Gln Glu Cys Arg Asp Pro Asn Arg Phe Gly Pro Asp
145   150   155   160
Cys Gln Ser Val Cys Arg Cys Val His Gly Val Cys Arg His Gly Pro
                165   170   175
Arg Gly Asp Gly Ser Cys Leu Cys Phe Ala Gly Tyr Thr Gly Ala Arg
            180   185   190
Cys Asp Gln Glu Leu Leu Ala Cys Gln Ala Leu Asn Cys Pro Arg Asn
        195   200   205
Ser Gln Cys Ser Glu Glu Ala Pro Ser Cys Ser Cys Leu Pro Gly Tyr
    210   215   220
Thr Gln Gln Gly His Glu Cys Arg Ala Ser Asp Pro Cys Arg Pro Ser
225   230   235   240
Pro Cys Ser Pro Leu Ala Gln Cys Ser Val Gly Pro Gly Gly Gln Ala
                245   250   255
Gln Cys Arg Cys Pro Glu Asn Tyr His Gly Asp Gly Thr Val Cys Leu
            260   265   270
Pro Gln Asp Pro Cys Thr Thr Asn Asn Gly Gly Cys Pro Ser Asn Ser
        275   280   285
Thr Leu Cys Leu Tyr Arg Lys Pro Gly Gln Ala Ser Cys Leu Cys Lys
    290   295   300
Pro Gly Leu Val Ser Ile Ala His Asp Ser Ser Ala Gly Cys Phe Ala
305   310   315   320
His Cys Ser Ala Phe Ser Cys Asp Arg Ser Ala Thr Cys Gln Val Thr
                325   330   335
Pro Asp Gly Lys Thr Ser Cys Val Cys Lys Glu Gly Glu Val Gly Asp
            340   345   350
Gly Arg Ala Cys Tyr Gly His Leu Leu His Glu Val Gln Lys Ala Ser
        355   360   365
Gln Thr Ser Met Leu Leu Arg Leu Arg Val Thr Phe Ala Met Leu Asp
    370   375   380
Gln Gly Cys Arg Glu Ile Leu Ser Thr Ser Gly Pro Phe Thr Val Leu
385   390   395   400
Ala Pro Leu Val Ser Ser Arg Thr Met Asn Ala Ser Val Ala Gln Gln
                405   410   415
Leu Cys Arg Gln His Ile Ile Ala Gly Gln His Met Leu Glu Glu Ala

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            420                 425                 430
Gly Thr Gln Ala Pro Arg Arg Trp Trp Thr Leu Ala Gly Gln Glu Ile
        435                 440                 445
Thr Val Ser Phe Ser Arg Phe Arg Lys Tyr Thr Tyr Lys Tyr Gln Asp
    450                 455                 460
Gln Pro Gln Gln Thr Phe Thr Ile His Lys Ala Asn Tyr Pro Ala Ala
465                 470                 475                 480
Asn Gly Leu Phe His Val Val Thr Ala Leu Arg Leu Gln Pro Pro Pro
                485                 490                 495
Glu Leu Pro Glu Asp Pro Lys Arg Thr Ile Gly Gln Ile Leu Ala Ser
            500                 505                 510
Asn Glu Val Phe Ser Arg Phe Glu Thr Ile Leu Glu Asn Cys Gly Leu
        515                 520                 525
Pro Ser Phe Leu Asp Gly Pro Gly Pro Phe Thr Val Phe Ala Pro Ser
    530                 535                 540
Asn Glu Ala Val Asp Gly Leu Arg Asp Gly Arg Leu Val Tyr Leu Phe
545                 550                 555                 560
Thr Ala Gly Leu Ser Lys Leu Gln Glu Leu Val Arg Tyr His Val Tyr
                565                 570                 575
Asn His Gly Gln Leu Thr Val Glu Lys Leu Leu Ser Lys Gly Arg Val
            580                 585                 590
Leu Thr Met Ala Asn Gln Ile Leu Ala Val Asn Ile Ser Glu Glu Gly
        595                 600                 605
Arg Ile Leu Leu Gly Pro Glu Gly Val Pro Leu Arg Arg Val Asp Val
    610                 615                 620
Leu Ala Ala Asn Gly Val Ile His Met Leu Glu Gly Val Leu Leu Pro
625                 630                 635                 640
Pro Thr Ile Leu Pro Ile Leu Pro Lys Leu Cys Asn Glu Glu Gln His
                645                 650                 655
Ala Val Val Ala Gly Ser Cys Val Asp Cys Gln Ala Leu Asn Thr Ser
            660                 665                 670
Thr Cys Pro Pro Asn Ser Val Lys Leu Asp Ile Ser Pro Glu Glu Cys
        675                 680                 685
Val Tyr Ile His Asp Pro Thr Gly Leu Asn Val Leu Lys Lys Gly Cys
    690                 695                 700
Ala Tyr Tyr Cys Asn Gln Thr Ile Gln Lys Pro Gly Cys Cys Lys Gly
705                 710                 715                 720
Phe Phe Gly Pro Asp Cys Leu Gln Cys Pro Gly Gly Phe Ser Asn Pro
                725                 730                 735
Cys Tyr Gly Lys Gly Asn Cys Ser Asp Gly Val Gln Gly Ser Gly Ala
            740                 745                 750
Cys Leu Cys Phe Pro Asp Tyr Lys Gly Ile Ala Cys His Ile Cys Ser
        755                 760                 765
Asn Pro Asn Lys His Gly Asp Gln Cys Gln Glu Asp Cys Gly Cys Val
    770                 775                 780
His Gly Leu Cys Asp Asn Arg Pro Gly Ser Gly Gly Val Cys Gln His
785                 790                 795                 800
Gly Thr Cys Ala Pro Gly Phe Ser Gly Arg Phe Cys Asn Glu Ser Thr
                805                 810                 815
Val Ser Cys Gly Ser Thr Glu Gln Ala Gln Gln Cys His Pro His Ala
            820                 825                 830
Arg Cys Val Asn Gln Gly Gly Val Ser Arg Cys Leu Cys Leu Asp Gly
        835                 840                 845
Phe Glu Gly Asp Gly Phe Ser Cys Thr Pro Ser Asp Pro Cys Ser Arg
    850                 855                 860
Pro Asp Arg Gly Gly Cys Ser Glu Asn Ala Glu Cys Val Pro Gly Val
865                 870                 875                 880
Arg Gly Ala His His Cys Met Cys His Lys Gly Trp Ser Gly Asp Gly
```

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                885                 890                 895
Arg Val Cys Val Ala Val Asp Glu Cys Glu Leu Asp Leu Arg Gly Gly
            900                 905                 910
Cys His Ala Asp Ala Leu Cys Ser Tyr Val Gly Pro Gly Gln Ser Arg
        915                 920                 925
Cys Thr Cys Lys Leu Gly Phe Ala Gly Asp Gly Tyr Val Cys Ser Pro
    930                 935                 940
Ile Asp Pro Cys Arg Ala Gly Asn Gly Gly Cys His Asp Leu Ala Thr
945                 950                 955                 960
Cys Arg Ala Val Gly Gly Gly Gln Arg Val Cys Thr Cys Pro Pro Asp
                965                 970                 975
Tyr Gly Gly Asp Gly Phe Ser Cys Tyr Gly Asp Ile Leu Lys Glu Leu
            980                 985                 990
Glu Ala Asn Ala His Phe Ser Val Phe Tyr Gln Trp Ile Lys Gly Ala
        995                 1000                1005
Gly Ile Thr Leu Pro Ala Asp Ser Gln Val Thr Ala Leu Val Pro Ser
    1010                1015                1020
Glu Ser Ala Ile Arg Arg Leu Ser Thr Glu Asp Gln Ala Phe Trp Leu
1025                1030                1035                1040
Gln Pro Arg Leu Leu Pro Gln Leu Val Arg Ala His Phe Leu Gln Gly
                1045                1050                1055
Ala Leu Ser Glu Glu Glu Leu Ala Arg Leu His Gly Gln Asn Val Ser
            1060                1065                1070
Thr Leu Asn Pro Thr Val Arg Trp Glu Ile His Asn Val Ser Gly Arg
        1075                1080                1085
Val Trp Val Gln Asn Ala Ser Val Asp Val Ala Asp Leu Leu Ala Thr
    1090                1095                1100
Asn Gly Val Leu His Val Leu Ser Gln Val Leu Leu Pro Pro Arg Arg
1105                1110                1115                1120
Asp Val Leu Gly Gly Gln Gly Leu Leu Gln Gln Leu Asp Ser Val Pro
                1125                1130                1135
Ala Phe His Leu Phe Arg Glu Leu Leu Gln Arg His Arg Leu Val Pro
            1140                1145                1150
Gln Ile Glu Ala Ala Thr Ala Tyr Thr Ile Phe Val Pro Thr Asn His
        1155                1160                1165
Ser Leu Glu Ala Gln Ala Asn Ser Ser Ser Leu Asp Ser Asp Val Val
    1170                1175                1180
Arg His His Val Ile Leu Gly Glu Ala Leu Ser Thr Glu Ala Leu Gly
1185                1190                1195                1200
Lys Gly Gly His Arg Asn Ser Leu Leu Gly Pro Ala His Trp Leu Val
                1205                1210                1215
Phe Tyr Asn His Ser Gly Gln Pro Glu Val Asn His Val Pro Leu Glu
            1220                1225                1230
Gly Pro Val Leu Gln Ala Pro Gly Arg Ser Leu Phe Gly Leu Ser Gly
        1235                1240                1245
Val Leu Thr Val Gly Ser Ser Arg Cys Leu His Ser His Ala Glu Ala
    1250                1255                1260
Leu Arg Glu Lys Cys Val Asn Cys Ser Arg Lys Phe Arg Cys Thr Gln
1265                1270                1275                1280
Gly Tyr Gln Leu Glu Asp Thr Pro Arg Lys Ser Cys Val Tyr Arg Ser
                1285                1290                1295
Gly Tyr Ser Phe Ser Arg Gly Cys Ser Tyr Thr Cys Ala Lys Lys Ile
            1300                1305                1310
Gln Val Pro Asp Cys Cys Pro Gly Phe Phe Gly Thr Leu Cys Glu Pro
        1315                1320                1325
Cys Pro Gly Gly Leu Gly Gly Val Cys Ser Gly His Gly Gln Cys Gln
    1330                1335                1340
Asp Arg Leu Leu Gly Ser Gly Glu Cys Arg Cys His Glu Gly Phe His
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1345                1350                1355                1360
Gly Thr Ala Cys Glu Met Cys Glu Leu Gly Arg Tyr Gly Pro Asn Cys
                1365                1370                1375
Thr Gly Val Cys Asp Cys Ala His Gly Leu Cys Gln Glu Gly Leu Arg
            1380                1385                1390
Gly Asp Gly Ser Cys Val Cys Asn Val Gly Trp Gln Gly Leu Arg Cys
        1395                1400                1405
Asp Gln Lys Ile Ser Gly Pro Gln Cys Leu Gln Lys Cys Asp Pro Asn
    1410                1415                1420
Ala Asn Cys Val Gln Asp Ser Ala Ala Ala Pro Val Cys Val Cys Ala
1425                1430                1435                1440
Ala Gly Tyr Ser Gly Asp Gly Val Ser Cys Ser Ala Val Asp Pro Cys
                1445                1450                1455
Ala Arg Asp His Gly Gly Cys Ser Pro His Ala Asn Cys Thr Thr Val
            1460                1465                1470
Ala Pro Gly Gln Arg Thr Cys Thr Cys Leu Asp Gly Tyr Thr Gly Asp
        1475                1480                1485
Gly Glu Leu Cys Arg Glu Ala Asn Ser Cys Leu Ile Arg His Gly Gly
    1490                1495                1500
Cys His Met His Ala Glu Cys Ile Pro Thr Gly Pro Gln Gln Val Ser
1505                1510                1515                1520
Cys Ser Cys Arg Glu Gly Tyr Ser Gly Asp Gly Ile Arg Ala Cys Val
                1525                1530                1535
Leu Leu Asp Pro Cys Ser Gln Asn Asn Gly Gly Cys Ser Pro Tyr Ala
            1540                1545                1550
Val Cys Lys Ser Thr Gly Asp Gly Gln Arg Thr Cys Ala Cys Asp Ala
        1555                1560                1565
Val Arg Thr Val Gly Asp Gly Phe Thr Cys Arg Ala Arg Ile Ser Leu
    1570                1575                1580
Glu Leu Leu Arg Asp Lys His Ala Ser Phe Phe Ser Leu His Leu Leu
1585                1590                1595                1600
Glu Tyr Lys Asp Leu Lys Gly Asp Gly Pro Phe Thr Val Phe Val Pro
                1605                1610                1615
His Ala Asp Leu Leu Thr Asn Met Ser Gln Asp Glu Leu Ala Arg Ile
            1620                1625                1630
Arg Ala Asn Arg Gln Leu Val Phe Arg Tyr His Val Val Gly Cys Arg
        1635                1640                1645
Gln Leu Arg Ser Gln Glu Leu Leu Glu Glu Gly Tyr Ala Thr Ala Leu
    1650                1655                1660
Ser Gly His Pro Leu Arg Phe Ser Glu Arg Glu Gly Asn Ile Tyr Ile
1665                1670                1675                1680
Asn Asp Phe Ala Arg Val Val Ser Ser Asp Gln Glu Ala Val Asn Gly
                1685                1690                1695
Val Leu His Phe Ile Asp Arg Val Leu Leu Pro Pro Glu Val Leu His
            1700                1705                1710
Trp Glu Ala Asp Ala Ala Pro Ala Pro Arg Arg Asn Phe Thr Ala Ala
        1715                1720                1725
Ala Glu Thr Phe Gly Tyr Lys Ile Phe Ser Gly Leu Val Thr Met Ala
    1730                1735                1740
Gly Leu Leu Pro Leu Leu Gln Asp Ser Ser His Arg Pro Leu Thr Met
1745                1750                1755                1760
Leu Trp Pro Thr Asp Ser Ala Leu Gln Ala Leu Pro Pro Asp Arg Gln
                1765                1770                1775
Val Trp Leu Tyr His Lys Asp His Arg Asp Lys Leu Ala Ala Ile Leu
            1780                1785                1790
Arg Gly His Val Ile Arg Asn Val Glu Ala Leu Ala Ser Asp Leu Pro
        1795                1800                1805
Asn Leu Gly Pro Leu Arg Thr Met His Gly Thr Pro Ile Ser Phe Ser
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```
    1810                1815                1820
Cys Ser His Ala Arg Pro Gly Ala Leu Thr Val Gly Glu Asp Ala Ala
1825                1830                1835                1840
Arg Ile Val Gln Arg His Leu Pro Phe Glu Gly Gly Leu Ala Tyr Gly
                1845                1850                1855
Ile Asp Gln Leu Leu Glu Pro Pro Gly Leu Gly Ala Arg Cys Asp Arg
            1860                1865                1870
Phe Glu Thr Arg Pro Leu Trp Leu Lys Val Cys Ser Ile Cys Gly Leu
        1875                1880                1885
Glu Pro Pro Cys Pro Pro Gly Ser Gln Glu Gln Gly Ser Pro Glu Ala
    1890                1895                1900
Cys Trp Arg Tyr Phe Ser Lys Phe Trp Thr Ser Pro Pro Leu His Ser
1905                1910                1915                1920
Leu Ala Leu Arg Ser Val Trp Thr Arg Pro Ser His Trp Gly His Pro
                1925                1930                1935
Gln Gly Leu Gly Arg Gly Cys Tyr Arg Asn Cys Val Thr Thr Thr Trp
            1940                1945                1950
Lys Pro Ser Cys Cys Pro Gly His Tyr Gly Ser Glu Cys Arg Ala Cys
        1955                1960                1965
Pro Gly Gly Ala Ser Ser Pro Cys Asn Gln Arg Gly Ser Cys Met Asp
    1970                1975                1980
Gly Met Ser Gly Ser Gly Glu Cys Arg Cys His Thr Arg Phe Ala Gly
1985                1990                1995                2000
Thr Ala Cys Glu Leu Cys Ala Pro Gly Ala Phe Gly Pro Leu Cys Gln
                2005                2010                2015
Ala Cys Asn Cys Thr Ser His Gly Arg Cys Asp Glu Gly Leu Gly Gly
            2020                2025                2030
Ser Gly Ser Cys Phe Cys Asp Glu Gly Trp Thr Gly Pro Arg Cys Glu
        2035                2040                2045
Val Gln Leu Glu Leu Gln Pro Val Cys Ala Pro Pro Cys Ala Pro Gln
    2050                2055                2060
Ala Val Cys Arg Ala Gly Asn Ser Cys Glu Cys Ser Leu Gly Tyr Glu
2065                2070                2075                2080
Gly Asp Gly Arg Thr Cys Thr Val Val Asn Leu Cys Gln Asp Gly Arg
                2085                2090                2095
Gly Gly Cys Ser Glu His Ala Asn Cys Ser Gln Ala Gly Thr Ala Val
            2100                2105                2110
Thr Cys Ile Cys Trp Pro Asp Tyr Glu Gly Asp Gly Trp Ser Cys Arg
        2115                2120                2125
Ala Arg Asn Pro Cys Glu Asp Gly Leu Arg Gly Gly Cys Ser Glu His
    2130                2135                2140
Ala Asp Cys Leu Asn Thr Gly Pro Asn Thr Arg Arg Cys Val Cys His
2145                2150                2155                2160
Ala Gly Tyr Val Gly Asp Gly Leu Gln Cys Leu Leu Glu Pro Glu Pro
                2165                2170                2175
Pro Val Asp Arg Cys Leu Asp Arg Pro Pro Pro Cys His Ala Asp Ala
            2180                2185                2190
Val Cys Thr Asp Leu His Phe Gln Glu Lys Arg Ala Gly Val Phe His
        2195                2200                2205
Leu Gln Ala Pro Ser Gly Pro Tyr Gly Leu Asn Phe Ser Glu Ala Glu
    2210                2215                2220
Ala Ala Cys Gly Ala Gln Gly Ala Val Leu Ala Ser Leu Leu Gln Leu
2225                2230                2235                2240
Ser Ala Ala Gln Gln Leu Gly Leu His Leu Cys Leu Val Gly Trp Leu
                2245                2250                2255
Ala Asn Gly Ser Ala Ala His Pro Val Val Phe Pro Ala Ala Asp Cys
            2260                2265                2270
Gly Asp Gly Gln Val Gly Val Val Ser Leu Gly Ala Arg Glu Asn Leu
```

```
        2275                2280                2285
Ser Glu Arg Trp Asp Ala Tyr Cys Phe Arg Met Arg Asp Val Ala Cys
    2290                2295                2300
Arg Cys Arg Asp Gly Phe Val Gly Asp Gly Thr Ser Val Cys Asn Gly
2305                2310                2315                2320
Lys Leu Leu Asp Val Leu Ala Thr Thr Ala Asn Phe Ser Ile Phe Tyr
                2325                2330                2335
Gly Met Leu Leu Gly Tyr Ala Asn Ala Thr Pro Arg Gly Leu Glu Phe
            2340                2345                2350
Leu Asp Phe Leu Asp Asp Glu Arg Thr Tyr Lys Thr Leu Phe Val Pro
        2355                2360                2365
Val Asp Glu Ala Phe Thr Asp Asn Thr Thr Leu Ser Gly Pro Asp Leu
    2370                2375                2380
Glu Leu His Ala Ser Asn Thr Thr Phe Leu Ser Ala Asn Ala Ser Gln
2385                2390                2395                2400
Gly Ala Leu Leu Pro Ala His Ser Gly Leu Ser Leu Val Ile Gly Asn
                2405                2410                2415
Leu Gly Pro Gly Asn Ser Ser Arg Ala Pro Glu Val Pro Gly Ala Val
            2420                2425                2430
Val Val Ser Arg Val Ile Val Trp Asp Ile Leu Ala Phe Asn Gly Ile
        2435                2440                2445
Ile His Thr Leu Ala Ser Pro Leu Leu Ala Pro Pro Gln Ala Trp Ala
    2450                2455                2460
Val Val Ala Pro Glu Ala Pro Pro Val Ala Ala Gly Val Gly Ala Val
2465                2470                2475                2480
Val Ala Ala Gly Ala Val Leu Gly Leu Val Ala Gly Ala Leu Tyr Phe
                2485                2490                2495
Arg Gly Arg Ser Arg Ser Ala Gly Phe Gly Phe Ser Ala Phe Gln Ala
            2500                2505                2510
Glu Asp Ala Ala Ala Asp Asp Phe Ser Pro Trp Gln Glu Gly Thr Ser
        2515                2520                2525
Pro Pro Leu Val Ser Val Pro Asn Pro Val Phe Gly Ser His Glu Ala
    2530                2535                2540
Phe Cys Glu Pro Phe Asp Asp Ser Val Leu Glu Glu Asp Phe Pro Asp
2545                2550                2555                2560
Thr Gln Arg Ile Leu Glu Val Lys
                2565


<210> 257
<211> 2559
<212> PRT
<213> Mus musculus

<220>
<223> Mouse Stabilin-2  Q8R4U0


<400> 257
Met Ala Arg Ser Lys Leu Leu Leu Gly Lys Leu Leu Pro Leu Ile Leu
 1               5                  10                  15
Ile Phe Leu Gly Leu Leu Val Gln Asn Ala Cys Ser Pro Thr Glu Ala
            20                  25                  30
Pro Glu Leu Thr Lys Arg Cys Asp Lys Lys Ser Thr Leu Thr Ile Lys
        35                  40                  45
Thr Glu Cys Gln Ser Cys Ser Val Asn Ile Ala Val Lys Cys Pro Asp
    50                  55                  60
Gly Tyr Ile Lys Ile Thr Asn Gly Thr Val Gly Val Arg Asp Cys Arg
```

```
65                  70                  75                  80
Tyr Ser Leu Lys Ile Gln Ser Tyr Val Leu Asp Ile Pro Gly Cys Arg
                85                  90                  95
His Ile Cys Arg Lys Asp Tyr Leu Gln Pro Gln Cys Cys Pro Gly His
            100                 105                 110
Trp Gly Pro Asp Cys Met Glu Cys Pro Gly Gly Ala Arg Ala Pro Cys
        115                 120                 125
Gly Gly Arg Gly Val Cys Asp Glu Gly Met Glu Gly Thr Gly Ser Cys
    130                 135                 140
Ser Cys Arg Ala Gly Phe Arg Gly Thr Ala Cys Glu Asn Cys Ala Ala
145                 150                 155                 160
Glu Asp Val Phe Gly Pro Asn Cys Ser Ala Val Cys Ser Cys Val His
                165                 170                 175
Gly Val Cys Asn Ser Gly Ile Ser Gly Asp Gly Thr Cys Glu Cys Leu
            180                 185                 190
Ser Ala Tyr Arg Gly Pro Arg Cys Asp Lys Pro Ile Pro Glu Cys Ala
        195                 200                 205
Ala Leu Leu Cys Pro Glu Asn Ser Arg Cys Ser Pro Ser Ser Lys Asp
    210                 215                 220
Glu Thr Lys Leu Gln Cys Lys Cys Leu Pro Ser Tyr Lys Gly Asp Gly
225                 230                 235                 240
Gln Thr Cys Lys Pro Ile Asn Pro Cys Leu Lys Asn Val Cys His Pro
                245                 250                 255
His Ala Ser Cys Ser Tyr Leu Gly Pro Asn Arg His Ser Cys Val Cys
            260                 265                 270
Gln Lys Gly Tyr Gln Gly Asp Gly Gln Val Cys Leu Pro Val Asp Pro
        275                 280                 285
Cys Gln Thr Ser Tyr Gly Asn Cys Pro Thr Lys Ser Thr Val Cys Arg
    290                 295                 300
Tyr Asp Gly Pro Gly Gln Ser His Cys Glu Cys Lys Glu His Tyr Arg
305                 310                 315                 320
Asn Phe Val Pro Gly Val Gly Cys Ser Met Thr Asp Ile Cys Glu Ser
                325                 330                 335
Lys Asn Pro Cys His Lys Asn Ala Asn Cys Ser Thr Val Ser Pro Gly
            340                 345                 350
Gln Thr Gln Cys Thr Cys Gln Lys Gly Tyr Val Gly Asp Gly Leu Asn
        355                 360                 365
Cys Tyr Gly Asn Ile Met Gln Arg Leu Arg Glu Leu Asn Thr Glu Pro
    370                 375                 380
Arg Gly Met Trp Gln Gly Gln Leu Thr Ser Phe Ile Ser Ile Leu Asp
385                 390                 395                 400
Arg Thr Tyr Ala Trp Pro Leu Ser Asn Leu Gly Pro Phe Thr Val Leu
                405                 410                 415
Leu Pro Ser Asp Lys Gly Leu Lys Gly Val Asp Val Lys Glu Leu Leu
            420                 425                 430
Met Asp Lys Glu Ala Ala Arg Tyr Phe Val Lys Leu His Ile Ile Ala
        435                 440                 445
Gly Gln Met Ser Thr Glu Gln Met Tyr Asn Leu Asp Thr Phe Tyr Thr
    450                 455                 460
Leu Thr Gly Lys Ser Gly Glu Ile Ile Asn Lys Asp Lys Asp Asn Gln
465                 470                 475                 480
Leu Lys Leu Lys Leu Tyr Gly Ser Lys Ile Val Gln Ile Ile Gln Gly
                485                 490                 495
Asn Ile Val Ala Ser Asn Gly Leu Val His Ile Leu Asp Arg Ala Met
            500                 505                 510
Asp Lys Ile Glu Pro Thr Leu Glu Ser Asn Pro Gln Gln Thr Ile Met
        515                 520                 525
Thr Met Leu Gln Pro Arg Tyr Gly Lys Phe Arg Ser Leu Leu Glu Lys
```

```
    530                 535                 540
Thr Asn Val Gly Gln Ala Leu Glu Lys Gly Gly Ile Asp Glu Pro Tyr
545                 550                 555                 560
Thr Ile Phe Val Pro Ser Asn Glu Ala Leu Ser Asn Met Thr Ala Gly
                565                 570                 575
Val Leu Asp Tyr Leu Leu Ser Pro Glu Gly Ser Arg Lys Leu Leu Glu
            580                 585                 590
Leu Val Arg Tyr His Ile Val Ala Phe Thr Gln Leu Glu Val Ala Thr
        595                 600                 605
Leu Val Ser Thr Leu His Ile Arg Ser Met Ala Asn Gln Ile Ile Thr
    610                 615                 620
Phe Asn Ile Ser Ser Lys Gly Gln Ile Leu Ala Asn Asn Val Ala Val
625                 630                 635                 640
Asp Glu Thr Glu Val Ala Ala Lys Asn Gly Arg Ile Tyr Thr Leu Thr
                645                 650                 655
Gly Val Leu Ile Pro Pro Ser Ile Leu Pro Ile Leu Pro His Arg Cys
            660                 665                 670
Asn Glu Thr Lys Arg Glu Met Lys Leu Gly Thr Cys Val Arg Cys Phe
        675                 680                 685
Met Lys Asn Trp Ser Lys Cys Pro Thr Asn Ser Glu Pro Thr Ala Ile
    690                 695                 700
Phe Thr Asn Lys Cys Phe Tyr Gly Ser Arg Ala Trp Asn Leu Lys Ile
705                 710                 715                 720
Gly Cys Ala Arg Tyr Cys Asp Val Thr Val Glu Ile Pro Arg Cys Cys
                725                 730                 735
Lys Gly Phe Phe Gly Pro Asp Cys Asn Pro Cys Pro Gly Gly Phe Met
            740                 745                 750
Asn Pro Cys Ser Gly Asn Gly Gln Cys Ile Asp Gly Leu Gly Gly Asn
        755                 760                 765
Gly Thr Cys Ile Cys Glu Asp Gly Phe Gln Gly Ser Arg Cys Gln Phe
    770                 775                 780
Cys Ser Lys Pro Asn Arg Tyr Gly Pro Gln Cys Asn Arg Thr Cys Gln
785                 790                 795                 800
Cys Val His Gly Ile Cys Asp Asn Arg Leu Asp Ser Asp Gly Ser Cys
                805                 810                 815
Leu Pro Gly Thr Cys Arg Glu Gly Thr Ala Gly Arg Phe Cys Asp Lys
            820                 825                 830
Gln Thr Ser Ala Cys Gly Pro Tyr Met Gln Phe Cys His Ile His Ala
        835                 840                 845
Thr Cys Glu Tyr Ser Asn Glu Thr Ala Ser Cys Val Cys Asn Asp Gly
    850                 855                 860
Tyr Glu Gly Asp Gly Thr Leu Cys Ser Lys Lys Asp Pro Cys Leu Gly
865                 870                 875                 880
Ser Thr Ser Arg Gly Gly Cys Ser Pro Asn Ala Glu Cys Ile Gln Ala
                885                 890                 895
Ser Thr Gly Thr Tyr Ser Cys Val Cys Gln Arg Gly Trp Thr Gly Asn
            900                 905                 910
Gly Arg Asp Cys Val Glu Ile Asn Ser Cys Leu Leu Pro Ser Ser Gly
        915                 920                 925
Gly Cys His Asp Asn Ala Thr Cys Leu Tyr Val Gly Pro Gly Gln Asn
    930                 935                 940
Glu Cys Glu Cys Lys Lys Gly Phe Arg Gly Asn Gly Ile Asp Cys Glu
945                 950                 955                 960
Pro Ile Ile Ser Cys Leu Glu Gln Ile Glu Lys Cys His Pro Leu Ala
                965                 970                 975
Thr Cys Gln Tyr Thr Leu Ser Gly Val Trp Ser Cys Val Cys Gln Glu
            980                 985                 990
Gly Tyr Glu Gly Asn Gly Val Leu Cys Tyr Gly Asn Val Leu Met Glu
```

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        995                 1000                1005
Leu Ser Phe Leu Ser Glu Ala Ala Val Phe Tyr Gln Trp Ile Asn Asn
    1010                1015                1020
Ala Ser Leu Gln Ser Met Leu Ser Ala Thr Ser Asn Leu Thr Val Leu
1025                1030                1035                1040
Val Pro Ser Leu Gln Ala Ile Lys Asp Met Asp Gln Asn Glu Lys Ser
                1045                1050                1055
Phe Trp Leu Ser Arg Asn Asn Ile Pro Ala Leu Ile Lys Tyr His Thr
            1060                1065                1070
Leu Leu Gly Thr Tyr Arg Val Ala Asp Leu Gln Thr Leu Pro Ser Ser
        1075                1080                1085
His Met Leu Ala Thr Ser Leu Gln Gly Ser Phe Leu Arg Leu Asp Lys
    1090                1095                1100
Ala Asp Gly Asn Ile Thr Ile Glu Gly Ala Ser Phe Val Asp Gly Asp
1105                1110                1115                1120
Asn Ala Ala Thr Asn Gly Val Val His Ile Ile Asn Lys Val Leu Ile
                1125                1130                1135
Pro Gln Arg Gly Leu Thr Gly Ser Leu Pro Ser Leu Leu Thr Arg Leu
            1140                1145                1150
Glu Gln Met Pro Asp Tyr Ser Ile Phe Arg Gly Tyr Ile Ile His Tyr
        1155                1160                1165
Asn Leu Ala Ser Ala Ile Glu Ala Ala Asp Ala Tyr Thr Val Phe Val
    1170                1175                1180
Pro Asn Asn Glu Ala Ile Glu Ser Tyr Ile Arg Glu Lys Lys Ala Thr
1185                1190                1195                1200
Ser Leu Lys Glu Asp Ile Leu Gln Tyr His Val Val Leu Gly Glu Lys
                1205                1210                1215
Leu Leu Arg Asn Asp Leu His Asn Gly Met His Arg Glu Thr Met Leu
            1220                1225                1230
Gly Phe Ser Tyr Leu Leu Ala Phe Phe Leu His Asn Asp Gln Leu Tyr
        1235                1240                1245
Val Asn Glu Ala Pro Ile Asn Tyr Thr Asn Val Ala Thr Asp Lys Gly
    1250                1255                1260
Val Ile His Gly Leu Glu Lys Val Leu Glu Ile Lys Lys Asn Arg Cys
1265                1270                1275                1280
Asp Asn Asn Asp Thr Ile Ile Val Arg Gly Lys Cys Gly Lys Cys Ser
                1285                1290                1295
Gln Gln Thr Leu Cys Pro Leu Glu Thr Lys Pro Leu Ser Glu Thr Arg
            1300                1305                1310
Lys Cys Ile Tyr Ser Val Tyr Phe Met Gly Lys Arg Ser Ile Phe Ile
        1315                1320                1325
Gly Cys Gln Leu Gln Cys Val Arg Thr Ile Ile Thr Ser Ala Cys Cys
    1330                1335                1340
Ala Gly Phe Phe Gly Pro Gln Cys Gln Ala Cys Pro Gly Lys Gly Gln
1345                1350                1355                1360
Asn Val Cys Ser Gly Asn Gly Phe Cys Leu Asp Gly Val Asn Gly Thr
                1365                1370                1375
Gly Thr Cys Glu Cys Glu Gln Gly Phe Asn Gly Thr Ala Cys Glu Thr
            1380                1385                1390
Cys Thr Glu Gly Lys Tyr Gly Ile His Cys Asp Gln Ala Cys Ser Cys
        1395                1400                1405
Val His Gly Arg Cys Asn Gln Gly Pro Ser Gly Asp Gly Ser Cys Asp
    1410                1415                1420
Cys Asp Val Gly Trp Arg Gly Val Lys Cys Asp Ser Glu Ile Thr Thr
1425                1430                1435                1440
Asp Asn Cys Asn Gly Thr Cys His Thr Ser Ala Asn Cys Leu Leu Asp
                1445                1450                1455
Pro Asp Gly Lys Ala Ser Cys Lys Cys Ala Ala Gly Phe Gln Gly Asn
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            1460                1465                1470
Gly Thr Val Cys Thr Ala Ile Asn Ala Cys Glu Ile Ser Asn Gly Gly
        1475                1480                1485
Cys Ser Ala Lys Ala Asp Cys Lys Arg Thr Ile Pro Gly Ser Arg Val
    1490                1495                1500
Cys Val Cys Lys Ala Gly Tyr Thr Gly Asp Gly Ile Val Cys Leu Glu
1505                1510                1515                1520
Ile Asn Pro Cys Leu Glu Asn His Gly Gly Cys Asp Arg His Ala Glu
                1525                1530                1535
Cys Thr Gln Thr Gly Pro Asn Gln Ala Val Cys Asn Cys Leu Pro Lys
            1540                1545                1550
Tyr Thr Gly Asp Gly Lys Val Cys Thr Leu Ile Asn Val Cys Leu Thr
        1555                1560                1565
Asn Asn Gly Gly Cys Ser Pro Phe Ala Phe Cys Asn His Thr Glu Gln
    1570                1575                1580
Asp Gln Arg Thr Cys Thr Cys Lys Pro Asp Tyr Thr Gly Asp Gly Ile
1585                1590                1595                1600
Val Cys Arg Gly Ser Ile His Ser Glu Leu Pro Lys Asn Pro Ser Thr
                1605                1610                1615
Ser Gln Tyr Phe Phe Gln Leu Gln Glu His Ala Val Gln Glu Leu Ala
            1620                1625                1630
Gly Pro Gly Pro Phe Thr Val Phe Val Pro Ser Ser Asp Ser Phe Asn
        1635                1640                1645
Ser Glu Ser Lys Leu Lys Val Trp Asp Lys Gln Gly Leu Met Ser Gln
    1650                1655                1660
Ile Leu Arg Tyr His Val Val Ala Cys Gln Gln Leu Leu Leu Glu Asn
1665                1670                1675                1680
Leu Lys Val Ile Thr Ser Ala Thr Thr Leu Gln Gly Glu Pro Ile Ser
                1685                1690                1695
Ile Ser Val Ser Gln Asp Thr Val Leu Ile Asn Lys Lys Ala Lys Val
            1700                1705                1710
Leu Ser Ser Asp Ile Ile Ser Thr Asn Gly Val Ile His Val Ile Asp
        1715                1720                1725
Thr Leu Leu Ser Pro Gln Asn Leu Leu Ile Thr Pro Lys Gly Ala Ser
    1730                1735                1740
Gly Arg Val Leu Leu Asn Leu Thr Thr Val Ala Ala Asn His Gly Tyr
1745                1750                1755                1760
Thr Lys Phe Ser Lys Leu Ile Gln Asp Ser Gly Leu Leu Lys Val Ile
                1765                1770                1775
Thr Asp Pro Met His Thr Pro Val Thr Leu Phe Trp Pro Thr Asp Lys
            1780                1785                1790
Ala Leu Gln Ala Leu Pro Gln Glu Gln Gln Asp Phe Leu Phe Asn Glu
        1795                1800                1805
Asp Asn Lys Asp Lys Leu Lys Ala Tyr Leu Lys Phe His Val Ile Arg
    1810                1815                1820
Asp Thr Met Ala Leu Ala Ser Asp Leu Pro Arg Ser Ala Ser Trp Lys
1825                1830                1835                1840
Thr Leu Gln Gly Ser Glu Leu Ser Val Arg Cys Gly Thr Gly Ser Asp
                1845                1850                1855
Val Gly Glu Leu Phe Leu Asn Gly Gln Met Cys Arg Ile Ile Gln Arg
            1860                1865                1870
Arg Leu Leu Phe Asp Gly Gly Val Ala Tyr Gly Ile Asp Cys Leu Leu
        1875                1880                1885
Met Asp Pro Thr Glu Gly Gly Arg Cys Asp Thr Phe Thr Thr Phe Asn
    1890                1895                1900
Ile Pro Gly Glu Cys Gly Ser Cys Phe Ser Thr Pro Arg Cys Pro Leu
1905                1910                1915                1920
Gln Ser Lys Pro Lys Gly Val Arg Lys Lys Cys Ile Tyr Asn Pro Leu
```

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                1925                1930                1935
Pro Phe Arg Arg Asp Val Glu Gly Cys Gln Asn Leu Cys Thr Leu Val
            1940                1945                1950
Val His Val Pro Arg Cys Cys Ser Gly Tyr Phe Met Pro Asp Cys Gln
        1955                1960                1965
Ala Cys Pro Gly Gly Pro Asp Thr Pro Cys Asn Asn Arg Gly Met Cys
    1970                1975                1980
Tyr Asp Gln Tyr Lys Pro Thr Gly Gln Cys Gln Cys His Thr Gly Phe
1985                1990                1995                2000
Asn Gly Thr Ala Cys Glu Leu Cys Leu Pro Gly Arg Phe Gly Pro Asp
                2005                2010                2015
Cys Gln Pro Cys Gly Cys Ser Glu His Gly Gln Cys Asp Glu Gly Ile
            2020                2025                2030
Thr Gly Ser Gly Gln Cys Leu Cys Glu Ala Gly Trp Thr Gly Arg Phe
        2035                2040                2045
Cys Asp Ala Pro Thr Val Val Ile Pro Val Cys Ile Pro Ala Cys Ser
    2050                2055                2060
Met His Ala Thr Cys Met Glu Asn Asn Thr Cys Val Cys Asn Leu Asn
2065                2070                2075                2080
Tyr Glu Gly Asp Gly Ile Thr Cys Thr Val Val Asp Phe Cys Lys Gln
                2085                2090                2095
Asn Asn Gly Gly Cys Ala Lys Val Ala Lys Cys Ser Gln Lys Gly Thr
            2100                2105                2110
Gln Val Ser Cys Ser Cys Gln Lys Gly Tyr Lys Gly Asp Gly His Ser
        2115                2120                2125
Cys Thr Glu Ile Asp Pro Cys Ala Asn Gly Val Asn Gly Gly Cys His
    2130                2135                2140
Glu His Ala Thr Cys Arg Met Thr Gly Pro Gly Lys Gln Lys Cys Glu
2145                2150                2155                2160
Cys Lys Ser His Tyr Val Gly Asp Gly Arg Asp Cys Glu Pro Glu Gln
                2165                2170                2175
Leu Pro Leu Asp Arg Cys Leu Gln Asp Asn Gly Gln Cys His Pro Asp
            2180                2185                2190
Ala Asn Cys Val Asp Leu His Phe Gln Asp Thr Thr Val Gly Val Phe
        2195                2200                2205
His Leu Arg Ser Pro Leu Gly Gln Tyr Lys Leu Thr Phe Asp Lys Ala
    2210                2215                2220
Lys Glu Ala Cys Ala Lys Glu Ala Ala Ser Ile Ala Thr Tyr Asn Gln
2225                2230                2235                2240
Leu Ser Tyr Ala Gln Lys Ala Lys Tyr His Leu Cys Ser Ala Gly Trp
                2245                2250                2255
Leu Glu Ser Gly Arg Val Ala Tyr Pro Thr Ile Tyr Ala Ser Lys Lys
            2260                2265                2270
Cys Ala Asn Ile Val Gly Ile Val Asp Tyr Gly Thr Arg Thr Asn Lys
        2275                2280                2285
Ser Glu Met Trp Asp Val Phe Cys Tyr Arg Met Lys Asp Val Asn Cys
    2290                2295                2300
Thr Cys Lys Ala Gly Tyr Val Gly Asp Gly Phe Ser Cys Asn Gly Asn
2305                2310                2315                2320
Leu Leu Gln Val Leu Met Ser Phe Pro Ser Leu Thr Asn Phe Leu Thr
                2325                2330                2335
Glu Val Leu Val Phe Ser Arg Ser Ser Ala Gln Gly Arg Ala Phe Leu
            2340                2345                2350
Lys His Leu Thr Asp Leu Ser Ile Ser Gly Thr Leu Phe Val Pro Gln
        2355                2360                2365
Asn Ser Gly Leu Pro Lys Asn Lys Ser Leu Ser Gly Arg Asp Ile Glu
    2370                2375                2380
His His Leu Thr Asn Val Asn Val Ser Phe Tyr Asp Asp Leu Val Asn
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2385 2390 2395 2400
Gly Thr Val Leu Lys Thr Arg Leu Gly Ser Gln Leu Leu Ile Thr Ser
2405 2410 2415
Ser Gln Asp Gln Leu His Gln Glu Ala Arg Phe Val Asp Gly Arg Ala
2420 2425 2430
Ile Leu Gln Trp Asp Ile Ile Ala Ser Asn Gly Val Leu His Ile Ile
2435 2440 2445
Ser Glu Pro Leu Lys Ala Pro Pro Thr Ala Ala Thr Ala Ala His Ser
2450 2455 2460
Gly Leu Gly Thr Gly Ile Phe Cys Ala Val Val Leu Val Thr Gly Ala
2465 2470 2475 2480
Ile Ala Leu Ala Ala Tyr Ser Tyr Phe Arg Leu Asn Gln Arg Thr Thr
2485 2490 2495
Gly Phe Arg Arg Phe Glu Ser Glu Asp Asp Ile Asp Ala Leu Ala Phe
2500 2505 2510
Gly Lys Gln Gln Pro Glu Ser Ile Thr Asn Pro Leu Tyr Glu Thr Ser
2515 2520 2525
Thr Pro Ala Ala Pro Glu Pro Ser Cys Asp Pro Phe Thr Asp Ser Gly
2530 2535 2540
Glu Arg Glu Leu Glu Asn Ser Asp Pro Leu Gly Ala Leu Arg Ser
2545 2550 2555

<210> 258
<211> 1431
<212> PRT
<213> Rattus norvegicus

<220>
<223> Rat Stabilin-2 Q8CFM6

<400> 258
Ser Leu Pro Ser Leu Leu Thr Arg Leu Glu Gln Met Pro Asp Tyr Ser
1 5 10 15
Ile Phe Arg Gly Tyr Ile Ile His Tyr Asn Leu Ala Ser Ala Ile Glu
20 25 30
Ser Ala Asp Ala Tyr Thr Val Phe Val Pro Asn Asn Glu Ala Ile Glu
35 40 45
Asn Tyr Ile Arg Glu Lys Lys Ala Thr Ser Leu Lys Glu Asp Ile Leu
50 55 60
Arg Tyr His Val Val Leu Gly Glu Lys Leu Leu Lys Asn Asp Leu His
65 70 75 80
Asn Gly Met His Arg Glu Thr Met Leu Gly Phe Ser Tyr Leu Leu Ala
85 90 95
Phe Phe Leu Arg Asn Asp Gln Leu Tyr Val Asn Glu Ala Pro Ile Asn
100 105 110
Tyr Thr Asn Val Ala Thr Asp Lys Gly Val Ile His Gly Leu Glu Lys
115 120 125
Val Leu Glu Ile Gln Lys Asn Arg Cys Asp Asn Asn Asp Thr Ile Ile
130 135 140
Val Arg Gly Glu Cys Gly Lys Cys Ser Gln Gln Ala Pro Cys Pro Leu
145 150 155 160
Glu Thr Lys Pro Leu Arg Glu Thr Arg Lys Cys Ile Tyr Ser Ile Tyr
165 170 175
Phe Met Gly Lys Arg Ser Val Phe Ile Gly Cys Gln Pro Gln Cys Val
180 185 190
Arg Thr Ile Ile Thr Arg Ala Cys Cys Ala Gly Phe Phe Gly Pro Gln

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        195                 200                 205
Cys Gln Ala Cys Pro Gly Arg Gly Gln Asn Val Cys Ser Gly Asn Gly
    210                 215                 220
Phe Cys Leu Asp Gly Val Asn Gly Thr Gly Thr Cys Gln Cys Gly Leu
225                 230                 235                 240
Gly Phe Asn Gly Thr Ala Cys Glu Thr Cys Thr Glu Gly Lys Tyr Gly
                245                 250                 255
Ile His Cys Asp Gln Ala Cys Ser Cys Val His Gly Arg Cys Ser Gln
            260                 265                 270
Gly Pro Leu Gly Asp Gly Ser Cys Asp Cys Asp Val Gly Trp Arg Gly
        275                 280                 285
Val Lys Cys Asp Met Glu Ile Thr Thr Asp Asn Cys Asn Gly Thr Cys
    290                 295                 300
His Thr Ser Ala Asn Cys Leu Leu Asp Pro Asp Gly Lys Ala Ser Cys
305                 310                 315                 320
Lys Cys Ala Ala Gly Phe Arg Gly Asn Gly Thr Val Cys Thr Ala Ile
                325                 330                 335
Asn Ala Cys Glu Thr Ser Asn Gly Gly Cys Ser Thr Lys Ala Asp Cys
            340                 345                 350
Lys Arg Thr Thr Pro Gly Asn Arg Val Cys Val Cys Lys Ala Gly Tyr
        355                 360                 365
Thr Gly Asp Gly Ile Val Cys Leu Glu Ile Asn Pro Cys Leu Glu Asn
    370                 375                 380
His Gly Gly Cys Asp Arg Asn Ala Glu Cys Thr Gln Thr Gly Pro Asn
385                 390                 395                 400
Gln Ala Val Cys Asn Cys Leu Pro Lys Tyr Thr Gly Asp Gly Lys Val
                405                 410                 415
Cys Ser Leu Ile Asn Val Cys Leu Thr Asn Asn Gly Gly Cys Ser Pro
            420                 425                 430
Phe Ala Phe Cys Asn Tyr Thr Glu Gln Asp Gln Arg Ile Cys Thr Cys
        435                 440                 445
Lys Pro Asp Tyr Thr Gly Asp Gly Ile Val Cys Arg Gly Ser Ile Tyr
    450                 455                 460
Gly Glu Leu Pro Lys Asn Pro Ser Thr Ser Gln Tyr Phe Phe Gln Leu
465                 470                 475                 480
Gln Glu His Ala Val Arg Glu Leu Ala Gly Pro Gly Pro Phe Thr Val
                485                 490                 495
Phe Ala Pro Leu Ser Ser Ser Phe Asn His Glu Pro Arg Ile Lys Asp
            500                 505                 510
Trp Asp Gln Gln Gly Leu Met Ser Gln Val Leu Arg Tyr His Val Val
        515                 520                 525
Gly Cys Gln Gln Leu Leu Leu Asp Asn Leu Lys Val Thr Thr Ser Ala
    530                 535                 540
Thr Thr Leu Gln Gly Glu Pro Val Ser Ile Ser Val Ser Gln Asp Thr
545                 550                 555                 560
Val Phe Ile Asn Asn Glu Ala Lys Val Leu Ser Ser Asp Ile Ile Ser
                565                 570                 575
Thr Asn Gly Val Ile His Val Ile Asp Lys Leu Leu Ser Pro Lys Asn
            580                 585                 590
Leu Leu Ile Thr Pro Lys Asp Ala Leu Gly Arg Val Leu Gln Asn Leu
        595                 600                 605
Thr Thr Val Ala Ala Asn His Gly Tyr Thr Lys Phe Ser Lys Leu Ile
    610                 615                 620
Gln Asp Ser Gly Leu Leu Ser Val Ile Thr Asp Ser Ile His Thr Pro
625                 630                 635                 640
Val Thr Val Phe Trp Pro Thr Asp Lys Ala Leu Glu Ala Leu Pro Pro
                645                 650                 655
Glu Gln Gln Asp Phe Leu Phe Asn Gln Asp Asn Lys Asp Lys Leu Lys
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            660                 665                 670
Ser Tyr Leu Lys Phe His Val Ile Arg Asp Ser Lys Ala Leu Ala Ser
        675                 680                 685
Asp Leu Pro Arg Ser Ala Ser Trp Lys Thr Leu Gln Gly Ser Glu Leu
    690                 695                 700
Ser Val Arg Cys Gly Thr Gly Ser Asp Ile Gly Glu Leu Phe Leu Asn
705                 710                 715                 720
Glu Gln Met Cys Arg Phe Ile His Arg Gly Leu Leu Phe Asp Val Gly
                725                 730                 735
Val Ala Tyr Gly Ile Asp Cys Leu Leu Met Asn Pro Thr Leu Gly Gly
            740                 745                 750
Arg Cys Asp Thr Phe Thr Thr Phe Asp Ile Pro Gly Glu Cys Gly Ser
        755                 760                 765
Cys Ile Phe Thr Pro Lys Cys Pro Leu Lys Ser Lys Pro Lys Gly Val
    770                 775                 780
Lys Lys Lys Cys Ile Tyr Asn Pro Leu Pro Phe Arg Arg Asn Val Glu
785                 790                 795                 800
Gly Cys Gln Asn Leu Cys Thr Val Val Ile Gln Thr Pro Arg Cys Cys
                805                 810                 815
His Gly Tyr Phe Met Pro Asp Cys Gln Ala Cys Pro Gly Gly Pro Asp
            820                 825                 830
Thr Pro Cys Asn Asn Arg Gly Met Cys Arg Asp Leu Tyr Thr Pro Met
        835                 840                 845
Gly Gln Cys Leu Cys His Thr Gly Phe Asn Gly Thr Ala Cys Glu Leu
    850                 855                 860
Cys Trp His Gly Arg Phe Gly Pro Asp Cys Gln Pro Arg Ser Cys Ser
865                 870                 875                 880
Glu His Gly Gln Cys Asp Glu Gly Ile Thr Gly Ser Gly Glu Cys Leu
                885                 890                 895
Cys Glu Thr Gly Trp Thr Ala Ala Ser Cys Asp Thr Pro Thr Ala Val
            900                 905                 910
Phe Ala Val Cys Thr Pro Ala Cys Ser Val His Ala Thr Cys Thr Glu
        915                 920                 925
Asn Asn Thr Cys Val Cys Asn Leu Asn Tyr Glu Gly Asp Gly Ile Thr
    930                 935                 940
Cys Thr Val Val Asp Phe Cys Lys Gln Asn Asn Gly Gly Cys Ala Lys
945                 950                 955                 960
Val Ala Lys Cys Ser Gln Lys Gly Thr Gln Val Ser Cys Ser Cys Lys
                965                 970                 975
Lys Gly Tyr Lys Gly Asp Gly Tyr Ser Cys Ile Glu Ile Asp Pro Cys
            980                 985                 990
Ala Asp Gly Val Asn Gly Gly Cys His Glu His Ala Thr Cys Arg Met
        995                 1000                1005
Thr Gly Pro Gly Lys His Lys Cys Glu Cys Lys Ser His Tyr Val Gly
    1010                1015                1020
Asp Gly Val Asp Cys Glu Pro Glu Gln Leu Pro Leu Asp Arg Cys Leu
1025                1030                1035                1040
Gln Asp Asn Gly Gln Cys His Pro Asp Ala Ser Cys Ala Asp Leu Tyr
                1045                1050                1055
Phe Gln Asp Thr Thr Val Gly Val Phe His Leu Arg Ser Pro Leu Gly
            1060                1065                1070
Gln Tyr Lys Leu Thr Phe Asp Lys Ala Lys Glu Ala Cys Ala Lys Glu
        1075                1080                1085
Ala Ala Thr Ile Ala Thr Tyr Asn Gln Leu Ser Tyr Ala Gln Lys Ala
    1090                1095                1100
Lys Tyr His Leu Cys Ser Ala Gly Trp Leu Glu Ser Gly Arg Val Ala
1105                1110                1115                1120
Tyr Pro Thr Thr Tyr Ala Ser Gln Lys Cys Gly Ala Asn Val Val Gly
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1125 1130 1135
Ile Val Asp Tyr Gly Ser Arg Ala Asn Lys Ser Glu Met Trp Asp Val
1140 1145 1150
Phe Cys Tyr Arg Met Lys Asp Val Asn Cys Thr Cys Lys Ala Gly Tyr
1155 1160 1165
Val Gly Asp Gly Phe Ser Cys Ser Gly Asn Leu Leu Gln Val Leu Met
1170 1175 1180
Ser Phe Pro Ser Leu Thr Asn Phe Leu Thr Glu Val Leu Ala Phe Ser
1185 1190 1195 1200
Lys Ser Ser Ala Arg Gly Gln Ala Phe Leu Lys His Leu Thr Asp Leu
1205 1210 1215
Ser Ile Arg Gly Thr Leu Phe Val Pro Gln Asn Ser Gly Leu Pro Gly
1220 1225 1230
Asn Lys Ser Leu Ser Gly Arg Asp Ile Glu His His Leu Thr Asn Val
1235 1240 1245
Asn Val Ser Phe Tyr Asn Asp Leu Val Asn Gly Thr Phe Leu Arg Thr
1250 1255 1260
Met Leu Gly Ser Gln Leu Leu Ile Thr Phe Ser Gln Asp Gln Leu His
1265 1270 1275 1280
Gln Glu Thr Arg Phe Val Asp Gly Arg Ser Ile Leu Gln Trp Asp Ile
1285 1290 1295
Ile Ala Ala Asn Gly Ile Leu His Ile Ile Ser Glu Pro Leu Arg Ala
1300 1305 1310
Pro Pro Thr Ala Ala Thr Ala Ala His Ser Gly Leu Gly Thr Gly Ile
1315 1320 1325
Phe Cys Ala Val Val Leu Val Thr Gly Ala Ile Ala Leu Ala Ala Tyr
1330 1335 1340
Ser Tyr Phe Arg Leu Lys Gln Arg Thr Thr Gly Phe Gln Arg Phe Asp
1345 1350 1355 1360
Gln Lys Arg Thr Leu Met Ser Trp Leu Leu Ala Ser Ser Ser Pro Arg
1365 1370 1375
Ile Ser Gln Thr Leu Cys Met Arg Pro Gln Arg Arg His Pro Gln Ser
1380 1385 1390
Pro Pro Val Thr Pro Ser Gln Thr Leu Glu Asn Arg Ile Trp Arg Thr
1395 1400 1405
Ala Thr Leu Trp Gly His Cys Gly Pro Asp Met Arg Ser Gln Gln Ala
1410 1415 1420
Thr Thr Val Thr Val Pro Arg
1425 1430

<210> 259
<211> 778
<212> PRT
<213> Mus musculus

<220>
<223> Mouse CD44 P15379

<400> 259
Met Asp Lys Phe Trp Trp His Thr Ala Trp Gly Leu Cys Leu Leu Gln
1 5 10 15
Leu Ser Leu Ala His Gln Gln Ile Asp Leu Asn Val Thr Cys Arg Tyr
20 25 30
Ala Gly Val Phe His Val Glu Lys Asn Gly Arg Tyr Ser Ile Ser Arg
35 40 45
Thr Glu Ala Ala Asp Leu Cys Gln Ala Phe Asn Ser Thr Leu Pro Thr

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    50                  55                  60
Met Asp Gln Met Lys Leu Ala Leu Ser Lys Gly Phe Glu Thr Cys Arg
65                  70                  75                  80
Tyr Gly Phe Ile Glu Gly Asn Val Val Ile Pro Arg Ile His Pro Asn
                85                  90                  95
Ala Ile Cys Ala Ala Asn His Thr Gly Val Tyr Ile Leu Val Thr Ser
            100                 105                 110
Asn Thr Ser His Tyr Asp Thr Tyr Cys Phe Asn Ala Ser Ala Pro Pro
        115                 120                 125
Glu Glu Asp Cys Thr Ser Val Thr Asp Leu Pro Asn Ser Phe Asp Gly
    130                 135                 140
Pro Val Thr Ile Thr Ile Val Asn Arg Asp Gly Thr Arg Tyr Ser Lys
145                 150                 155                 160
Lys Gly Glu Tyr Arg Thr His Gln Glu Asp Ile Asp Ala Ser Asn Ile
                165                 170                 175
Ile Asp Asp Asp Val Ser Ser Gly Ser Thr Ile Glu Lys Ser Thr Pro
            180                 185                 190
Glu Gly Tyr Ile Leu His Thr Tyr Leu Pro Thr Glu Gln Pro Thr Gly
        195                 200                 205
Asp Gln Asp Asp Ser Phe Phe Ile Arg Ser Thr Leu Ala Thr Ile Ala
    210                 215                 220
Ser Thr Val His Ser Lys Ser His Ala Ala Ala Gln Lys Gln Asn Asn
225                 230                 235                 240
Trp Ile Trp Ser Trp Phe Gly Asn Ser Gln Ser Thr Thr Gln Thr Gln
                245                 250                 255
Glu Pro Thr Thr Ser Ala Thr Thr Ala Leu Met Thr Thr Pro Glu Thr
            260                 265                 270
Pro Pro Lys Arg Gln Glu Ala Gln Asn Trp Phe Ser Trp Leu Phe Gln
        275                 280                 285
Pro Ser Glu Ser Lys Ser His Leu His Thr Thr Thr Lys Met Pro Gly
    290                 295                 300
Thr Glu Ser Asn Thr Asn Pro Thr Gly Trp Glu Pro Asn Glu Glu Asn
305                 310                 315                 320
Glu Asp Glu Thr Asp Thr Tyr Pro Ser Phe Ser Gly Ser Gly Ile Asp
                325                 330                 335
Asp Asp Glu Asp Phe Ile Ser Ser Thr Ile Ala Thr Thr Pro Arg Val
            340                 345                 350
Ser Ala Arg Thr Glu Asp Asn Gln Asp Trp Thr Gln Trp Lys Pro Asn
        355                 360                 365
His Ser Asn Pro Glu Val Leu Leu Gln Thr Thr Thr Arg Met Ala Asp
    370                 375                 380
Ile Asp Arg Ile Ser Thr Ser Ala His Gly Glu Asn Trp Thr Pro Glu
385                 390                 395                 400
Pro Gln Pro Pro Phe Asn Asn His Glu Tyr Gln Asp Glu Glu Glu Thr
                405                 410                 415
Pro His Ala Thr Ser Thr Thr Pro Asn Ser Thr Ala Glu Ala Ala Ala
            420                 425                 430
Thr Gln Gln Glu Thr Trp Phe Gln Asn Gly Trp Gln Gly Lys Asn Pro
        435                 440                 445
Pro Thr Pro Ser Glu Asp Ser His Val Thr Glu Gly Thr Thr Ala Ser
    450                 455                 460
Ala His Asn Asn His Pro Ser Gln Arg Ile Thr Thr Gln Ser Gln Glu
465                 470                 475                 480
Asp Val Ser Trp Thr Asp Phe Phe Asp Pro Ile Ser His Pro Met Gly
                485                 490                 495
Gln Gly His Gln Thr Glu Ser Lys Asp Thr Asp Ser Ser His Ser Thr
            500                 505                 510
Thr Leu Gln Pro Thr Ala Ala Pro Asn Thr His Leu Val Glu Asp Leu
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        515                 520                 525
Asn Arg Thr Gly Pro Leu Ser Val Thr Thr Pro Gln Ser His Ser Gln
    530                 535                 540
Asn Phe Ser Thr Leu His Gly Glu Pro Glu Glu Asp Glu Asn Tyr Pro
545                 550                 555                 560
Thr Thr Ser Ile Leu Pro Ser Ser Thr Lys Ser Ser Ala Lys Asp Ala
                565                 570                 575
Arg Arg Gly Gly Ser Leu Pro Thr Asp Thr Thr Thr Ser Val Glu Gly
            580                 585                 590
Tyr Thr Phe Gln Tyr Pro Asp Thr Met Glu Asn Gly Thr Leu Phe Pro
        595                 600                 605
Val Thr Pro Ala Lys Thr Glu Val Phe Gly Glu Thr Glu Val Thr Leu
    610                 615                 620
Ala Thr Asp Ser Asn Val Asn Val Asp Gly Ser Leu Pro Gly Asp Arg
625                 630                 635                 640
Asp Ser Ser Lys Asp Ser Arg Gly Ser Ser Arg Thr Val Thr His Gly
                645                 650                 655
Ser Glu Leu Ala Gly His Ser Ser Ala Asn Gln Asp Ser Gly Val Thr
            660                 665                 670
Thr Thr Ser Gly Pro Met Arg Arg Pro Gln Ile Pro Glu Trp Leu Ile
        675                 680                 685
Ile Leu Ala Ser Leu Leu Ala Leu Ala Leu Ile Leu Ala Val Cys Ile
    690                 695                 700
Ala Val Asn Ser Arg Arg Arg Cys Gly Gln Lys Lys Lys Leu Val Ile
705                 710                 715                 720
Asn Gly Gly Asn Gly Thr Val Glu Asp Arg Lys Pro Ser Glu Leu Asn
                725                 730                 735
Gly Glu Ala Ser Lys Ser Gln Glu Met Val His Leu Val Asn Lys Glu
            740                 745                 750
Pro Ser Glu Thr Pro Asp Gln Cys Met Thr Ala Asp Glu Thr Arg Asn
        755                 760                 765
Leu Gln Ser Val Asp Met Lys Ile Gly Val
    770                 775


<210> 260
<211> 503
<212> PRT
<213> Rattus norvegicus

<220>
<223> Rat CD44  P26051


<400> 260
Met Asp Lys Val Trp Trp His Thr Ala Trp Gly Leu Leu Cys Leu Leu
 1               5                  10                  15
Gln Leu Ser Leu Ala Gln Gln Gln Ile Asp Leu Asn Ile Thr Cys Arg
            20                  25                  30
Tyr Ala Gly Val Phe His Val Glu Lys Asn Gly Arg Tyr Ser Ile Ser
        35                  40                  45
Arg Thr Glu Ala Ala Asp Leu Cys Glu Ala Phe Asn Thr Thr Leu Pro
    50                  55                  60
Thr Met Ala Gln Met Glu Leu Ala Leu Arg Lys Gly Phe Glu Thr Cys
65                  70                  75                  80
Arg Tyr Gly Phe Ile Glu Gly His Val Val Ile Pro Arg Ile His Pro
                85                  90                  95
Asn Ala Ile Cys Ala Ala Asn Asn Thr Gly Val Tyr Ile Leu Leu Ala
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            100                 105                 110
Ser Asn Thr Ser His Tyr Asp Thr Tyr Cys Phe Asn Ala Ser Ala Pro
        115                 120                 125
Leu Glu Glu Asp Cys Thr Ser Val Thr Asp Leu Pro Asn Ser Phe Asp
    130                 135                 140
Gly Pro Val Thr Ile Thr Ile Val Asn Arg Asp Gly Thr Arg Tyr Ser
145                 150                 155                 160
Lys Lys Gly Glu Tyr Arg Thr His Gln Glu Asp Ile Asp Ala Ser Asn
                165                 170                 175
Ile Ile Asp Glu Asp Val Ser Ser Gly Ser Thr Ile Glu Lys Ser Thr
            180                 185                 190
Pro Glu Gly Tyr Ile Leu His Thr Asp Leu Pro Thr Ser Gln Pro Thr
        195                 200                 205
Gly Asp Arg Asp Asp Ala Phe Phe Ile Gly Ser Thr Leu Ala Thr Ile
    210                 215                 220
Ala Thr Thr Pro Trp Val Ser Ala His Thr Lys Gln Asn Gln Glu Arg
225                 230                 235                 240
Thr Gln Trp Asn Pro Ile His Ser Asn Pro Glu Val Leu Leu Gln Thr
                245                 250                 255
Thr Thr Arg Met Thr Asp Ile Asp Arg Asn Ser Thr Ser Ala His Gly
            260                 265                 270
Glu Asn Trp Thr Gln Glu Pro Gln Pro Pro Phe Asn Asn His Glu Tyr
        275                 280                 285
Gln Asp Glu Glu Glu Thr Pro His Ala Thr Ser Thr Thr Trp Ala Asp
    290                 295                 300
Pro Asn Ser Thr Thr Glu Glu Ala Ala Thr Gln Lys Glu Lys Trp Phe
305                 310                 315                 320
Glu Asn Glu Trp Gln Gly Lys Asn Pro Pro Thr Pro Ser Glu Asp Ser
                325                 330                 335
His Val Thr Glu Gly Thr Thr Ala Ser Ala His Asn Asn His Pro Ser
            340                 345                 350
Gln Arg Met Thr Thr Gln Ser Gln Glu Asp Val Ser Trp Thr Asp Phe
        355                 360                 365
Phe Asp Pro Ile Ser His Pro Met Gly Gln Gly His Gln Thr Glu Ser
    370                 375                 380
Lys Gly His Ser Ser Gly Asn Gln Asp Ser Gly Val Thr Thr Thr Ser
385                 390                 395                 400
Gly Pro Ala Arg Arg Pro Gln Ile Pro Glu Trp Leu Ile Ile Leu Ala
                405                 410                 415
Ser Leu Leu Ala Leu Ala Leu Ile Leu Ala Val Cys Ile Ala Val Asn
            420                 425                 430
Ser Arg Arg Arg Cys Gly Gln Lys Lys Lys Leu Val Ile Asn Ser Gly
        435                 440                 445
Asn Gly Thr Val Glu Asp Arg Lys Pro Ser Glu Leu Asn Gly Glu Ala
    450                 455                 460
Ser Lys Ser Gln Glu Met Val His Leu Val Asn Lys Glu Pro Thr Glu
465                 470                 475                 480
Thr Pro Asp Gln Phe Met Thr Ala Asp Glu Thr Arg Asn Leu Gln Ser
                485                 490                 495
Val Asp Met Lys Ile Gly Val
            500
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<210> 261
<211> 366
<212> PRT
<213> Bos taurus

<220>
<223> Cow CD44 Q29423

<400> 261
Met Asp Thr Phe Trp Trp Arg Ala Ala Trp Gly Leu Cys Leu Val Gln
 1   5   10   15
Leu Ser Leu Ala Gln Ile Asp Leu Asn Ile Thr Cys Arg Tyr Ala Gly
            20   25   30
Val Phe His Val Glu Lys Asn Gly Arg Tyr Ser Ile Ser Lys Thr Glu
        35   40   45
Ala Ala Asp Leu Cys Lys Ala Phe Asn Ser Thr Leu Pro Thr Met Ala
    50   55   60
Gln Met Glu Ala Ala Arg Asn Ile Gly Phe Glu Thr Cys Arg Tyr Gly
65   70   75   80
Phe Ile Glu Gly His Val Val Ile Pro Arg Ile His Pro Asn Ser Ile
                85   90   95
Cys Ala Ala Asn Asn Thr Gly Val Tyr Ile Leu Thr Ser Asn Thr Ser
            100   105   110
Gln Tyr Asp Thr Ile Cys Phe Asn Ala Ser Ala Pro Pro Gly Glu Asp
        115   120   125
Cys Thr Ser Val Thr Asp Leu Pro Asn Ala Phe Glu Gly Pro Ile Thr
    130   135   140
Ile Thr Ile Val Asn Arg Asp Gly Thr Arg Tyr Thr Lys Lys Gly Glu
145   150   155   160
Tyr Arg Thr Asn Pro Glu Asp Ile Asn Pro Ser Val Val Ser Pro Ser
                165   170   175
Ser Pro Pro Asp Asp Glu Met Ser Ser Gly Ser Pro Ser Glu Arg Ser
            180   185   190
Thr Ser Gly Gly Tyr Ser Ile Phe His Thr His Leu Pro Thr Val His
        195   200   205
Pro Ser Arg Pro Arg Arg Pro Trp Ser Gln Arg Ala Glu Asn Thr Ser
    210   215   220
Asp Thr Arg Asp Tyr Gly Ser Ser His Asp Pro Ser Gly Arg Ser Tyr
225   230   235   240
Thr Thr His Ala Ser Glu Ser Ala Gly His Ser Ser Gly Ser Glu Glu
                245   250   255
His Gly Ala Asn Thr Thr Ser Gly Pro Met Arg Lys Pro Gln Ile Pro
            260   265   270
Glu Trp Leu Ile Ile Leu Ala Ser Leu Leu Ala Leu Ala Leu Ile Leu
        275   280   285
Ala Val Cys Ile Ala Val Asn Ser Arg Arg Arg Cys Gly Gln Lys Lys
    290   295   300
Lys Leu Val Ile Asn Asn Gly Asn Gly Thr Met Glu Glu Arg Lys Pro
305   310   315   320
Ser Gly Leu Asn Gly Glu Ala Ser Lys Ser Gln Glu Met Val His Leu
                325   330   335
Val Asn Lys Gly Ser Ser Glu Thr Pro Asp Gln Phe Met Thr Ala Asp
            340   345   350
Glu Thr Arg Asn Leu Gln Asn Val Asp Met Lys Ile Gly Val
        355   360   365

<210> 262
<211> 351
<212> PRT
<213> Canis lupus familiaris

<220>
<223> Dog CD44 Q28284

<400> 262
Leu Ala Trp Gly Leu Cys Leu Leu Arg Leu Ser Leu Ala Gln Ile Asp
 1   5   10   15
Leu Asn Ile Thr Cys Arg Tyr Ala Gly Val Phe His Val Glu Lys Asn
            20   25   30
Gly Arg Tyr Ser Ile Ser Arg Thr Ala Ala Ala Asp Leu Cys Lys Ala
        35   40   45
Phe Asn Ser Thr Leu Pro Thr Met Ala Gln Met Glu Arg Ala Leu Ser
    50   55   60
Val Gly Phe Glu Thr Cys Arg Tyr Gly Phe Ile Glu Gly His Val Val
65   70   75   80
Ile Pro Arg Ile Gln Pro Asn Ala Ile Cys Ala Ala Asn His Thr Gly
                85   90   95
Val Tyr Ile Leu Ile Ser Asn Thr Ser Gln Tyr Asp Thr Tyr Cys Phe
            100   105   110
Asn Ala Ser Ala Pro Pro Glu Glu Asp Cys Thr Ser Val Thr His Leu
        115   120   125
Pro Asn Ala Phe Asp Gly Pro Ile Thr Ile Thr Ile Val Asn Arg Asp
    130   135   140
Gly Thr Arg Tyr Ser Gln Lys Gly Glu Tyr Arg Thr Asn Pro Glu Asp
145   150   155   160
Ile Asn Pro Ser Asn Pro Thr Asp Asp Asp Val Ser Ser Gly Ser Ser
                165   170   175
Ser Glu Arg Ser Thr Ser Ala Gly Tyr Asn Ile Phe His Thr His Leu
            180   185   190
Pro Thr Ala Tyr Pro Thr Glu Asp Gln Asp Ser Ser Arg Val Ser Ser
        195   200   205
Asn Ser Asp His Thr Pro Ile Thr Lys Asp His Asp Ser Ser Val His
    210   215   220
Pro Ser Glu Arg Ser His Thr Thr His Gly Ser Glu Ser Ala Gly His
225   230   235   240
Ser Ser Gly Ser Gln Glu Gly Gly Ala Asn Thr Thr Ser Gly Pro Met
                245   250   255
Arg Lys Pro Gln Ile Pro Glu Trp Leu Ile Ile Leu Ala Ser Leu Leu
            260   265   270
Ala Leu Ala Leu Ile Leu Ala Val Cys Ile Ala Val Asn Ser Arg Arg
        275   280   285
Arg Cys Gly Gln Lys Lys Lys Leu Val Ile Asn Asn Gly Asn Gly Ala
    290   295   300
Val Gly Asp Arg Lys Pro Ser Gly Ile Asn Gly Glu Ala Ser Lys Ser
305   310   315   320
Gln Glu Met Val His Leu Val Asn Lys Glu Pro Ser Glu Thr Pro Asp
                325   330   335
Gln Tyr Thr Thr Ala Asp Glu Thr Arg Asn Leu Gln Asn Val Asp
            340   345   350

<210> 263
<211> 359
<212> PRT
<213> Equus caballus

<220>
<223> Horse CD44 Q05078

<400> 263
Met Asp Lys Phe Trp Trp Arg Ala Ala Trp Gly Leu Cys Leu Val Pro
 1   5   10   15
Leu Ser Leu Ala Gln Ile Asp Leu Asn Ile Thr Cys Arg Tyr Ala Gly
            20   25   30
Val Phe His Val Glu Lys Asn Gly Arg Tyr Ser Ile Ser Arg Thr Glu
        35   40   45
Ala Ala Asp Leu Cys Lys Ala Phe Asn Ser Thr Leu Pro Thr Met Ala
    50   55   60
Gln Met Gln Lys Ala Leu Asn Ile Gly Phe Glu Thr Cys Arg Ile Gly
65   70   75   80
Phe Ile Glu Gly His Val Val Ile Pro Pro Ile His Pro Asn Ser Ile
                85   90   95
Cys Ala Ala Asn Asn Thr Gly Val Tyr Ile Leu Thr Ser Asn Thr Ser
            100   105   110
Gln Tyr Asp Thr Tyr Cys Phe Asn Ala Ser Ala Pro Pro Glu Glu Asp
        115   120   125
Cys Thr Ser Val Thr Asp Leu Pro Asn Ala Phe Glu Gly Pro Ile Thr
    130   135   140
Ile Thr Ile Val Asn Arg Asp Gly Thr Arg Tyr Thr Lys Lys Gly Glu
145   150   155   160
Tyr Arg Thr Asn Pro Glu Asp Ile Asn Pro Ser Thr Pro Ala Asp Asp
                165   170   175
Asp Val Ser Ser Gly Ser Ser Ser Glu Arg Ser Thr Ser Gly Gly Tyr
            180   185   190
Ser Ile Phe His Thr His Leu Pro Thr Thr Arg Pro Thr Gln Asp Gln
        195   200   205
Ser Ser Pro Trp Val Ser Asp Ser Pro Glu Lys Thr Pro Thr Thr Lys
    210   215   220
Asp Arg Ala Ser Gly Gly Arg Ala Gln Thr Thr His Gly Ser Glu Thr
225   230   235   240
Ser Gly His Ser Thr Gly Ser Gln Glu Gly Gly Ala Ser Thr Thr Ser
                245   250   255
Gly Pro Ile Arg Arg Pro Gln Ile Pro Glu Trp Leu Ile Ile Leu Ala
            260   265   270
Ser Leu Leu Ala Leu Ala Leu Ile Leu Ala Val Cys Ile Ala Val Asn
        275   280   285
Ser Arg Arg Arg Cys Gly Gln Lys Lys Lys Leu Val Ile Asn Asn Gly
    290   295   300
Asn Gly Ala Val Asp Asp Arg Lys Ala Ser Gly Leu Asn Gly Glu Ala
305   310   315   320
Ser Arg Ser Gln Glu Met Val His Leu Val Asn Lys Glu Ser Ser Glu
                325   330   335
Thr Gln Asp Gln Phe Met Thr Ala Asp Glu Thr Arg Asn Leu Gln Asn
            340   345   350
Val Asp Met Lys Ile Gly Val
        355

<210> 264
<211> 362
<212> PRT
<213> Cricetulus griseus

<220>

<223> Hamster CD44 P20944

<400> 264
Met Asp Lys Phe Trp Trp His Ala Ala Trp Gly Leu Cys Leu Leu Pro
 1   5   10   15
Leu Ser Leu Ala His Glu Gln Ile Asp Leu Asn Ile Thr Cys Arg Tyr
            20   25   30
Ala Gly Val Phe His Val Glu Lys Asn Gly Arg Tyr Ser Ile Ser Arg
        35   40   45
Thr Glu Ala Ala Asp Leu Cys Gln Ala Phe Asn Ser Thr Leu Pro Thr
    50   55   60
Met Asp Gln Met Val Met Ala Leu Ser Lys Gly Phe Glu Thr Cys Arg
65   70   75   80
Tyr Gly Phe Ile Glu Gly His Val Val Ile Pro Arg Ile Gln Pro Asn
                85   90   95
Ala Ile Cys Ala Ala Asn His Thr Gly Val Tyr Ile Leu Thr Ser Asn
            100   105   110
Thr Ser His Tyr Asp Thr Tyr Cys Phe Asn Ala Ser Ala Pro Leu Glu
        115   120   125
Glu Asp Cys Thr Ser Val Thr Asp Leu Pro Asn Ser Phe Glu Gly Pro
    130   135   140
Val Thr Ile Thr Ile Val Asn Arg Asp Gly Thr Arg Tyr Ser Lys Lys
145   150   155   160
Gly Glu Tyr Arg Thr His Gln Glu Asp Ile Asp Ala Ser Asn Thr Thr
                165   170   175
Asp Asp Asp Val Ser Ser Gly Ser Ser Ser Glu Lys Ser Thr Ser Gly
            180   185   190
Gly Tyr Val Phe His Thr Tyr Leu Pro Thr Ile His Ser Thr Ala Asp
        195   200   205
Gln Asp Asp Pro Tyr Phe Ile Gly Ser Thr Met Ala Thr Arg Asp Gln
    210   215   220
Asp Ser Ser Met Asp Pro Arg Gly Asn Ser Leu Thr Val Thr Asp Gly
225   230   235   240
Ser Lys Leu Thr Glu His Ser Ser Gly Asn Gln Asp Ser Gly Leu Asn
                245   250   255
Ser Thr Ser Arg Pro Gly Gly Lys Pro Arg Val Pro Glu Trp Leu Ile
            260   265   270
Val Leu Ala Ser Leu Leu Ala Leu Ala Leu Ile Leu Ala Val Cys Ile
        275   280   285
Ala Val Asn Ser Arg Arg Arg Cys Gly Gln Lys Lys Lys Leu Val Ile
    290   295   300
Asn Ser Gly Asn Gly Lys Val Glu Asp Arg Lys Pro Ser Glu Leu Asn
305   310   315   320
Gly Glu Ala Ser Lys Ser Gln Glu Met Val His Leu Val Asn Lys Glu
                325   330   335
Pro Ser Glu Thr Pro Asp Gln Phe Met Thr Ala Asp Glu Thr Arg Asn
            340   345   350
Leu Gln Asn Val Asp Met Lys Ile Gly Val
        355   360

<210> 265
<211> 362
<212> PRT
<213> Papio hamadryas

<220>

<223> Baboon CD44 P14745

<400> 265
Met Asp Lys Phe Trp Trp Arg Ala Ala Trp Gly Leu Cys Leu Val Gln
 1   5   10   15
Leu Ser Leu Ala Gln Ile Asp Leu Asn Ile Thr Cys Arg Phe Glu Gly
            20   25   30
Ile Tyr His Val Glu Lys Asn Gly Arg Tyr Ser Ile Ser Arg Thr Glu
        35   40   45
Ala Ala Asp Leu Cys Lys Ala Phe Asn Ser Thr Leu Pro Thr Met Ala
    50   55   60
Gln Met Glu Lys Ala Leu Ser Ile Gly Phe Glu Thr Cys Arg Tyr Gly
65   70   75   80
Phe Ile Glu Gly His Val Val Ile Pro Arg Ile His Pro Asn Ser Ile
                85   90   95
Cys Ala Ala Asn Asn Thr Gly Val Tyr Ile Leu Thr Ser Asn Thr Ser
            100   105   110
Gln Tyr Asp Thr Tyr Cys Phe Asn Ala Ser Ala Pro Pro Gly Glu Asp
        115   120   125
Cys Thr Ser Val Thr Asp Leu Pro Asn Ala Phe Asp Gly Pro Ile Thr
    130   135   140
Ile Thr Ile Val Asn Arg Asp Gly Thr Arg Tyr Val Lys Lys Gly Glu
145   150   155   160
Tyr Arg Thr Asn Pro Glu Asp Ile Asn Pro Ser Ser Pro Thr Asp Asp
                165   170   175
Asp Val Ser Ser Gly Ser Ser Ser Glu Arg Ser Ser Thr Leu Gly Gly
            180   185   190
Tyr Ile Phe Tyr Asn His Phe Ser Thr Ser Pro Pro Ile Pro Asp Glu
        195   200   205
Asp Gly Pro Trp Ile Thr Asp Ser Thr Asp Arg Thr Pro Ala Thr Arg
    210   215   220
Asp Gln Gly Ala Phe Asp Pro Ser Gly Gly Ser His Thr Thr His Gly
225   230   235   240
Ser Glu Ser Ala Gly His Ser His Gly Ser Arg Glu Gly Gly Ala Asn
                245   250   255
Thr Thr Ser Gly Pro Leu Arg Thr Pro Gln Ile Pro Glu Trp Leu Ile
            260   265   270
Ile Leu Ala Ser Leu Leu Ala Leu Ala Leu Ile Leu Ala Val Cys Ile
        275   280   285
Ala Val Asn Ser Arg Arg Arg Cys Gly Gln Lys Lys Lys Leu Val Ile
    290   295   300
Asn Asn Gly Asn Gly Ala Val Glu Asp Arg Lys Ser Ser Gly Leu Asn
305   310   315   320
Gly Glu Ala Ser Lys Ser Gln Glu Met Val His Leu Val Asn Lys Glu
                325   330   335
Ser Ser Glu Thr Pro Asp Gln Phe Met Thr Ala Asp Glu Thr Arg Asn
            340   345   350
Leu Gln Asn Val Asp Met Lys Ile Gly Val
        355   360

<210> 266
<211> 431
<212> PRT
<213> Mesocricetus auratus

<220>
<223> Golden Hamster CD44 Q60522

<400> 266
Met Asp Lys Phe Trp Trp His Ala Ala Trp Gly Leu Cys Leu Leu Pro
 1   5   10   15
Leu Ser Leu Ala Gln Gln Gln Ile Asp Leu Asn Ile Thr Cys Arg Tyr
            20   25   30
Ala Gly Val Phe His Val Glu Lys Asn Gly Arg Tyr Ser Ile Ser Arg
        35   40   45
Thr Glu Ala Ala Asp Leu Cys Gln Ala Phe Asn Ser Thr Leu Pro Thr
    50   55   60
Met Asp Gln Met Val Met Ala Leu Ser Lys Gly Phe Glu Thr Cys Arg
65   70   75   80
Tyr Gly Phe Ile Glu Gly His Val Val Ile Pro Arg Ile Gln Pro Asn
                85   90   95
Ala Ile Cys Ala Ala Asn His Thr Gly Val Tyr Ile Leu Thr Ser Asn
            100   105   110
Thr Ser His Tyr Asp Thr Tyr Cys Phe Asn Ala Ser Ala Pro Leu Glu
        115   120   125
Glu Asp Cys Thr Ser Val Thr Asp Leu Pro Asn Ser Phe Glu Gly Pro
    130   135   140
Val Thr Ile Thr Ile Val Asn Arg Asp Gly Thr Arg Tyr Ser Lys Lys
145   150   155   160
Gly Glu Tyr Arg Thr His Gln Glu Asp Ile Asp Ala Ser Asn Thr Thr
                165   170   175
Asp Asp Asp Val Ser Ser Gly Ser Ser Ser Glu Lys Ser Thr Ser Gly
            180   185   190
Gly Tyr Val Phe His Thr Tyr Leu Pro Thr Ile His Ser Thr Ala Asp
        195   200   205
Gln Asp Asp Pro Tyr Phe Ile Gly Ser Thr Met Ala Thr Thr Arg Ser
    210   215   220
Gly Gly Lys Asp Gly Arg Arg Gly Gly Gly Leu Pro Lys Asp Ala Thr
225   230   235   240
Thr Ser Leu Glu Gly Tyr Thr Thr His Tyr Pro Glu Thr Met Glu Asn
                245   250   255
Gly Thr Leu Thr Pro Val Thr Pro Ala Lys Thr Gly Val Phe Gly Glu
            260   265   270
Thr Glu Val Thr Val Ala Glu Asp Ser Asn Phe Asn Val Asp Gly Ser
        275   280   285
Leu Pro Gly Asp Gln Asp Ser Ser Met Asp Pro Arg Gly Asn Ser Leu
    290   295   300
Thr Val Thr Asp Gly Ser Lys Leu Thr Gly His Ser Ser Gly Asn Gln
305   310   315   320
Asp Ser Gly Ala Asn Thr Thr Ser Arg Pro Gly Arg Lys Pro Gln Ile
                325   330   335
Pro Glu Trp Leu Ile Val Leu Ala Ser Leu Leu Ala Leu Ala Leu Ile
            340   345   350
Leu Ala Val Cys Ile Ala Val Asn Ser Arg Arg Arg Cys Gly Gln Lys
        355   360   365
Lys Lys Leu Val Ile Asn Ser Gly Asn Gly Lys Val Glu Asp Arg Lys
    370   375   380
Pro Ser Glu Leu Asn Gly Glu Ala Ser Lys Ser Gln Glu Met Val His
385   390   395   400
Leu Val Asn Lys Glu Pro Ser Glu Thr Pro Asp Gln Phe Met Thr Ala
                405   410   415
Asp Glu Thr Arg Asn Leu Gln Asn Val Asp Met Lys Ile Gly Val

420 425 430

<210> 267
<211> 318
<212> PRT
<213> Mus musculus

<220>
<223> Mouse LYVE-1 Q8BHC0

<400> 267
Met Leu Gln His Thr Ser Leu Val Leu Leu Leu Ala Ser Ile Trp Thr
1 5 10 15
Thr Arg His Pro Val Gln Gly Ala Asp Leu Val Gln Asp Leu Ser Ile
20 25 30
Ser Thr Cys Arg Ile Met Gly Val Ala Leu Val Gly Arg Asn Lys Asn
35 40 45
Pro Gln Met Asn Phe Thr Glu Ala Asn Glu Ala Cys Lys Met Leu Gly
50 55 60
Leu Thr Leu Ala Ser Arg Asp Gln Val Glu Ser Ala Gln Lys Ser Gly
65 70 75 80
Phe Glu Thr Cys Ser Tyr Gly Trp Val Gly Glu Gln Phe Ser Val Ile
85 90 95
Pro Arg Ile Phe Ser Asn Pro Arg Cys Gly Lys Asn Gly Lys Gly Val
100 105 110
Leu Ile Trp Asn Ala Pro Ser Ser Gln Lys Phe Lys Ala Tyr Cys His
115 120 125
Asn Ser Ser Asp Thr Trp Val Asn Ser Cys Ile Pro Glu Ile Val Thr
130 135 140
Thr Phe Tyr Pro Val Leu Asp Thr Gln Thr Pro Ala Thr Glu Phe Ser
145 150 155 160
Val Ser Ser Ser Ala Tyr Leu Ala Ser Ser Pro Asp Ser Thr Thr Pro
165 170 175
Val Ser Ala Thr Thr Arg Ala Pro Pro Leu Thr Ser Met Ala Arg Lys
180 185 190
Thr Lys Lys Ile Cys Ile Thr Glu Val Tyr Thr Glu Pro Ile Thr Met
195 200 205
Ala Thr Glu Thr Glu Ala Phe Val Ala Ser Gly Ala Ala Phe Lys Asn
210 215 220
Glu Ala Ala Gly Phe Gly Gly Val Pro Thr Ala Leu Leu Val Leu Ala
225 230 235 240
Leu Leu Phe Phe Gly Ala Ala Ala Val Leu Ala Val Cys Tyr Val Lys
245 250 255
Arg Tyr Val Lys Ala Phe Pro Phe Thr Thr Lys Asn Gln Gln Lys Glu
260 265 270
Met Ile Glu Thr Lys Val Val Lys Glu Glu Lys Ala Asp Asp Val Asn
275 280 285
Ala Asn Glu Glu Ser Lys Lys Thr Ile Lys Asn Pro Glu Glu Ala Lys
290 295 300
Ser Pro Pro Lys Thr Thr Val Arg Cys Leu Glu Ala Glu Val
305 310 315

<210> 268
<211> 322
<212> PRT

<213> Bos taurus

<220>
<223> Cow LYVE-1 Q6UC88

<400> 268
Met Ala Lys Phe Phe Ser Leu Gly Leu Leu Leu Ala Ser Ile Trp Thr
 1   5   10   15
Thr Arg Leu Leu Val Gln Gly Ser Leu Arg Ser Glu Glu Ile Ser Ile
            20   25   30
Leu Gly Pro Cys Arg Ile Met Gly Val Thr Leu Val Thr Lys Lys Thr
        35   40   45
Gln Pro Leu Leu Asn Phe Thr Glu Ala Gln Glu Ala Cys Arg Leu Val
    50   55   60
Gly Leu Thr Leu Ala Ser Gln Asp Gln Val Glu Glu Ala Arg Lys Phe
65   70   75   80
Gly Phe Glu Thr Cys Ser Tyr Gly Trp Val Lys Asn Gln Phe Val Val
                85   90   95
Ile Pro Arg Ile Ile Ser Asn Pro Lys Cys Gly Lys Ser Gly Val Gly
            100   105   110
Val Val Ile Trp Arg Ser Ser Leu Ser Ser Arg His Arg Ser Tyr Cys
        115   120   125
His Asn Ser Ser Asp Ile Trp Ile Asn Ser Cys Leu Pro Glu Ile Ile
    130   135   140
Thr Thr Asp Asp Pro Leu Phe Asn Thr Glu Thr Ala Thr Tyr Thr Thr
145   150   155   160
Lys Leu Met Val Ser Asp Ser Thr His Ser Glu Leu Ser Thr Asp Gly
                165   170   175
Pro Asp Tyr Val Thr Thr Thr Val Ala Pro Pro Leu Ala Ser Thr Ser
            180   185   190
Thr Pro Arg Lys Arg Lys Leu Ile Cys Ile Thr Glu Ala Phe Met Asp
        195   200   205
Thr Ser Ala Val Ala Thr Glu Arg Glu Ser Asp Ile Gln Asn Arg Pro
    210   215   220
Ala Phe Lys Asn Glu Ala Val Gly Phe Gly Gly Val Pro Thr Ala Leu
225   230   235   240
Leu Val Leu Ala Leu Leu Phe Phe Ala Ala Ala Ala Gly Leu Ala Val
                245   250   255
Cys Tyr Val Lys Arg Tyr Val Lys Ala Phe Pro Phe Thr Asn Lys Asn
            260   265   270
Gln Gln Lys Glu Met Ile Glu Thr Lys Val Val Lys Glu Glu Lys Ala
        275   280   285
Asp Asp Ser Asn Pro Asn Glu Glu Ser Lys Lys Met Asn Lys Thr Pro
    290   295   300
Glu Glu Pro Lys Ser Pro Pro Lys Thr Thr Val Arg Cys Leu Glu Ala
305   310   315   320
Glu Val

<210> 269
<211> 180
<212> PRT
<213> Bos taurus

<220>
<223> Cow HAPLN1 A8E4P9

<400> 269
Met Lys Ser Leu Leu Leu Leu Val Leu Ile Ser Phe Cys Trp Ala Asp
 1   5   10   15
His His Ser Asp Asn Tyr Thr Val Asp His Asp Arg Val Ile His Ile
            20   25   30
Gln Ala Glu Asn Gly Pro Arg Leu Leu Val Glu Ala Glu Gln Ala Lys
        35   40   45
Val Phe Ser Arg Arg Gly Gly Asn Val Thr Leu Pro Cys Lys Phe Tyr
    50   55   60
Arg Asp Pro Thr Ala Phe Gly Ser Gly Thr His Lys Ile Arg Ile Lys
65   70   75   80
Trp Thr Lys Leu Thr Ser Asp Tyr Leu Lys Glu Val Asp Val Phe Val
                85   90   95
Ser Met Gly Tyr His Lys Lys Thr Tyr Gly Gly Tyr His Gly Arg Val
            100   105   110
Phe Leu Lys Gly Gly Ser Asp Asn Asp Ala Ser Leu Val Ile Thr Asp
        115   120   125
Leu Thr Leu Glu Asp Tyr Gly Arg Tyr Lys Cys Glu Val Ile Glu Gly
    130   135   140
Leu Glu Asp Asp Thr Ala Val Val Ala Leu Asp Leu Gln Gly Lys Tyr
145   150   155   160
Gly Val Lys Leu Gly Met Ile Ile Asn His Cys Phe Phe Phe Met Thr
                165   170   175
Ser Asn Val Gln
            180

<210> 270
<211> 356
<212> PRT
<213> Mus musculus

<220>
<223> MOUSE HAPLN1 Q9QUP5

<400> 270
Met Arg Ser Leu Leu Leu Leu Val Leu Ile Ser Val Cys Trp Ala Asp
 1   5   10   15
His His Leu Ser Asp Ser Tyr Thr Pro Pro Asp Gln Asp Arg Val Ile
            20   25   30
His Ile Gln Ala Glu Asn Gly Pro Arg Leu Leu Val Glu Ala Glu Gln
        35   40   45
Ala Lys Val Phe Ser His Arg Gly Gly Asn Val Thr Leu Pro Cys Lys
    50   55   60
Phe Tyr Arg Asp Pro Thr Ala Phe Gly Ser Gly Ile His Lys Ile Arg
65   70   75   80
Ile Lys Trp Thr Lys Leu Thr Ser Asp Tyr Leu Arg Glu Val Asp Val
                85   90   95
Phe Val Ser Met Gly Tyr His Lys Lys Thr Tyr Gly Gly Tyr Gln Gly
            100   105   110
Arg Val Phe Leu Lys Gly Gly Ser Asp Asn Asp Ala Ser Leu Val Ile
        115   120   125
Thr Asp Leu Thr Leu Glu Asp Tyr Gly Arg Tyr Lys Cys Glu Val Ile
    130   135   140
Glu Gly Leu Glu Asp Asp Thr Ala Val Val Ala Leu Glu Leu Gln Gly

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145                 150                 155                 160
Val Val Phe Pro Tyr Phe Pro Arg Leu Gly Arg Tyr Asn Leu Asn Phe
                165                 170                 175
His Glu Ala Arg Gln Ala Cys Leu Asp Gln Asp Ala Val Ile Ala Ser
            180                 185                 190
Phe Asp Gln Leu Tyr Asp Ala Trp Arg Gly Gly Leu Asp Trp Cys Asn
        195                 200                 205
Ala Gly Trp Leu Ser Asp Gly Ser Val Gln Tyr Pro Ile Thr Lys Pro
    210                 215                 220
Arg Glu Pro Cys Gly Gly Gln Asn Thr Val Pro Gly Val Arg Asn Tyr
225                 230                 235                 240
Gly Phe Trp Asp Lys Asp Lys Ser Arg Tyr Asp Val Phe Cys Phe Thr
                245                 250                 255
Ser Asn Phe Asn Gly Arg Phe Tyr Tyr Leu Ile His Pro Thr Lys Leu
            260                 265                 270
Thr Tyr Asp Glu Ala Val Gln Ala Cys Leu Asn Asp Gly Ala Gln Ile
        275                 280                 285
Ala Lys Val Gly Gln Ile Phe Ala Ala Trp Lys Leu Leu Gly Tyr Asp
    290                 295                 300
Arg Cys Asp Ala Gly Trp Leu Ala Asp Gly Ser Val Arg Tyr Pro Ile
305                 310                 315                 320
Ser Arg Pro Arg Arg Arg Cys Ser Pro Thr Glu Ala Ala Val Arg Phe
                325                 330                 335
Val Gly Phe Pro Asp Lys Lys His Lys Leu Tyr Gly Val Tyr Cys Phe
            340                 345                 350
Arg Ala Tyr Asn
        355
```

<210> 271
<211> 354
<212> PRT
<213> Rattus norvegicus

<220>
<223> RAT HAPLN1 P03994

<400> 271

```
Met Arg Ser Leu Leu Phe Leu Val Leu Ile Ser Val Cys Arg Ala Asp
 1               5                  10                  15
His Leu Ser Asp Ser Tyr Thr Pro Asp Gln Asp Arg Val Ile His Ile
            20                  25                  30
Gln Ala Glu Asn Gly Pro Arg Leu Leu Val Glu Ala Glu Gln Ala Lys
        35                  40                  45
Val Phe Ser His Arg Gly Gly Asn Val Thr Leu Pro Cys Lys Phe Tyr
    50                  55                  60
Arg Asp Pro Thr Ala Phe Gly Ser Gly Ile His Lys Ile Arg Ile Lys
65                  70                  75                  80
Trp Thr Lys Leu Thr Ser Asp Tyr Leu Arg Glu Val Asp Val Phe Val
                85                  90                  95
Ser Met Gly Tyr His Lys Lys Thr Tyr Gly Gly Tyr Gln Gly Arg Val
            100                 105                 110
Phe Leu Lys Gly Gly Ser Asp Asn Asp Ala Ser Leu Ile Ile Thr Asp
        115                 120                 125
Leu Thr Leu Glu Asp Tyr Gly Arg Tyr Lys Cys Glu Val Ile Glu Gly
    130                 135                 140
Leu Glu Asp Asp Thr Ala Val Val Ala Leu Glu Leu Gln Gly Val Val
```

```
145                 150                 155                 160
Phe Pro Tyr Phe Pro Arg Leu Gly Arg Tyr Asn Leu Asn Phe His Glu
                165                 170                 175
Ala Arg Gln Ala Cys Leu Asp Gln Asp Ala Val Ile Ala Ser Phe Asp
            180                 185                 190
Gln Leu Tyr Asp Ala Trp Arg Gly Gly Leu Asp Trp Cys Asn Ala Gly
        195                 200                 205
Trp Leu Ser Asp Gly Ser Val Gln Tyr Pro Ile Thr Lys Pro Arg Glu
    210                 215                 220
Pro Cys Gly Gly Gln Asn Thr Val Pro Gly Val Arg Asn Tyr Gly Phe
225                 230                 235                 240
Trp Asp Lys Asp Lys Ser Arg Tyr Asp Val Phe Cys Phe Thr Ser Asn
                245                 250                 255
Phe Asn Gly Arg Phe Tyr Tyr Leu Ile His Pro Thr Lys Leu Thr Tyr
            260                 265                 270
Asp Glu Ala Val Gln Ala Cys Leu Asn Asp Gly Ala Gln Ile Ala Lys
        275                 280                 285
Val Gly Gln Ile Phe Ala Ala Trp Lys Leu Leu Gly Tyr Asp Arg Cys
    290                 295                 300
Asp Ala Gly Trp Leu Ala Asp Gly Ser Val Arg Tyr Pro Ile Ser Arg
305                 310                 315                 320
Pro Arg Arg Arg Cys Ser Pro Thr Glu Ala Ala Val Arg Phe Val Gly
                325                 330                 335
Phe Pro Asp Lys Lys His Lys Leu Tyr Gly Val Tyr Cys Phe Arg Ala
            340                 345                 350
Tyr Asn
```

<210> 272
<211> 355
<212> PRT
<213> Gallus gallus

<220>
<223> CHICKEN HAPLN1 P07354

<400> 272

```
Met Thr Ser Leu Leu Phe Leu Val Leu Ile Ser Val Cys Trp Ala Glu
 1               5                  10                  15
Pro His Pro Asp Asn Ser Ser Leu Glu His Glu Arg Ile Ile His Ile
            20                  25                  30
Gln Glu Glu Asn Gly Pro Arg Leu Leu Val Val Ala Glu Gln Ala Lys
        35                  40                  45
Ile Phe Ser Gln Arg Gly Gly Asn Val Thr Leu Pro Cys Lys Phe Tyr
    50                  55                  60
His Glu His Thr Ser Thr Ala Gly Ser Gly Thr His Lys Ile Arg Val
65                  70                  75                  80
Lys Trp Thr Lys Leu Thr Ser Asp Tyr Leu Lys Glu Val Asp Val Phe
                85                  90                  95
Val Ala Met Gly His His Arg Lys Ser Tyr Gly Lys Tyr Gln Gly Arg
            100                 105                 110
Val Phe Leu Arg Glu Ser Ser Glu Asn Asp Ala Ser Leu Ile Ile Thr
        115                 120                 125
Asn Ile Met Leu Glu Asp Tyr Gly Arg Tyr Lys Cys Glu Val Ile Glu
    130                 135                 140
Gly Leu Glu Asp Asp Thr Ala Val Val Ala Leu Asn Leu Glu Gly Val
```

```
145                 150                 155                 160
Val Phe Pro Tyr Ser Pro Arg Leu Gly Arg Tyr Asn Leu Asn Phe His
                165                 170                 175
Glu Ala Gln Gln Ala Cys Leu Asp Gln Asp Ser Ile Ile Ala Ser Phe
            180                 185                 190
Asp Gln Leu Tyr Glu Ala Trp Arg Ser Gly Leu Asp Trp Cys Asn Ala
        195                 200                 205
Gly Trp Leu Ser Asp Gly Ser Val Gln Tyr Pro Ile Thr Lys Pro Arg
    210                 215                 220
Glu Pro Cys Gly Gly Lys Asn Thr Val Pro Gly Val Arg Asn Tyr Gly
225                 230                 235                 240
Phe Trp Asp Lys Glu Arg Ser Arg Tyr Asp Val Phe Cys Phe Thr Ser
                245                 250                 255
Asn Phe Asn Gly Arg Phe Tyr Tyr Leu Ile His Pro Thr Lys Leu Thr
            260                 265                 270
Tyr Asp Glu Ala Val Gln Ala Cys Leu Lys Asp Gly Ala Gln Ile Ala
        275                 280                 285
Lys Val Gly Gln Ile Phe Ala Ala Trp Lys Leu Leu Gly Tyr Asp Arg
    290                 295                 300
Cys Asp Ala Gly Trp Leu Ala Asp Gly Ser Val Arg Tyr Pro Ile Ser
305                 310                 315                 320
Arg Pro Arg Lys Arg Cys Ser Pro Asn Glu Ala Ala Val Arg Phe Val
                325                 330                 335
Gly Phe Pro Asp Lys Lys His Lys Leu Tyr Gly Val Tyr Cys Phe Arg
            340                 345                 350
Ala Tyr Asn
        355


<210> 273
<211> 354
<212> PRT
<213> Bos taurus

<220>
<223> COW HAPLN1 P55252


<400> 273
Met Lys Ser Leu Leu Leu Leu Val Leu Ile Ser Phe Cys Trp Ala Asp
 1               5                  10                  15
His His Ser Asp Asn Tyr Thr Val Asp His Asp Arg Val Ile His Ile
            20                  25                  30
Gln Ala Glu Asn Gly Pro Arg Leu Leu Val Glu Ala Glu Gln Ala Lys
        35                  40                  45
Val Phe Ser Arg Arg Gly Gly Asn Val Thr Leu Pro Cys Lys Phe Tyr
    50                  55                  60
Arg Asp Pro Thr Ala Phe Gly Ser Gly Thr His Lys Ile Arg Ile Lys
65                  70                  75                  80
Trp Thr Lys Leu Thr Ser Asp Tyr Leu Lys Glu Val Asp Val Phe Val
                85                  90                  95
Ser Met Gly Tyr His Lys Lys Thr Tyr Gly Gly Tyr His Gly Arg Val
            100                 105                 110
Phe Leu Lys Gly Gly Ser Asp Asn Asp Ala Ser Leu Val Ile Thr Asp
        115                 120                 125
Leu Thr Leu Glu Asp Tyr Gly Arg Tyr Lys Cys Glu Val Ile Glu Gly
    130                 135                 140
Leu Glu Asp Asp Thr Ala Val Val Ala Leu Asp Leu Gln Gly Val Val
```

```
145                 150                 155                 160
Phe Pro Tyr Phe Pro Arg Leu Gly Arg Tyr Asn Leu Asn Phe His Glu
                165                 170                 175
Ala Gln Gln Ala Cys Leu Asp Gln Asp Ala Val Ile Ala Ser Phe Asp
            180                 185                 190
Gln Leu Tyr Asp Ala Trp Arg Ser Gly Leu Asp Trp Cys Asn Ala Gly
        195                 200                 205
Trp Leu Ser Asp Gly Ser Val Gln Tyr Pro Ile Thr Lys Pro Arg Glu
    210                 215                 220
Pro Cys Gly Gly Gln Asn Thr Val Pro Gly Val Arg Asn Tyr Gly Phe
225                 230                 235                 240
Trp Asp Lys Asp Lys Ser Arg Tyr Asp Val Phe Cys Phe Thr Ser Asn
                245                 250                 255
Phe Asn Gly Arg Phe Tyr Tyr Leu Ile His Pro Thr Lys Leu Thr Tyr
            260                 265                 270
Asp Glu Ala Val Gln Ala Cys Leu Asn Asp Gly Ala Gln Ile Ala Lys
        275                 280                 285
Val Gly Gln Ile Phe Ala Ala Trp Lys Leu Leu Gly Tyr Asp Arg Cys
    290                 295                 300
Asp Ala Gly Trp Leu Ala Asp Gly Ser Val Arg Tyr Pro Ile Ser Arg
305                 310                 315                 320
Pro Arg Arg Arg Cys Ser Pro Ser Glu Ala Ala Val Arg Phe Val Gly
                325                 330                 335
Phe Pro Asp Lys Lys His Lys Leu Tyr Gly Val Tyr Cys Phe Arg Ala
            340                 345                 350
Tyr Asn
```

<210> 274
<211> 354
<212> PRT
<213> Equus caballus

<220>
<223> HORSE HAPLN1 28381

<400> 274

```
Met Lys Ser Leu Leu Leu Leu Val Leu Ile Ser Ile Cys Gly Ala Asp
 1               5                  10                  15
His Arg Ser Asp Asn Tyr Thr Leu Asp His Asp Arg Val Ile His Ile
            20                  25                  30
Gln Ala Glu Asn Gly Pro Arg Leu Leu Val Glu Ala Glu Gln Ala Lys
        35                  40                  45
Val Phe Ser His Arg Gly Gly Asn Val Thr Leu Pro Cys Lys Phe Leu
    50                  55                  60
Arg Asp Pro Thr Ala Phe Gly Ser Gly Thr His Lys Ile Arg Ile Lys
65                  70                  75                  80
Trp Thr Lys Leu Thr Ser Asp Tyr Leu Lys Glu Val Asp Val Phe Val
                85                  90                  95
Ser Met Gly Tyr His Lys Lys Thr Tyr Gly Gly Tyr Gln Gly Arg Val
            100                 105                 110
Phe Leu Lys Gly Gly Ser Asp Asn Asp Ala Ser Leu Val Ile Thr Asp
        115                 120                 125
Leu Thr Leu Asp Asp Tyr Gly Arg Tyr Lys Cys Glu Val Ile Glu Gly
    130                 135                 140
Leu Glu Asp Asp Thr Ala Val Val Ala Leu Asp Leu Gln Gly Val Val
```

```
145                 150                 155                 160
Phe Pro Tyr Phe Pro Arg Leu Gly Arg Tyr Asn Leu Asn Phe His Glu
                165                 170                 175
Ala Gln Gln Ala Cys Leu Asp Gln Asp Ala Val Ile Ala Ser Phe Asp
            180                 185                 190
Gln Leu Tyr Asp Ala Trp Arg Gly Gly Leu Asp Trp Cys Asn Ala Gly
        195                 200                 205
Trp Leu Ser Asp Gly Ser Val Gln Tyr Pro Ile Thr Lys Pro Arg Glu
    210                 215                 220
Pro Cys Gly Gly Gln Asn Thr Val Pro Gly Val Arg Asn Tyr Gly Phe
225                 230                 235                 240
Trp Asp Lys Glu Lys Ser Arg Tyr Asp Val Phe Cys Phe Thr Ser Asn
                245                 250                 255
Phe Asn Gly Arg Phe Tyr Tyr Leu Ile His Pro Thr Lys Leu Thr Tyr
            260                 265                 270
Asp Glu Ala Val Gln Ala Cys Leu Lys Asp Gly Ala Gln Ile Ala Lys
        275                 280                 285
Val Gly Gln Ile Phe Ala Ala Trp Lys Leu Leu Gly Tyr Asp Arg Cys
    290                 295                 300
Asp Ala Gly Trp Leu Ala Asp Gly Ser Val Arg Tyr Pro Ile Ser Arg
305                 310                 315                 320
Pro Arg Arg Arg Cys Ser Pro Thr Glu Ala Ala Val Arg Phe Val Gly
                325                 330                 335
Phe Pro Asp Lys Lys His Lys Leu Tyr Gly Val Tyr Cys Phe Arg Ala
            340                 345                 350
Tyr Asn
```

<210> 275
<211> 354
<212> PRT
<213> Sus scrofa

<220>
<223> PIG HAPLN1 P10859

<400> 275

```
Met Lys Ser Leu Leu Leu Leu Val Leu Ile Ser Val Cys Trp Ala Asp
 1               5                  10                  15
His Leu Ser Asn Asn Tyr Thr Leu Asp His Asp Arg Val Ile His Ile
            20                  25                  30
Gln Ala Glu Asn Gly Pro Arg Leu Leu Val Glu Ala Glu Gln Ala Lys
        35                  40                  45
Val Phe Ser His Arg Gly Gly Asn Val Thr Leu Pro Cys Lys Phe Phe
    50                  55                  60
Arg Asp Pro Thr Ala Phe Gly Ser Gly Thr His Lys Ile Arg Ile Lys
65                  70                  75                  80
Trp Thr Lys Leu Thr Ser Asp Tyr Leu Lys Glu Val Asp Val Phe Val
                85                  90                  95
Ser Met Gly Tyr His Lys Lys Thr Tyr Gly Gly Tyr His Gly Arg Val
            100                 105                 110
Phe Leu Lys Gly Gly Ser Asp Asn Asp Ala Ser Leu Val Ile Thr Asp
        115                 120                 125
Leu Thr Leu Glu Asp Tyr Gly Arg Tyr Lys Cys Glu Val Ile Glu Gly
    130                 135                 140
Leu Glu Asp Asp Thr Ala Val Val Ala Leu Asp Leu Glu Gly Val Val
```

```
145                 150                 155                 160
Phe Pro Tyr Phe Pro Arg Leu Gly Arg Tyr Asn Leu Asn Phe His Glu
                165                 170                 175
Ala Gln Gln Ala Cys Leu Asp Gln Asp Ala Val Ile Ala Ser Phe Asp
            180                 185                 190
Gln Leu Tyr Asp Ala Trp Arg Gly Gly Leu Asp Trp Cys Asn Ala Gly
        195                 200                 205
Trp Leu Ser Asp Gly Ser Val Gln Tyr Pro Ile Thr Lys Pro Arg Glu
    210                 215                 220
Pro Cys Gly Gly Gln Asn Thr Val Pro Gly Val Arg Asn Tyr Gly Phe
225                 230                 235                 240
Trp Asp Lys Asp Lys Ser Arg Tyr Asp Val Phe Cys Phe Thr Ser Asn
                245                 250                 255
Phe Asn Gly Arg Phe Tyr Tyr Leu Ile His Pro Thr Lys Leu Thr Tyr
            260                 265                 270
Asp Glu Ala Val Gln Ala Cys Leu Asn Asp Gly Ala Gln Ile Ala Lys
        275                 280                 285
Val Gly Gln Ile Phe Ala Ala Trp Lys Leu Leu Gly Tyr Asp Arg Cys
    290                 295                 300
Asp Ala Gly Trp Leu Ala Asp Gly Ser Val Arg Tyr Pro Ile Ser Arg
305                 310                 315                 320
Pro Arg Arg Arg Cys Arg Pro Asn Glu Ala Ala Val Arg Phe Val Gly
                325                 330                 335
Phe Pro Asp Lys Lys His Lys Leu Tyr Gly Val Tyr Cys Phe Arg Ala
            340                 345                 350
Tyr Asn
```

<210> 276
<211> 341
<212> PRT
<213> Mus musculus

<220>
<223> Mouse HAPLN2 Q9ESM3

<400> 276

```
Met Pro Ser Arg Ile Pro Leu Pro Ala Phe Cys Cys Phe Leu Leu Pro
 1               5                  10                  15
Trp Ala Phe Thr Ser Phe His Lys Ala Leu Gly Asn Pro Ala Pro His
            20                  25                  30
Pro Gly Pro His Tyr Leu Leu Pro Pro Ile His Glu Val Ile His Ser
        35                  40                  45
Arg Arg Gly Ala Thr Ala Thr Leu Pro Cys Val Leu Gly Thr Ser Pro
    50                  55                  60
Pro Ser Tyr Lys Val Arg Trp Ser Lys Val Glu Pro Gly Glu Leu Arg
65                  70                  75                  80
Glu Thr Leu Ile Leu Ile Thr Asn Gly Leu His Ala Arg Asp Tyr Gly
                85                  90                  95
Leu Leu Gly Gly Arg Ala Ser Leu Arg Arg Gly His Arg Leu Asp Ala
            100                 105                 110
Ser Leu Ile Ile Lys Asn Val Arg Leu Glu Asp Glu Gly Arg Tyr Arg
        115                 120                 125
Cys Glu Leu Ile Asn Gly Ile Glu Asp Glu Ser Val Ala Leu Thr Leu
    130                 135                 140
Arg Leu Glu Gly Val Val Phe Pro Tyr Gln Pro Ser Arg Gly Arg Tyr
```

145 150 155 160
Gln Phe Asn Tyr Phe Glu Ala Lys Arg Ala Cys Glu Glu Gln Asp Gly
165 170 175
Arg Leu Ala Thr Tyr Gly Gln Leu Tyr Gln Ala Trp Thr Glu Gly Leu
180 185 190
Asp Trp Cys Asn Ala Gly Trp Leu Leu Glu Gly Ser Val Arg Tyr Pro
195 200 205
Val Leu Thr Ala Arg Ala Pro Cys Gly Gly His Gly Arg Pro Gly Ile
210 215 220
Arg Ser Tyr Gly Pro Arg Asp Arg Ser Arg Asp Arg Tyr Asp Ala Phe
225 230 235 240
Cys Phe Thr Ser Ala Leu Ala Gly Gln Val Phe Phe Val Pro Gly Arg
245 250 255
Leu Thr Leu Ser Glu Ala His Ala Ala Cys Arg Arg Arg Gly Ala Val
260 265 270
Val Ala Lys Val Gly His Leu Tyr Ala Ala Trp Lys Phe Ser Gly Leu
275 280 285
Asp Gln Cys Asp Gly Gly Trp Leu Ala Asp Gly Ser Val Arg Phe Pro
290 295 300
Ile Thr Thr Pro Arg Pro Arg Cys Gly Gly Leu Pro Asp Pro Gly Val
305 310 315 320
Arg Ser Phe Gly Phe Pro Arg Pro Gln Gln Ala Ser Tyr Gly Thr Tyr
325 330 335
Cys Tyr Ala Glu Lys
340

<210> 277
<211> 341
<212> PRT
<213> Rattus norvegicus

<220>
<223> Rat HAPLN2 Q9ESM2

<400> 277
Met Pro Ser Trp Ile Pro Leu Pro Ala Phe Cys Cys Leu Leu Leu Pro
1 5 10 15
Trp Ala Phe Thr Val Phe His Lys Thr Leu Gly Asn Pro Ala Pro His
20 25 30
Pro Gly Pro His Tyr Leu Leu Pro Pro Ile His Glu Val Ile His Ser
35 40 45
Arg Arg Gly Ala Thr Ala Thr Leu Pro Cys Val Leu Gly Thr Ser Pro
50 55 60
Pro Ser Tyr Lys Val Arg Trp Ser Lys Val Glu Pro Gly Glu Leu Arg
65 70 75 80
Glu Thr Leu Ile Leu Ile Thr Asn Gly Leu His Ala Arg Asp Tyr Gly
85 90 95
Leu Leu Gly Gly Arg Ala Ser Leu Arg Arg Gly His Arg Leu Asp Ala
100 105 110
Ser Leu Ile Ile Lys Asn Val Arg Leu Glu Asp Glu Gly Arg Tyr Arg
115 120 125
Cys Glu Leu Ile Asn Gly Ile Glu Asp Glu Ser Val Ala Leu Thr Leu
130 135 140
Arg Leu Glu Gly Val Val Phe Pro Tyr Gln Pro Ser Arg Gly Arg Tyr
145 150 155 160
Gln Phe Asn Tyr Phe Glu Ala Lys Arg Ala Cys Glu Glu Gln Asp Gly

```
                165                 170                 175
Arg Leu Ala Thr Tyr Ser Gln Leu Tyr Gln Ala Trp Thr Glu Gly Leu
            180                 185                 190
Asp Trp Cys Asn Ala Gly Trp Leu Leu Glu Gly Ser Val Arg Tyr Pro
        195                 200                 205
Val Leu Asn Ala Arg Ala Pro Cys Gly Gly His Gly Arg Pro Gly Ile
    210                 215                 220
Arg Ser Tyr Gly Pro Arg Asp Arg Ser Arg Asp Arg Tyr Asp Ala Phe
225                 230                 235                 240
Cys Phe Thr Ser Ala Leu Ala Gly Gln Val Phe Phe Val Pro Gly Arg
                245                 250                 255
Leu Thr Leu Ser Glu Ala His Ala Val Cys Arg Arg Arg Gly Ala Val
            260                 265                 270
Val Ala Lys Val Gly His Leu Tyr Ala Ala Trp Lys Phe Ser Gly Leu
        275                 280                 285
Asp Arg Cys Asp Gly Gly Trp Leu Ala Asp Gly Ser Val Arg Phe Pro
    290                 295                 300
Ile Thr Thr Pro Arg Pro Arg Cys Gly Gly Leu Pro Asp Pro Gly Val
305                 310                 315                 320
Arg Ser Phe Gly Phe Pro Arg Pro Gln Gln Ala Ala Tyr Gly Thr Tyr
                325                 330                 335
Cys Tyr Ala Glu Lys
            340
```

<210> 278
<211> 340
<212> PRT
<213> Bos taurus

<220>
<223> Cow HAPLN2 NP_001069152

<400> 278

```
Met Gln Gly Arg Ile Ser Leu Pro Thr Leu Cys His Phe Leu Leu Pro
 1               5                  10                  15
Trp Ala Phe Thr Thr Phe His Arg Ala Leu Gly Ser Gln Ala Pro His
            20                  25                  30
Pro Gly Pro His Tyr Leu Leu Pro Pro Ile His Glu Val Ile His Ser
        35                  40                  45
Arg Arg Gly Ala Thr Thr Thr Leu Pro Cys Val Leu Gly Ala Pro Pro
    50                  55                  60
Pro Ser Tyr Lys Val Arg Trp Ser Lys Val Glu Pro Gly Glu Leu Arg
65                  70                  75                  80
Glu Thr Pro Ile Leu Ile Thr Asn Gly Leu His Ala Arg Gly Tyr Gly
                85                  90                  95
Pro Leu Gly Gly Arg Ala Arg Met Arg Arg Gly His Arg Leu Asp Ala
            100                 105                 110
Ser Leu Val Ile Ala Gly Val Arg Leu Glu Asp Glu Gly Arg Tyr Arg
        115                 120                 125
Cys Glu Leu Ile Asn Gly Ile Glu Asp Glu Ser Val Ala Met Thr Leu
    130                 135                 140
Arg Leu Glu Gly Val Val Phe Pro Tyr Gln Pro Ser Arg Gly Arg Tyr
145                 150                 155                 160
Gln Phe Asn Tyr Tyr Glu Ala Lys Gln Ala Cys Glu Glu Gln Asp Gly
                165                 170                 175
Arg Leu Ala Thr Tyr Ala Gln Leu Tyr Gln Ala Trp Thr Glu Gly Leu
```

```
            180                 185                 190
Asp Trp Cys Asn Ala Gly Trp Leu Leu Glu Gly Ser Val Arg Tyr Pro
        195                 200                 205
Val Leu Thr Ala Arg Ala Pro Cys Gly Gly Arg Gly Arg Pro Gly Ile
    210                 215                 220
Arg Ser Tyr Gly Pro Arg Asp Arg Lys Arg Asp Arg Tyr Asp Ala Phe
225                 230                 235                 240
Cys Phe Thr Ser Ala Leu Ser Gly His Val Phe Phe Val Pro Gly Arg
                245                 250                 255
Leu Ser Leu Ser Glu Ala His Ala Ala Cys Arg Arg Arg Gly Ala Met
            260                 265                 270
Val Ala Lys Val Gly His Leu Tyr Ala Ala Trp Lys Phe Ser Gly Leu
        275                 280                 285
Asp Gln Cys Asp Gly Gly Trp Leu Ala Asp Gly Ser Val Arg Phe Pro
    290                 295                 300
Ile Thr Thr Pro Arg Pro Arg Cys Gly Gly Leu Pro Asp Pro Gly Val
305                 310                 315                 320
Arg Ser Phe Gly Phe Pro Arg Pro Gln Gln Ala Asp Tyr Gly Thr Tyr
                325                 330                 335
Cys Tyr Ser Glu
            340
```

<210> 279
<211> 359
<212> PRT
<213> Mus musculus

<220>
<223> Mouse HAPLN3 Q80WM5

<400> 279

```
Met Ser Leu Leu Phe Leu Val Leu Leu Ser Pro Phe Pro Cys Val Leu
 1               5                  10                  15
Gly Leu Pro Phe Tyr Asn Gly Phe Tyr Tyr Ser Asn Asp Leu Ser Gly
            20                  25                  30
Arg Thr Leu Gly Asn Gly Tyr Gly Glu Gly Leu Phe Asn Gly Val Lys
        35                  40                  45
Leu Val Val Glu Thr Thr Glu Glu Ser Leu Phe Ser His Gln Gly Ala
    50                  55                  60
Ser Val Thr Leu Pro Cys His Tyr His Tyr Glu Pro Ala Leu Ala Ser
65                  70                  75                  80
Pro Arg His Val Arg Val Lys Trp Trp Lys Leu Ser Glu Asn Gly Ala
                85                  90                  95
Pro Glu Gln Asp Val Leu Val Val Ile Gly Gln Arg His Arg Ser Phe
            100                 105                 110
Gly Asp Tyr Gln Gly Arg Val Gln Leu Arg Gln Asp Lys Gln Gln Glu
        115                 120                 125
Val Ser Leu Glu Leu Arg Asp Leu Arg Leu Glu Asp Ser Gly Arg Tyr
    130                 135                 140
Arg Cys Glu Val Ile Asp Gly Leu Glu Asp Glu Ser Gly Leu Val Glu
145                 150                 155                 160
Leu Glu Leu Arg Gly Val Val Phe Pro Tyr Gln Ser Arg Glu Gly Arg
                165                 170                 175
Tyr Gln Leu Asn Phe His Glu Ala Gln Gln Ala Cys Gln Glu Gln Gly
            180                 185                 190
Ala Met Val Ala Thr Phe Glu Gln Leu Phe Arg Ala Trp Glu Glu Gly
```

```
        195                 200                 205
Leu Asp Trp Cys Asn Ala Gly Trp Leu Gln Asp Ala Ser Val Gln Tyr
    210                 215                 220
Pro Ile Val Leu Pro Arg Gln Pro Cys Gly Gly Leu Gly Leu Ala Pro
225                 230                 235                 240
Gly Val Arg Ser Tyr Gly Gln Arg His His Arg Leu His Arg Tyr Asp
                245                 250                 255
Val Phe Cys Phe Ala Ala Ala Leu Lys Gly Arg Val Tyr Tyr Leu Glu
            260                 265                 270
Asn Pro Lys Lys Leu Thr Leu Leu Glu Ala Arg Glu Ala Cys Gln Glu
        275                 280                 285
Asp Gly Ala Gln Ile Ser Thr Val Gly Gln Leu Phe Ala Ala Trp Lys
    290                 295                 300
Phe Arg Gly Leu Asp Arg Cys Asp Ala Gly Trp Leu Ala Asp Gly Ser
305                 310                 315                 320
Ala Arg Tyr Pro Ile Val His Pro Arg Leu Asn Cys Gly Pro Pro Glu
                325                 330                 335
Pro Gly Val Arg Thr Phe Gly Phe Pro Asp Pro His Thr Arg Tyr Gly
            340                 345                 350
Val Tyr Cys Tyr Val Gln His
        355
```

<210> 280
<211> 359
<212> PRT
<213> Rattus norvegicus

<220>
<223> Rat HAPLN3 NP_001008559

<400> 280

```
Met Gly Leu Leu Phe Leu Val Leu Leu Ser Pro Leu Ser Cys Val Leu
 1               5                  10                  15
Gly Leu Pro Phe Tyr Asn Gly Phe Tyr Tyr Ser Asn Gly Leu His Gly
            20                  25                  30
Arg Thr Leu Gly Asn Gly Tyr Gly Glu Gly Leu Phe Asn Gly Val Lys
        35                  40                  45
Leu Val Val Glu Thr Thr Glu Glu Ser Leu Phe Ser His Gln Gly Ala
    50                  55                  60
Ser Val Thr Leu Pro Cys His Tyr His Tyr Glu Pro Ala Leu Ala Ser
65                  70                  75                  80
Pro Arg His Val Arg Ile Lys Trp Trp Lys Leu Ser Glu Asn Gly Thr
                85                  90                  95
Pro Glu Gln Asp Val Leu Val Ala Ile Gly Gln Arg His Arg Ser Phe
            100                 105                 110
Gly Asp Tyr Gln Gly Arg Val Gln Leu Arg Gln Asp Lys Glu Gln Glu
        115                 120                 125
Val Ser Leu Glu Leu Arg Asp Leu Arg Leu Glu Asp Ser Gly Arg Tyr
    130                 135                 140
Arg Cys Glu Val Ile Asp Gly Leu Glu Asp Glu Ser Gly Leu Val Glu
145                 150                 155                 160
Leu Glu Leu Arg Gly Val Val Phe Pro Tyr Gln Pro Arg Glu Gly Arg
                165                 170                 175
Tyr Gln Leu Asn Phe His Glu Ala Gln Gln Val Cys Gln Glu Gln Asp
            180                 185                 190
Ala Val Val Ala Thr Phe Glu Gln Leu Phe Arg Ala Trp Glu Glu Gly
```

```
        195                 200                 205
Leu Asp Trp Cys Asn Ala Gly Trp Leu Gln Asp Ala Ser Val Gln Tyr
    210                 215                 220
Pro Ile Val Leu Pro Arg Gln Pro Cys Gly Gly Leu Gly Leu Ala Pro
225                 230                 235                 240
Gly Val Arg Ser Tyr Gly Gln Arg His His Arg Leu His Arg Tyr Asp
                245                 250                 255
Val Phe Cys Phe Ala Ala Ala Leu Lys Gly Arg Val Tyr Tyr Leu Glu
            260                 265                 270
Asn Pro Glu Lys Leu Thr Leu Leu Glu Ala Arg Glu Ala Cys Gln Glu
        275                 280                 285
Asp Gly Ala Gln Ile Ser Thr Val Gly Gln Leu Phe Ala Ala Trp Lys
    290                 295                 300
Phe Arg Gly Leu Asp Arg Cys Asp Ala Gly Trp Leu Ala Asp Gly Ser
305                 310                 315                 320
Ala Arg Tyr Pro Ile Ile His Pro Arg Pro Asn Cys Gly Pro Pro Glu
                325                 330                 335
Pro Gly Val Arg Thr Phe Gly Phe Pro Asp Pro Asn Thr Arg Tyr Gly
            340                 345                 350
Val Tyr Cys Tyr His Gln His
        355
```

<210> 281
<211> 360
<212> PRT
<213> Bos taurus

<220>
<223> Cow HAPLN3 NP_001092451.1

<400> 281

```
Met Gly Leu Arg Leu Pro Ile Leu Leu Leu Leu Leu Cys Cys Val Ser
 1               5                  10                  15
Gly Leu Pro Phe Tyr Asn Gly Phe Tyr Tyr Ser Asn Arg Pro Asn Gly
            20                  25                  30
Arg Asn Leu Gly Asn Ser Tyr Ser Glu Gly Ile Phe Asn Gly Val Lys
        35                  40                  45
Leu Val Val Glu Thr Pro Glu Glu Thr Leu Phe Ser His Arg Gly Ala
    50                  55                  60
Asn Val Thr Leu Pro Cys Arg Tyr His Tyr Glu Pro Ala Leu Ala Ser
65                  70                  75                  80
Pro Arg Pro Val Arg Ile Lys Trp Trp Lys Leu Ser Glu Asn Gly Val
                85                  90                  95
Pro Glu Gln Asp Val Leu Val Ala Ile Gly Leu Arg Gln Arg Thr Phe
            100                 105                 110
Gly Asp Tyr Arg Gly Arg Val Arg Leu Arg Gln Asp Arg Ala Arg Glu
        115                 120                 125
Val Ser Leu Glu Ile Arg Asp Leu Arg Leu Glu Asp Tyr Gly Arg Tyr
    130                 135                 140
Arg Cys Glu Val Ile Asp Gly Leu Glu Asp Glu Ser Gly Leu Val Glu
145                 150                 155                 160
Leu Glu Leu Arg Gly Val Val Phe Pro Tyr Gln His Pro Gln Gly Arg
                165                 170                 175
Tyr Lys Phe Asn Phe His Glu Ala Gln Gln Ala Cys Glu Glu Gln Asp
            180                 185                 190
Ala Val Val Ala Ser Phe Glu Gln Leu Phe Arg Ala Trp Glu Glu Gly
```

```
        195                 200                 205
Leu Asp Trp Cys Asn Ala Gly Trp Leu Gln Asp Ala Ser Val Gln Tyr
    210                 215                 220
Pro Val Thr Gln Ala Arg Arg Pro Cys Gly Gly Leu Gly Leu Ala Pro
225                 230                 235                 240
Gly Val Arg Ser Tyr Gly Pro Arg His Arg Arg Leu His Arg Tyr Asp
                245                 250                 255
Val Phe Cys Phe Ala Val Ala Leu Arg Gly Gln Val Tyr Tyr Leu Glu
            260                 265                 270
His Pro Glu Lys Leu Thr Leu Ala Glu Ala Arg Glu Ala Cys Gln Glu
        275                 280                 285
Asp Gly Ala Gln Ile Ala Lys Val Gly Gln Leu Phe Ala Ala Trp Lys
    290                 295                 300
Phe Arg Gly Leu Asp Arg Cys Asp Ala Gly Trp Leu Ala Asp Gly Ser
305                 310                 315                 320
Ala Arg Tyr Pro Val Ala His Pro Arg Ser Asn Cys Gly Ala Leu Glu
                325                 330                 335
Pro Gly Val Arg Ser Phe Gly Phe Pro Asp Pro His Ser Arg Gln Tyr
            340                 345                 350
Gly Val Tyr Cys Tyr Arg Pro Arg
        355                 360
```

<210> 282
<211> 402
<212> PRT
<213> Mus musculus

<220>
<223> Mouse HAPLN4 Q80WM4

```
<400> 282
Met Val Cys Ala Arg Ala Ala Leu Gly Pro Gly Ala Leu Trp Ala Ala
 1               5                  10                  15
Ala Trp Gly Val Leu Leu Leu Thr Ala Pro Ala Gly Ala Gln Arg Gly
            20                  25                  30
Arg Lys Lys Val Val His Val Leu Glu Gly Glu Ser Gly Ser Val Val
        35                  40                  45
Val Gln Thr Ala Pro Gly Gln Val Val Ser His Arg Gly Gly Thr Ile
    50                  55                  60
Val Leu Pro Cys Arg Tyr His Tyr Glu Ala Ala Ala His Gly His Asp
65                  70                  75                  80
Gly Val Arg Leu Lys Trp Thr Lys Val Val Asp Pro Leu Ala Phe Thr
                85                  90                  95
Asp Val Phe Val Ala Leu Gly Pro Gln His Arg Ala Phe Gly Ser Tyr
            100                 105                 110
Arg Gly Arg Ala Glu Leu Gln Gly Asp Gly Pro Gly Asp Ala Ser Leu
        115                 120                 125
Val Leu Arg Asn Val Thr Leu Gln Asp Tyr Gly Arg Tyr Glu Cys Glu
    130                 135                 140
Val Thr Asn Glu Leu Glu Asp Asp Ala Gly Met Val Lys Leu Asp Leu
145                 150                 155                 160
Glu Gly Val Val Phe Pro Tyr His Pro Arg Gly Gly Arg Tyr Lys Leu
                165                 170                 175
Thr Phe Ala Glu Ala Gln Arg Ala Cys Ala Glu Gln Asp Gly Ile Leu
            180                 185                 190
Ala Ser Ala Glu Gln Leu His Ala Ala Trp Arg Asp Gly Leu Asp Trp
```

```
        195                 200                 205
Cys Asn Ala Gly Trp Leu Arg Asp Gly Ser Val Gln Tyr Pro Val Asn
    210                 215                 220
Arg Pro Arg Glu Pro Cys Gly Gly Leu Gly Gly Thr Gly Ser Ala Gly
225                 230                 235                 240
Gly Gly Gly Asp Ala Asn Gly Gly Leu Arg Asn Tyr Gly Tyr Arg His
                245                 250                 255
Asn Ala Glu Glu Arg Tyr Asp Ala Phe Cys Phe Thr Ser Asn Leu Pro
            260                 265                 270
Gly Arg Val Phe Phe Leu Lys Pro Leu Arg Pro Val Pro Phe Ser Gly
        275                 280                 285
Ala Ala Arg Ala Cys Ala Ala Arg Gly Ala Ala Val Ala Lys Val Gly
    290                 295                 300
Gln Leu Phe Ala Ala Trp Lys Leu Gln Leu Leu Asp Arg Cys Thr Ala
305                 310                 315                 320
Gly Trp Leu Ala Asp Gly Ser Ala Arg Tyr Pro Ile Val Asn Pro Arg
                325                 330                 335
Ala Arg Cys Gly Gly Arg Arg Pro Gly Val Arg Ser Leu Gly Phe Pro
            340                 345                 350
Asp Ala Thr Arg Arg Leu Phe Gly Val Tyr Cys Tyr Arg Ala Pro Gly
        355                 360                 365
Ala Pro Asp Pro Ala Pro Gly Gly Trp Gly Trp Gly Trp Ala Gly Gly
    370                 375                 380
Gly Gly Trp Ala Gly Gly Ala Arg Asp Pro Ala Ala Trp Thr Pro Leu
385                 390                 395                 400
His Val
```

<210> 283
<211> 421
<212> PRT
<213> Bos taurus

<220>
<223> Cow HAPLN4 KIAA1926 DAA28318

<400> 283

```
Met Arg Glu Arg Ser Pro Ser Ala Trp Gly Pro Leu Gly Glu Gly Arg
 1               5                  10                  15
Thr Gly Arg Met Val Cys Ala Arg Ala Ala Leu Gly Pro Gly Ala Leu
            20                  25                  30
Trp Ala Ala Ala Trp Gly Val Leu Leu Leu Thr Ala Ala Ala Glu Ala
        35                  40                  45
Gln Arg Gly Arg Lys Lys Val Val His Val Leu Glu Gly Glu Ser Gly
    50                  55                  60
Ser Val Val Val Gln Thr Ala Pro Gly Gln Val Val Ser His Arg Gly
65                  70                  75                  80
Gly Thr Ile Val Leu Pro Cys Arg Tyr His Tyr Glu Ala Ala Thr His
                85                  90                  95
Gly His Asp Gly Val Arg Leu Lys Trp Thr Lys Val Val Asp Pro Leu
            100                 105                 110
Ala Phe Ala Asp Val Phe Val Ala Leu Gly Pro Gln His Arg Ala Phe
        115                 120                 125
Gly Ser Tyr Arg Gly Arg Ala Glu Leu Gln Gly Asp Gly Pro Gly Asp
    130                 135                 140
Ala Ser Leu Val Leu Arg Asn Val Thr Leu Gln Asp Tyr Gly Arg Tyr
```

145 150 155 160
Glu Cys Glu Val Thr Asn Glu Leu Glu Asp Asp Thr Gly Met Val Lys
165 170 175
Leu Asp Leu Glu Gly Val Val Phe Pro Tyr His Pro Arg Gly Gly Arg
180 185 190
Tyr Lys Leu Thr Phe Ala Glu Ala Gln Arg Ala Cys Ala Glu Gln Asp
195 200 205
Gly Ile Leu Ala Ser Ala Glu Gln Leu His Ala Ala Trp Arg Asp Gly
210 215 220
Leu Asp Trp Cys Asn Ala Gly Trp Leu Arg Asp Gly Ser Val Gln Tyr
225 230 235 240
Pro Val Ser Gln Pro Arg Glu Pro Cys Gly Gly Leu Gly Gly Ala Gly
245 250 255
Ser Ala Gly Ala Gly Gly Gly Ala Ser Gly Gly Val Arg Asn Tyr Gly
260 265 270
Tyr Arg His Asn Ala Glu Glu Arg Tyr Asp Ala Phe Cys Phe Thr Ser
275 280 285
Asn Leu Pro Gly Arg Val Phe Phe Leu Lys Pro Leu Arg Pro Val Pro
290 295 300
Phe Ser Gly Ala Ala Arg Ala Cys Ala Ala Arg Gly Ala Ala Val Ala
305 310 315 320
Lys Val Gly Gln Leu Phe Ala Ala Trp Lys Leu Gln Leu Leu Asp Arg
325 330 335
Cys Thr Ala Gly Trp Leu Ala Asp Gly Ser Ala Arg Tyr Pro Ile Val
340 345 350
Asn Pro Arg Ala Arg Cys Gly Gly Arg Arg Pro Gly Val Arg Ser Leu
355 360 365
Gly Phe Pro Asp Ala Ser Arg Arg Leu Phe Gly Val Tyr Cys Tyr Arg
370 375 380
Ala Pro Gly Ala Pro Asp Pro Ala Pro Gly Gly Trp Gly Trp Gly Trp
385 390 395 400
Ala Gly Gly Gly Gly Trp Ala Gly Gly Ser Arg Asp Pro Ala Ala Trp
405 410 415
Thr Pro Leu Arg Val
420

<210> 284
<211> 400
<212> PRT
<213> Rattus norvegicus

<220>
<223> Rat HAPLN4 NP_001101868

<400> 284
Met Ala Cys Ala Pro Gly Ala Leu Gly His Arg Ala Leu Trp Ala Val
1 5 10 15
Ala Trp Gly Leu Leu Leu Leu Val Pro Val Leu Ala Gly Ala Gln Arg
20 25 30
Gly Arg Lys Lys Val Val His Val Leu Glu Gly Glu Ser Gly Ser Val
35 40 45
Val Val Gln Thr Ala Pro Gly Gln Val Val Ser His Arg Gly Gly Thr
50 55 60
Ile Val Leu Pro Cys Arg Tyr His Tyr Glu Ala Ala Ala His Gly His
65 70 75 80
Asp Gly Val Arg Leu Lys Trp Thr Lys Val Val Asp Pro Leu Ala Phe

```
                85                  90                  95
Ala Asp Val Phe Val Ala Leu Gly Pro Gln His Arg Ala Phe Gly Pro
            100                 105                 110
Tyr Arg Gly Arg Ala Glu Leu Gln Asn Asp Gly Pro Gly Asp Ala Ser
        115                 120                 125
Leu Val Leu Arg Asn Val Thr Leu Gln Asp Tyr Gly Arg Tyr Glu Cys
    130                 135                 140
Glu Val Thr Asn Glu Leu Glu Asp Asp Ala Gly Met Val Lys Leu Asp
145                 150                 155                 160
Leu Glu Gly Val Val Phe Pro Tyr His Pro Arg Gly Gly Arg Tyr Lys
                165                 170                 175
Met Thr Phe Ala Glu Ala Gln Arg Ala Cys Ala Glu Gln Asp Gly Ile
            180                 185                 190
Leu Ala Ser Ala Glu Gln Leu His Thr Ala Trp Arg Asp Gly Leu Asp
        195                 200                 205
Trp Cys Asn Ala Gly Trp Leu Arg Asp Gly Ser Val Gln Tyr Pro Val
    210                 215                 220
Ser Gln Ala Arg Glu Ala Cys Gly Gly Ser Gly Ser Pro Gly Ala Gly
225                 230                 235                 240
Gly Gly Thr Asn Gly Gly Val Arg Asn Tyr Gly Tyr Arg His Asn Ala
                245                 250                 255
Glu Glu Arg Tyr Asp Ala Phe Cys Phe Thr Ser Asn Leu Pro Gly Arg
            260                 265                 270
Val Phe Phe Leu Lys Pro Leu Arg Pro Val Ala Leu Ala Gly Ala Val
        275                 280                 285
Arg Ala Cys Ala Ala Arg Gly Ala Thr Val Ala Lys Val Gly Gln Leu
    290                 295                 300
Phe Ala Ala Trp Lys Leu Gln Leu Leu Asp Arg Cys Thr Ala Gly Trp
305                 310                 315                 320
Leu Ala Asp Gly Ser Ala Arg Tyr Pro Ile Val Asn Pro Arg Thr Arg
                325                 330                 335
Cys Gly Gly Pro Arg Pro Gly Val Arg Ser Leu Gly Phe Pro Asp Ala
            340                 345                 350
Ser Arg Arg Leu Phe Gly Val Tyr Cys Tyr Arg Ala Pro Gly Ala Pro
        355                 360                 365
Asp Pro Ala Pro Gly Gly Trp Gly Trp Gly Trp Ala Gly Gly Gly Gly
    370                 375                 380
Trp Ala Gly Gly Ser Arg Asp Pro Ala Ala Trp Thr Pro Leu Arg Val
385                 390                 395                 400


<210> 285
<211> 537
<212> PRT
<213> Sus scrofa

<220>
<223> Pig Aggrecan Q29011


<220>
<221> VARIANT
<222> 45, 49, 146
<223> Xaa = any amino acid

<400> 285
Ala Ile Ser Val Glu Val Ser Glu Pro Asp Asn Ser Leu Ser Val Ser
 1               5                  10                  15
```

```
Ile Pro Gln Pro Ser Pro Leu Arg Val Leu Leu Gly Gly Ser Leu Thr
            20                  25                  30
Ile Pro Cys Tyr Phe Ile Asp Pro Met His Pro Val Xaa Thr Ala Pro
        35                  40                  45
Xaa Thr Ala Pro Leu Ala Pro Arg Ile Lys Trp Ser Arg Val Ser Lys
    50                  55                  60
Glu Lys Glu Val Val Leu Leu Val Ala Thr Glu Gly Gln Val Arg Val
65                  70                  75                  80
Asn Ser Ala Tyr Gln Asp Arg Val Thr Leu Pro Asn Tyr Pro Ala Ile
                85                  90                  95
Pro Ser Asp Ala Thr Leu Glu Ile Gln Asn Leu Arg Ser Asn Asp Ser
            100                 105                 110
Gly Ile Tyr Arg Cys Glu Val Met His Gly Ile Glu Asp Ser Glu Ala
        115                 120                 125
Thr Leu Glu Val Val Val Lys Gly Ile Val Phe His Tyr Arg Ala Ile
    130                 135                 140
Ser Xaa Arg Tyr Thr Leu Asp Phe Asp Arg Ala Gln Arg Ala Cys Leu
145                 150                 155                 160
Gln Asn Ser Ala Ile Ile Ala Thr Pro Glu Gln Leu Gln Ala Ala Tyr
                165                 170                 175
Glu Asp Gly Phe His Gln Cys Asp Ala Gly Trp Leu Ala Asp Gln Thr
            180                 185                 190
Val Arg Tyr Pro Ile His Thr Pro Arg Glu Gly Cys Tyr Gly Asp Lys
        195                 200                 205
Asp Glu Phe Pro Gly Val Ile Thr Tyr Gly Ile Arg Asp Thr Asn Glu
    210                 215                 220
Thr Tyr Asp Val Tyr Cys Phe Ala Glu Glu Met Glu Gly Glu Val Phe
225                 230                 235                 240
Tyr Ala Thr Ser Pro Glu Lys Phe Thr Phe Gln Glu Ala Ala Asn Glu
                245                 250                 255
Cys Arg Arg Leu Gly Ala Arg Leu Ala Thr Thr Gly Gln Leu Tyr Leu
            260                 265                 270
Ala Trp Arg Gly Gly Met Asp Met Cys Ser Ala Gly Trp Leu Ala Asp
        275                 280                 285
Arg Ser Val Arg Tyr Pro Ile Ser Lys Ala Arg Pro Asn Cys Gly Gly
    290                 295                 300
Asn Leu Leu Gly Val Arg Thr Val Tyr Leu His Ala Asn Gln Thr Gly
305                 310                 315                 320
Tyr Pro Asp Pro Ser Ser Arg Tyr Asp Ala Ile Cys Tyr Thr Gly Glu
                325                 330                 335
Asp Phe Val Asp Ile Pro Glu Asn Phe Phe Gly Val Gly Gly Glu Glu
            340                 345                 350
Asp Ile Thr Ile Gln Thr Val Thr Trp Pro Asp Val Glu Leu Pro Leu
        355                 360                 365
Pro Arg Asn Ile Thr Glu Gly Glu Ala Arg Gly Thr Val Ile Leu Thr
    370                 375                 380
Val Lys Pro Val Phe Glu Phe Ser Pro Thr Ala Pro Glu Pro Glu Glu
385                 390                 395                 400
Pro Phe Thr Phe Ala Pro Gly Thr Gly Ala Thr Ala Phe Pro Glu Ala
                405                 410                 415
Glu Asn Arg Thr Gly Glu Ala Thr Arg Pro Trp Ala Phe Pro Glu Glu
            420                 425                 430
Ser Thr Pro Gly Leu Gly Ala Pro Thr Ala Phe Thr Ser Glu Asp Leu
        435                 440                 445
Val Val Gln Val Thr Ser Ala Ala Thr Glu Glu Gly Thr Glu Gly Pro
    450                 455                 460
Ser Ala Thr Glu Ala Pro Ser Thr Ser Glu Glu Pro Phe Pro Ser Glu
465                 470                 475                 480
```

```
Lys Pro Phe Pro Ser Glu Glu Pro Phe Pro Ser Glu Glu Pro Phe Pro
                485                 490                 495
Ser Glu Lys Pro Ser Ala Ser Glu Glu Pro Phe Pro Ser Glu Gln Pro
            500                 505                 510
Ser Thr Leu Ser Ala Pro Val Pro Ser Arg Thr Glu Leu Pro Gly Ser
        515                 520                 525
Gly Glu Val Ser Gly Ala Pro Glu Val
    530                 535
```

<210> 286
<211> 2109
<212> PRT
<213> Gallus gallus

<220>
<223> CHICKEN AGGRECAN P07898

<400> 286

```
Met Thr Thr Leu Leu Leu Val Phe Val Cys Leu Gln Ala Ile Thr Thr
 1               5                  10                  15
Ala Ala Ser Ala Glu Leu Ser Asp Ser Ser Asp Gly Leu Glu Val Lys
            20                  25                  30
Ile Pro Glu Gln Ser Pro Leu Arg Val Val Leu Gly Ser Ser Leu Asn
        35                  40                  45
Ile Pro Cys Tyr Phe Asn Ile Pro Glu Glu Glu Asp Thr Asn Ala Leu
    50                  55                  60
Leu Thr Pro Arg Ile Lys Trp Ser Lys Leu Ser Asn Gly Thr Glu Ile
65                  70                  75                  80
Val Leu Leu Val Ala Thr Gly Gly Lys Ile Arg Leu Asn Ala Glu Tyr
                85                  90                  95
Arg Glu Val Ile Ser Leu Pro Asn Tyr Pro Ala Ile Pro Thr Asp Ala
            100                 105                 110
Thr Leu Glu Ile Lys Ala Leu Arg Ser Asn His Thr Gly Ile Tyr Arg
        115                 120                 125
Cys Glu Val Met Tyr Gly Ile Glu Asp Arg Gln Asp Thr Ile Glu Val
    130                 135                 140
Leu Val Lys Gly Val Val Phe His Tyr Arg Ala Ile Ser Thr Arg Tyr
145                 150                 155                 160
Thr Leu Asn Phe Glu Arg Ala Lys Gln Ala Cys Ile Gln Asn Ser Ala
                165                 170                 175
Val Ile Ala Thr Pro Glu Gln Leu Gln Ala Ala Tyr Glu Asp Gly Tyr
            180                 185                 190
Glu Gln Cys Asp Ala Gly Trp Leu Ala Asp Gln Thr Val Arg Tyr Pro
        195                 200                 205
Ile His Leu Pro Arg Glu Arg Cys Tyr Gly Asp Lys Asp Glu Phe Pro
    210                 215                 220
Gly Val Arg Thr Tyr Gly Val Arg Glu Thr Asp Glu Thr Tyr Asp Val
225                 230                 235                 240
Tyr Cys Tyr Ala Glu Gln Met Gln Gly Lys Val Phe Tyr Ala Thr Ser
                245                 250                 255
Pro Glu Lys Phe Thr Phe Gln Glu Ala Phe Asp Lys Cys His Ser Leu
            260                 265                 270
Gly Ala Arg Leu Ala Thr Thr Gly Glu Leu Tyr Leu Ala Trp Lys Asp
        275                 280                 285
Gly Met Asp Met Cys Ser Ala Gly Trp Leu Ala Asp Arg Ser Val Arg
    290                 295                 300
```

```
Tyr Pro Ile Ser Arg Ala Arg Pro Asn Cys Gly Gly Asn Leu Val Gly
305                 310                 315                 320
Val Arg Thr Val Tyr Leu Asn Pro Ala Asn Gln Thr Gly Tyr Pro His
                325                 330                 335
Pro Ser Ser Arg Tyr Asp Ala Ile Cys Tyr Ser Gly Asp Asp Phe Glu
            340                 345                 350
Ala Leu Val Pro Gly Leu Phe Thr Asp Glu Val Gly Thr Glu Leu Gly
        355                 360                 365
Ser Ala Phe Thr Ile Gln Thr Val Thr Gln Thr Glu Val Glu Leu Pro
    370                 375                 380
Leu Pro Arg Asn Val Thr Glu Glu Glu Ala Arg Gly Ser Ile Ala Thr
385                 390                 395                 400
Leu Glu Pro Met Glu Ile Thr Ala Thr Ala Thr Glu Leu Tyr Glu Ala
                405                 410                 415
Phe Thr Val Leu Pro Asp Leu Phe Ala Thr Ser Val Thr Val Glu Thr
            420                 425                 430
Ala Ser Pro Arg Glu Glu Asn Val Thr Arg Glu Glu Ile Thr Gly Ile
        435                 440                 445
Trp Ala Val Pro Glu Glu Val Thr Thr Ser Val Ser Gly Thr Ala Phe
    450                 455                 460
Thr Thr Gly Met Ala Glu Val Ser Ser Val Glu Glu Ala Ile Ala Val
465                 470                 475                 480
Thr Ala Thr Pro Gly Leu Glu Ser Ala Ser Pro Phe Thr Ile Glu Asp
                485                 490                 495
His Leu Val Gln Val Thr Ala Ala Pro Asp Val Ala Leu Leu Pro Arg
            500                 505                 510
Gln Pro Ile Ser Pro Thr Gly Val Val Phe His Tyr Arg Ala Ala Thr
        515                 520                 525
Ser Arg Tyr Ala Phe Ser Phe Ile Gln Ala Gln Gln Ala Cys Leu Glu
    530                 535                 540
Asn Asn Ala Val Ile Ala Thr Pro Glu Gln Leu Gln Ala Ala Tyr Glu
545                 550                 555                 560
Ala Gly Phe Asp Gln Cys Asp Ala Gly Trp Leu Arg Asp Gln Thr Val
                565                 570                 575
Arg Tyr Pro Ile Val Asn Pro Arg Ser Asn Cys Val Gly Asp Lys Glu
            580                 585                 590
Ser Ser Pro Gly Val Arg Ser Tyr Gly Met Arg Pro Ala Ser Glu Thr
        595                 600                 605
Tyr Asp Val Tyr Cys Tyr Ile Asp Arg Leu Lys Gly Glu Val Phe Phe
    610                 615                 620
Ala Thr Gln Pro Glu Gln Phe Thr Phe Gln Glu Ala Gln Leu Tyr Cys
625                 630                 635                 640
Glu Ser Gln Asn Ala Thr Leu Ala Ser Ala Gly Gln Leu His Ala Ala
                645                 650                 655
Trp Lys Gln Gly Leu Asp Arg Cys Tyr Pro Gly Trp Leu Ala Asp Gly
            660                 665                 670
Ser Leu Arg Tyr Pro Ile Val Ser Pro Arg Pro Ala Cys Gly Gly Asp
        675                 680                 685
Ala Pro Gly Val Arg Thr Ile Tyr Gln His His Asn Gln Thr Gly Phe
    690                 695                 700
Pro Asp Pro Leu Ser Arg His His Ala Phe Cys Phe Arg Ala Leu Pro
705                 710                 715                 720
Ser Val Val Glu Glu Gly Val Thr Ser Leu Phe Glu Glu Glu Val Met
                725                 730                 735
Val Thr Gln Leu Ile Pro Gly Val Glu Gly Ile Pro Ser Gly Glu Glu
            740                 745                 750
Thr Thr Val Glu Thr Glu Leu Ser Ser Glu Pro Glu Asn Gln Thr Ala
        755                 760                 765
```

```
Gln Gly Thr Glu Val Phe Pro Thr Asp Val Ser Leu Leu Ser Ala Arg
    770                 775                 780
Pro Ser Ala Phe Pro Pro Ala Thr Val Ile Pro Glu Glu Thr Ser Thr
785                 790                 795                 800
Asn Ala Ser Ile Pro Glu Val Ser Gly Glu Phe Pro Glu Ser Gly Glu
                805                 810                 815
His Pro Thr Ser Gly Glu Pro Ser Ala Ser Gly Ala Pro Asp Thr Ser
            820                 825                 830
Gly Glu Pro Thr Ser Val Gly Phe Glu Leu Ser Gly Glu Gln Ser Gly
        835                 840                 845
Ile Gly Glu Ser Gly Leu Pro Ser Val Asp Leu Gln Ser Ser Gly Phe
    850                 855                 860
Val Pro Gly Glu Ser Gly Leu Pro Ser Gly Asp Val Ser Gly Leu Pro
865                 870                 875                 880
Ser Gly Ile Val Asp Ile Ser Gly Leu Pro Ser Ala Glu Glu Glu Val
                885                 890                 895
Thr Val Ser Val Ser Arg Ile Pro Glu Val Ser Gly Met Pro Ser Gly
            900                 905                 910
Ala Glu Ser Ser Gly Leu His Ser Gly Phe Ser Gly Glu Ile Ser Gly
        915                 920                 925
Thr Glu Leu Ile Ser Gly Leu Pro Ser Gly Glu Glu Ser Gly Leu Ala
    930                 935                 940
Ser Gly Phe Pro Thr Ile Ser Leu Val Asp Ser Thr Leu Val Glu Val
945                 950                 955                 960
Val Thr Ala Ala Pro Gly Arg Gln Glu Glu Gly Lys Gly Ser Ile Gly
                965                 970                 975
Val Ser Gly Glu Glu Glu Leu Ser Gly Phe Pro Ser Ala Glu Trp Asp
            980                 985                 990
Ser Ser Gly Ala Arg Gly Leu Pro Ser Gly Ala Glu Thr Ser Gly Glu
        995                 1000                1005
Gln Ser Gly Val Pro Glu Leu Ser Gly Glu His Ser Gly Val Pro Gly
    1010                1015                1020
Leu Ser Gly Glu Ala Phe Glu Val Pro Glu Leu Ser Gly Glu His Ser
1025                1030                1035                1040
Gly Val Thr Glu Leu Ser Gly Glu His Ser Gly Leu Pro Glu Leu Ser
                1045                1050                1055
Gly Glu Pro Phe Gly Val Pro Glu Leu Ser Gly Phe Pro Ser Gly Leu
            1060                1065                1070
Asp Ile Ser Gly Glu Pro Ser Gly Ala Pro Glu Val Ser Gly Pro Val
        1075                1080                1085
Asp Val Ser Gly Leu Thr Ser Gly Val Asp Gly Ser Gly Glu Val Ser
    1090                1095                1100
Gly Val Thr Phe Ile Ser Thr Ser Leu Gln Glu Val Thr Thr Pro Ser
1105                1110                1115                1120
Val Ala Glu Ala Glu Ala Lys Glu Ile Leu Glu Ile Ser Gly Leu Pro
                1125                1130                1135
Ser Gly Glu Thr Ser Gly Met Val Ser Gly Ser Leu Asp Val Ser Gly
            1140                1145                1150
Gln Pro Ser Gly His Ile Gly Phe Gly Gly Ser Ala Ser Gly Val Leu
        1155                1160                1165
Glu Met Ser Gly Phe Pro Gly Gly Ala Val Glu Ser Ser Gly Glu Ala
    1170                1175                1180
Ser Gly Val Glu Val Thr Ser Gly Leu Ala Ser Gly Glu Glu Ser Gly
1185                1190                1195                1200
Leu Thr Ser Gly Phe Pro Thr Val Ser Leu Val Asp Thr Thr Leu Val
                1205                1210                1215
Glu Val Val Thr Gln Thr Ser Val Ala Gln Glu Val Gly Glu Gly Pro
            1220                1225                1230
```

```
Ser Gly Met Ile Glu Ile Ser Gly Phe Leu Ser Gly Asp Arg Gly Val
        1235                1240                1245
Ser Gly Glu Gly Ser Gly Ala Val Gln Ser Ser Gly Leu Pro Ser Gly
    1250                1255                1260
Thr Gly Asp Phe Ser Gly Glu Pro Ser Gly Ile Pro Tyr Phe Ser Gly
1265                1270                1275                1280
Asp Ile Ser Gly Ala Thr Asp Leu Ser Gly Gln Pro Ser Ala Val Thr
                1285                1290                1295
Asp Ile Ser Gly Glu Asp Ser Gly Leu Pro Glu Val Thr Leu Val Thr
            1300                1305                1310
Ser Asp Leu Val Glu Val Val Thr Arg Pro Thr Val Ser Gln Glu Leu
        1315                1320                1325
Gly Gly Glu Thr Ala Val Thr Phe Pro Tyr Val Phe Gly Pro Ser Gly
    1330                1335                1340
Glu Gly Ser Ala Ser Gly Asp Leu Ser Gly Gly Ala Ser Ala Glu Gly
1345                1350                1355                1360
Gly Ile Glu Thr Ser Thr Ala Tyr Glu Ile Ser Gly Glu Ser Ser Ala
                1365                1370                1375
Phe Pro Glu Thr Ser Ile Glu Thr Ser Thr Asp Gln Glu Ile Ser Gly
            1380                1385                1390
Glu Ala Ser Ala Tyr Pro Glu Ile Ser Val Glu Thr Ser Thr His Leu
        1395                1400                1405
Glu Thr Ser Gly Glu Thr Ser Ala Tyr Pro Glu Ile Ser Thr Glu Thr
    1410                1415                1420
Ser Thr Ile Gln Glu Val Ser Gly Glu Thr Ser Ala Phe Pro Glu Ile
1425                1430                1435                1440
Ser Thr Glu Thr Ser Thr Ile Gln Glu Ile Ser Gly Glu Thr Ser Ala
                1445                1450                1455
Phe Pro Glu Ile Arg Ile Glu Thr Ser Thr Phe Gln Glu Ile Ser Gly
            1460                1465                1470
Glu Thr Ser Ala Phe Pro Glu Ile Arg Ile Glu Thr Ser Thr Ser Gln
        1475                1480                1485
Glu Ala Arg Gly Glu Thr Ser Ala Phe Pro Glu Ile Thr Ile Glu Ala
    1490                1495                1500
Ser Thr Val His Glu Thr Ser Gly Glu Thr Ser Ala Phe Pro Glu Ile
1505                1510                1515                1520
Ser Ile Glu Thr Ser Thr Val His Glu Thr Ser Gly Glu Thr Ser Ala
                1525                1530                1535
Phe Pro Glu Ile Ser Ile Glu Thr Ser Thr Val His Glu Ile Ser Gly
            1540                1545                1550
Glu Ser Ser Ala Phe Pro Glu Ile Arg Ile Glu Thr Ser Thr Ser Gln
        1555                1560                1565
Glu Ala Arg Gly Glu Thr Ser Ala Phe Pro Glu Ile Thr Ile Glu Ala
    1570                1575                1580
Ser Thr Ile Gln Glu Ile Ser Gly Glu Thr Ser Ala Phe Pro Glu Ile
1585                1590                1595                1600
Ser Ile Glu Thr Ser Thr Val Arg Glu Ile Ser Gly Glu Thr Ser Ala
                1605                1610                1615
Phe Pro Glu Ile Arg Ile Glu Thr Ser Thr Ser Gln Glu Ala Arg Gly
            1620                1625                1630
Glu Thr Ser Ala Leu Pro Glu Ile Thr Ile Glu Thr Ser Thr Val His
        1635                1640                1645
Glu Thr Ser Gly Glu Ala Ser Ala Phe Pro Glu Ile Ser Ile Glu Thr
    1650                1655                1660
Ser Thr Arg Gln Glu Ala Arg Ser Glu Ala Ser Ala Tyr Pro Glu Val
1665                1670                1675                1680
Ser Ile Glu Ala Ser Thr Thr Gln Glu Val Ser Gly Glu Ser Ser Ala
                1685                1690                1695
```

```
Phe Pro Glu Ile Ser Val Glu Thr Ser Thr Ser Gln Glu Ala Arg Gly
            1700                1705                1710
Glu Thr Ser Ala Phe Pro Glu Ile Gly Ile Glu Thr Ser Thr Ala His
        1715                1720                1725
Glu Gly Ser Gly Glu Thr Pro Gly Leu Pro Ala Val Ser Thr Asp Thr
    1730                1735                1740
Ala Ala Thr Ser Leu Ala Ser Gly Glu Pro Ser Gly Ala Pro Glu Lys
1745                1750                1755                1760
Glu Thr Pro Asp Thr Thr Ser His Leu Ile Thr Gly Val Ser Gly Glu
                1765                1770                1775
Thr Ser Val Pro Asp Ala Val Ile Ser Thr Ser Ala Pro Asp Val Glu
            1780                1785                1790
Leu Ala Gln Glu Pro Arg Asn Thr Glu Glu Thr Gln Leu Glu Ile Glu
        1795                1800                1805
Pro Ser Thr Pro Ala Ala Ser Gly Gln Glu Thr Glu Thr Ala Ala Val
    1810                1815                1820
Leu Asp Asn Pro His Leu Pro Ala Thr Ala Thr Ala Ala Leu His Pro
1825                1830                1835                1840
Ala Ser Gln Glu Ala Val Asp Ala Leu Gly Pro Thr Thr Glu Asp Thr
                1845                1850                1855
Asp Glu Cys His Ser Ser Pro Cys Leu Asn Gly Ala Thr Cys Val Asp
            1860                1865                1870
Gly Ile Asp Ser Phe Lys Cys Leu Cys Leu Pro Ser Tyr Gly Gly Asp
        1875                1880                1885
Leu Cys Glu Ile Asp Leu Ala Asn Cys Glu Glu Gly Trp Ile Lys Phe
    1890                1895                1900
Gln Gly His Cys Tyr Arg His Phe Glu Glu Arg Glu Thr Trp Met Asp
1905                1910                1915                1920
Ala Glu Ser Arg Cys Arg Glu His Gln Ala His Leu Ser Ser Ile Ile
                1925                1930                1935
Thr Pro Glu Glu Gln Glu Phe Val Asn Ser His Ala Gln Asp Tyr Gln
            1940                1945                1950
Trp Ile Gly Leu Ser Asp Arg Ala Val Glu Asn Asp Phe Arg Trp Ser
        1955                1960                1965
Asp Gly His Ser Leu Gln Phe Glu Asn Trp Arg Pro Asn Gln Pro Asp
    1970                1975                1980
Asn Phe Phe Phe Ala Gly Glu Asp Cys Val Val Met Ile Trp His Glu
1985                1990                1995                2000
Gln Gly Glu Trp Asn Asp Val Pro Cys Asn Tyr His Leu Pro Phe Thr
                2005                2010                2015
Cys Lys Lys Gly Thr Val Ala Cys Gly Asp Pro Pro Val Val Glu Asn
            2020                2025                2030
Ala Arg Thr Phe Gly Arg Lys Lys Asp Arg Tyr Glu Ile Asn Ser Leu
        2035                2040                2045
Val Arg Tyr Gln Cys Asp His Gly Tyr Ile Gln Arg His Val Pro Thr
    2050                2055                2060
Ile Arg Cys Gln Pro Asn Gly His Trp Glu Glu Pro Arg Ile Ser Cys
2065                2070                2075                2080
Thr Asn Pro Ser Ser Tyr Gln Arg Arg Leu Tyr Lys Arg Ser Pro Arg
                2085                2090                2095
Ser Arg Leu Arg Pro Gly Val Val His Arg Pro Thr His
            2100                2105
```

<210> 287
<211> 2132
<212> PRT
<213> Mus musculus

<220>
<223> MOUSE AGGRECAN Q61282

<400> 287
Met Thr Thr Leu Leu Leu Val Phe Val Thr Leu Arg Val Ile Ala Ala
 1   5   10   15
Val Ile Ser Glu Glu Val Pro Asp His Asp Asn Ser Leu Ser Val Ser
            20   25   30
Ile Pro Gln Pro Ser Pro Leu Lys Val Leu Leu Gly Ser Ser Leu Thr
        35   40   45
Ile Pro Cys Tyr Phe Ile Asp Pro Met His Pro Val Thr Thr Ala Pro
    50   55   60
Ser Thr Ala Pro Leu Thr Pro Arg Ile Lys Trp Ser Arg Val Ser Lys
65   70   75   80
Glu Lys Glu Val Val Leu Leu Val Ala Thr Glu Gly Gln Val Arg Val
                85   90   95
Asn Ser Ile Tyr Gln Asp Lys Val Ser Leu Pro Asn Tyr Pro Ala Ile
            100   105   110
Pro Ser Asp Ala Thr Leu Glu Ile Gln Asn Leu Arg Ser Asn Asp Ser
        115   120   125
Gly Ile Tyr Arg Cys Glu Val Met His Gly Ile Glu Asp Ser Glu Ala
    130   135   140
Thr Leu Glu Val Ile Val Lys Gly Ile Val Phe His Tyr Arg Ala Ile
145   150   155   160
Ser Thr Arg Tyr Thr Leu Asp Phe Asp Arg Ala Gln Arg Ala Cys Leu
                165   170   175
Gln Asn Ser Ala Ile Ile Ala Thr Pro Glu Gln Leu Gln Ala Ala Tyr
            180   185   190
Glu Asp Gly Phe His Gln Cys Asp Ala Gly Trp Leu Ala Asp Gln Thr
        195   200   205
Val Arg Tyr Pro Ile His Thr Pro Arg Glu Gly Cys Tyr Gly Asp Lys
    210   215   220
Asp Glu Phe Pro Gly Val Arg Thr Tyr Gly Ile Arg Asp Thr Asn Glu
225   230   235   240
Thr Tyr Asp Val Tyr Cys Phe Ala Glu Glu Met Glu Gly Glu Val Phe
                245   250   255
Tyr Ala Thr Ser Pro Glu Lys Phe Thr Phe Gln Glu Ala Ala Asn Glu
            260   265   270
Cys Arg Arg Leu Gly Ala Arg Leu Ala Thr Thr Gly Gln Leu Tyr Leu
        275   280   285
Ala Trp Gln Gly Gly Met Asp Met Cys Ser Ala Gly Trp Leu Ala Asp
    290   295   300
Arg Ser Val Arg Tyr Pro Ile Ser Lys Ala Arg Pro Asn Cys Gly Gly
305   310   315   320
Asn Leu Leu Gly Val Arg Thr Val Tyr Leu His Ala Asn Gln Thr Gly
                325   330   335
Tyr Pro Asp Pro Ser Ser Arg Tyr Asp Ala Ile Cys Tyr Thr Gly Glu
            340   345   350
Asp Phe Val Asp Ile Pro Glu Asn Phe Phe Gly Val Gly Gly Glu Asp
        355   360   365
Asp Ile Thr Ile Gln Thr Val Thr Trp Pro Asp Leu Glu Leu Pro Leu
    370   375   380
Pro Arg Asn Val Thr Glu Gly Glu Ala Leu Gly Ser Val Ile Leu Thr
385   390   395   400
Ala Lys Pro Ile Phe Asp Leu Ser Pro Thr Ile Ser Glu Pro Gly Glu

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                405                 410                 415
Ala Leu Thr Leu Ala Pro Glu Val Gly Ser Thr Ala Phe Pro Glu Ala
            420                 425                 430
Glu Glu Arg Thr Gly Glu Ala Thr Arg Pro Trp Gly Phe Pro Ala Glu
        435                 440                 445
Val Thr Arg Gly Pro Asp Ser Ala Thr Ala Phe Ala Ser Glu Asp Leu
    450                 455                 460
Val Val Arg Val Thr Ile Ser Pro Gly Ala Ala Glu Val Pro Gly Gln
465                 470                 475                 480
Pro Arg Leu Pro Gly Gly Val Val Phe His Tyr Arg Pro Gly Ser Thr
                485                 490                 495
Arg Tyr Ser Leu Thr Phe Glu Glu Ala Gln Gln Ala Cys Met His Thr
            500                 505                 510
Gly Ala Val Ile Ala Ser Pro Glu Gln Leu Gln Ala Ala Tyr Glu Ala
        515                 520                 525
Gly Tyr Glu Gln Cys Asp Ala Gly Trp Leu Gln Asp Gln Thr Val Arg
    530                 535                 540
Tyr Pro Ile Val Ser Pro Arg Thr Pro Cys Val Gly Asp Lys Asp Ser
545                 550                 555                 560
Ser Pro Gly Val Arg Thr Tyr Gly Val Arg Pro Ser Ser Glu Thr Tyr
                565                 570                 575
Asp Val Tyr Cys Tyr Val Asp Lys Leu Glu Gly Glu Val Phe Phe Ala
            580                 585                 590
Thr Arg Leu Glu Gln Phe Thr Phe Gln Glu Ala Arg Ala Phe Cys Ala
        595                 600                 605
Ala Gln Asn Ala Thr Leu Ala Ser Thr Gly Gln Leu Tyr Ala Ala Trp
    610                 615                 620
Ser Gln Gly Leu Asp Lys Cys Tyr Ala Gly Trp Leu Ala Asp Gly Thr
625                 630                 635                 640
Leu Arg Tyr Pro Ile Ile Thr Pro Arg Pro Ala Cys Gly Gly Asp Lys
                645                 650                 655
Pro Gly Val Arg Thr Val Tyr Leu Tyr Pro Asn Gln Thr Gly Leu Pro
            660                 665                 670
Asp Pro Leu Ser Lys His His Ala Phe Cys Phe Arg Gly Val Ser Val
        675                 680                 685
Ala Pro Ser Pro Gly Glu Glu Gly Gly Ser Thr Pro Thr Ser Pro Ser
    690                 695                 700
Asp Ile Glu Asp Trp Ile Val Thr Gln Val Gly Pro Gly Val Asp Ala
705                 710                 715                 720
Val Pro Leu Glu Pro Lys Thr Thr Glu Val Pro Tyr Phe Thr Thr Glu
                725                 730                 735
Pro Arg Lys Gln Thr Glu Trp Glu Pro Ala Tyr Thr Pro Val Gly Thr
            740                 745                 750
Ser Pro Gln Pro Gly Ile Pro Pro Thr Trp Leu Pro Thr Leu Pro Ala
        755                 760                 765
Ala Glu Glu His Thr Glu Ser Pro Ser Ala Ser Glu Glu Pro Ser Ala
    770                 775                 780
Ser Ala Val Pro Ser Thr Ser Glu Glu Pro Tyr Thr Ser Ser Phe Ala
785                 790                 795                 800
Val Pro Ser Met Thr Glu Leu Pro Gly Ser Gly Glu Ala Ser Gly Ala
                805                 810                 815
Pro Asp Leu Ser Gly Asp Phe Thr Gly Ser Gly Asp Ala Ser Gly Arg
            820                 825                 830
Leu Asp Ser Ser Gly Gln Pro Ser Gly Gly Ile Glu Ser Gly Leu Pro
        835                 840                 845
Ser Gly Asp Leu Asp Ser Ser Gly Leu Ser Pro Thr Val Ser Ser Gly
    850                 855                 860
Leu Pro Val Glu Ser Gly Ser Ala Ser Gly Asp Gly Glu Val Pro Trp
```

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865                 870                 875                 880
Ser His Thr Pro Thr Val Gly Arg Leu Pro Ser Gly Gly Glu Ser Pro
                885                 890                 895
Glu Gly Ser Ala Ser Ala Ser Gly Thr Gly Asp Leu Ser Gly Leu Pro
            900                 905                 910
Ser Gly Gly Glu Ile Thr Glu Thr Ser Thr Ser Gly Ala Glu Glu Thr
        915                 920                 925
Ser Gly Leu Pro Ser Gly Gly Asp Gly Leu Glu Thr Ser Thr Ser Gly
    930                 935                 940
Val Asp Asp Val Ser Gly Ile Pro Thr Gly Arg Glu Gly Leu Glu Thr
945                 950                 955                 960
Ser Ala Ser Gly Val Glu Asp Leu Ser Gly Leu Pro Ser Gly Glu Glu
                965                 970                 975
Gly Ser Glu Thr Ser Thr Ser Gly Ile Glu Asp Ile Ser Val Leu Pro
            980                 985                 990
Thr Gly Gly Glu Ser Leu Glu Thr Ser Ala Ser Gly Val Gly Asp Leu
        995                 1000                1005
Ser Gly Leu Pro Ser Gly Gly Glu Ser Leu Glu Thr Ser Ala Ser Gly
    1010                1015                1020
Ala Glu Asp Val Thr Gln Leu Pro Thr Glu Arg Gly Gly Leu Glu Thr
1025                1030                1035                1040
Ser Ala Ser Gly Val Glu Asp Ile Thr Val Leu Pro Thr Gly Arg Glu
                1045                1050                1055
Ser Leu Glu Thr Ser Ala Ser Gly Val Glu Asp Val Ser Gly Leu Pro
            1060                1065                1070
Ser Gly Arg Glu Gly Leu Glu Thr Ser Ala Ser Gly Ile Glu Asp Ile
        1075                1080                1085
Ser Val Phe Pro Thr Glu Ala Glu Gly Leu Asp Thr Ser Ala Ser Gly
    1090                1095                1100
Gly Tyr Val Ser Gly Ile Pro Ser Gly Gly Asp Gly Thr Glu Thr Ser
1105                1110                1115                1120
Ala Ser Gly Val Glu Asp Val Ser Gly Leu Pro Ser Gly Gly Glu Gly
                1125                1130                1135
Leu Glu Thr Ser Ala Ser Gly Val Glu Asp Leu Gly Pro Ser Thr Arg
            1140                1145                1150
Asp Ser Leu Glu Thr Ser Ala Ser Gly Val Asp Val Thr Gly Phe Pro
        1155                1160                1165
Ser Gly Arg Gly Asp Pro Glu Thr Ser Val Ser Gly Val Gly Asp Asp
    1170                1175                1180
Phe Ser Gly Leu Pro Ser Gly Lys Glu Gly Leu Glu Thr Ser Ala Ser
1185                1190                1195                1200
Gly Ala Glu Asp Leu Ser Gly Leu Pro Ser Gly Lys Glu Asp Leu Val
                1205                1210                1215
Gly Ser Ala Ser Gly Ala Leu Asp Phe Gly Lys Leu Pro Pro Gly Thr
            1220                1225                1230
Leu Gly Ser Gly Gln Thr Pro Glu Val Asn Gly Phe Pro Ser Gly Phe
        1235                1240                1245
Ser Gly Glu Tyr Ser Gly Ala Asp Ile Gly Ser Gly Pro Ser Ser Gly
    1250                1255                1260
Leu Pro Asp Phe Ser Gly Leu Pro Ser Gly Phe Pro Thr Val Ser Leu
1265                1270                1275                1280
Val Asp Ser Thr Leu Val Glu Val Ile Thr Ala Thr Thr Ser Ser Glu
                1285                1290                1295
Leu Glu Gly Arg Gly Thr Ile Gly Ile Ser Gly Ser Gly Glu Val Ser
            1300                1305                1310
Gly Leu Pro Leu Gly Glu Leu Asp Ser Ser Ala Asp Ile Ser Gly Leu
        1315                1320                1325
Pro Ser Gly Thr Glu Leu Ser Gly Gln Ala Ser Gly Ser Pro Asp Ser
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1330 1335 1340
Ser Gly Glu Thr Ser Gly Phe Phe Asp Val Ser Gly Gln Pro Phe Gly
1345 1350 1355 1360
Ser Ser Gly Val Ser Glu Glu Thr Ser Gly Ile Pro Glu Ile Ser Gly
1365 1370 1375
Gln Pro Ser Gly Thr Pro Asp Thr Thr Ala Thr Ser Gly Val Thr Glu
1380 1385 1390
Leu Asn Glu Leu Ser Ser Gly Gln Pro Asp Val Ser Gly Asp Gly Ser
1395 1400 1405
Gly Ile Leu Phe Gly Ser Gly Gln Ser Ser Gly Ile Thr Ser Val Ser
1410 1415 1420
Gly Glu Thr Ser Gly Ile Ser Asp Leu Ser Gly Gln Pro Ser Gly Phe
1425 1430 1435 1440
Pro Val Phe Ser Gly Thr Ala Thr Arg Thr Pro Asp Leu Ala Ser Gly
1445 1450 1455
Thr Ile Ser Gly Ser Gly Glu Ser Ser Gly Ile Thr Phe Val Asp Thr
1460 1465 1470
Ser Phe Val Glu Val Thr Pro Thr Thr Phe Arg Glu Glu Glu Gly Leu
1475 1480 1485
Gly Ser Val Glu Leu Ser Gly Phe Pro Ser Gly Glu Thr Glu Leu Ser
1490 1495 1500
Gly Thr Ser Gly Thr Val Asp Val Ser Glu Gln Ser Ser Gly Ala Ile
1505 1510 1515 1520
Asp Ser Ser Gly Leu Thr Ser Pro Thr Pro Glu Phe Ser Gly Leu Pro
1525 1530 1535
Ser Gly Val Ala Glu Val Ser Gly Glu Phe Ser Gly Val Glu Thr Gly
1540 1545 1550
Ser Ser Leu Pro Ser Gly Ala Phe Asp Gly Ser Gly Leu Val Ser Gly
1555 1560 1565
Phe Pro Thr Val Ser Leu Val Asp Arg Thr Leu Val Glu Ser Ile Thr
1570 1575 1580
Gln Ala Pro Thr Ala Gln Glu Ala Gly Glu Gly Pro Ser Gly Ile Leu
1585 1590 1595 1600
Glu Phe Ser Gly Ala His Ser Gly Thr Pro Asp Ile Ser Gly Glu Leu
1605 1610 1615
Ser Gly Ser Leu Asp Leu Ser Thr Leu Gln Ser Gly Gln Met Glu Thr
1620 1625 1630
Ser Thr Glu Thr Pro Ser Ser Pro Tyr Phe Ser Gly Asp Phe Ser Ser
1635 1640 1645
Thr Thr Asp Val Ser Gly Glu Ser Ile Ala Ala Thr Thr Gly Ser Gly
1650 1655 1660
Glu Ser Ser Gly Leu Pro Glu Val Thr Leu Asn Thr Ser Glu Leu Val
1665 1670 1675 1680
Glu Gly Val Thr Glu Pro Thr Val Ser Gln Glu Leu Gly His Gly Pro
1685 1690 1695
Ser Met Thr Tyr Thr Pro Arg Leu Phe Glu Ala Ser Gly Asp Ala Ser
1700 1705 1710
Ala Ser Gly Asp Leu Gly Gly Ala Val Thr Asn Phe Pro Gly Ser Gly
1715 1720 1725
Ile Glu Ala Ser Val Pro Glu Ala Ser Ser Asp Leu Ser Ala Tyr Pro
1730 1735 1740
Glu Ala Gly Val Gly Val Ser Ala Ala Pro Glu Ala Ser Ser Lys Leu
1745 1750 1755 1760
Ser Glu Phe Pro Asp Leu His Gly Ile Thr Ser Ala Phe His Glu Thr
1765 1770 1775
Asp Leu Glu Met Thr Thr Pro Ser Thr Glu Val Asn Ser Asn Pro Trp
1780 1785 1790
Thr Phe Gln Glu Gly Thr Arg Glu Gly Ser Ala Ala Pro Glu Val Ser

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        1795                1800                1805
Gly Glu Ser Ser Thr Thr Ser Asp Ile Asp Thr Gly Thr Ser Gly Val
    1810                1815                1820
Pro Ser Ala Thr Pro Met Ala Ser Gly Asp Arg Thr Glu Ile Ser Gly
1825                1830                1835                1840
Glu Trp Ser Asp His Thr Ser Glu Val Asn Val Ala Ile Ser Ser Thr
                1845                1850                1855
Ile Thr Glu Ser Glu Trp Ala Gln Pro Thr Arg Tyr Pro Thr Glu Thr
            1860                1865                1870
Leu Gln Glu Ile Glu Ser Pro Asn Pro Ser Tyr Ser Gly Glu Glu Thr
        1875                1880                1885
Gln Thr Ala Glu Thr Thr Met Ser Leu Thr Asp Ala Pro Thr Leu Ser
    1890                1895                1900
Ser Ser Glu Gly Ser Gly Glu Thr Glu Ser Thr Val Ala Asp Gln Glu
1905                1910                1915                1920
Gln Cys Glu Glu Gly Trp Thr Lys Phe Gln Gly His Cys Tyr Arg His
                1925                1930                1935
Phe His Asp Arg Glu Thr Trp Val Asp Ala Glu Arg Arg Cys Arg Glu
            1940                1945                1950
Gln Gln Ser His Leu Ser Ser Ile Val Thr Pro Glu Glu Gln Glu Phe
        1955                1960                1965
Val Asn Lys Asn Ala Gln Asp Tyr Gln Trp Ile Gly Leu Asn Asp Arg
    1970                1975                1980
Thr Ile Glu Gly Asp Phe Arg Trp Ser Asp Gly His Ser Leu Gln Phe
1985                1990                1995                2000
Glu Lys Trp Arg Pro Asn Gln Pro Asp Asn Phe Phe Ala Thr Gly Glu
                2005                2010                2015
Asp Cys Val Val Met Ile Trp His Glu Arg Gly Glu Trp Asn Asp Val
            2020                2025                2030
Pro Cys Asn Tyr Gln Leu Pro Phe Thr Cys Lys Lys Gly Thr Val Ala
        2035                2040                2045
Cys Gly Asp Pro Pro Val Val Glu His Ala Arg Thr Leu Gly Gln Lys
    2050                2055                2060
Lys Asp Arg Tyr Glu Ile Ser Ser Leu Val Arg Tyr Gln Cys Thr Glu
2065                2070                2075                2080
Gly Phe Val Gln Arg His Val Pro Thr Ile Arg Cys Gln Pro Ser Gly
                2085                2090                2095
His Trp Glu Glu Pro Arg Ile Thr Cys Thr Asp Pro Asn Thr Tyr Lys
            2100                2105                2110
His Arg Leu Gln Lys Arg Ser Met Arg Pro Thr Arg Arg Ser Arg Pro
        2115                2120                2125
Ser Met Ala His
    2130


<210> 288
<211> 2364
<212> PRT
<213> Bos taurus

<220>
<223> COW AGGRECAN P13608


<400> 288
Met Thr Thr Leu Leu Leu Val Phe Val Thr Leu Arg Val Ile Thr Ala
 1               5                  10                  15
Ala Ile Ser Val Glu Val Ser Glu Pro Asp Asn Ser Leu Ser Val Ser
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            20                  25                  30
Ile Pro Glu Pro Ser Pro Leu Arg Val Leu Leu Gly Ser Ser Leu Thr
        35                  40                  45
Ile Pro Cys Tyr Phe Ile Asp Pro Met His Pro Val Thr Thr Ala Pro
    50                  55                  60
Ser Thr Ala Pro Leu Ala Pro Arg Ile Lys Trp Ser Arg Ile Ser Lys
65                  70                  75                  80
Glu Lys Glu Val Val Leu Leu Val Ala Thr Glu Gly Arg Val Arg Val
                85                  90                  95
Asn Ser Ala Tyr Gln Asp Lys Val Thr Leu Pro Asn Tyr Pro Ala Ile
            100                 105                 110
Pro Ser Asp Ala Thr Leu Glu Ile Gln Asn Met Arg Ser Asn Asp Ser
        115                 120                 125
Gly Ile Leu Arg Cys Glu Val Met His Gly Ile Glu Asp Ser Gln Ala
    130                 135                 140
Thr Leu Glu Val Val Val Lys Gly Ile Val Phe His Tyr Arg Ala Ile
145                 150                 155                 160
Ser Thr Arg Tyr Thr Leu Asp Phe Asp Arg Ala Gln Arg Ala Cys Leu
                165                 170                 175
Gln Asn Ser Ala Ile Ile Ala Thr Pro Glu Gln Leu Gln Ala Ala Tyr
            180                 185                 190
Glu Asp Gly Phe His Gln Cys Asp Ala Gly Trp Leu Ala Asp Gln Thr
        195                 200                 205
Val Arg Tyr Pro Ile His Thr Pro Arg Glu Gly Cys Tyr Gly Asp Lys
    210                 215                 220
Asp Glu Phe Pro Gly Val Arg Thr Tyr Gly Ile Arg Asp Thr Asn Glu
225                 230                 235                 240
Thr Tyr Asp Val Tyr Cys Phe Ala Glu Glu Met Glu Gly Glu Val Phe
                245                 250                 255
Tyr Ala Thr Ser Pro Glu Lys Phe Thr Phe Gln Glu Ala Ala Asn Glu
            260                 265                 270
Cys Arg Arg Leu Gly Ala Arg Leu Ala Thr Thr Gly Gln Leu Tyr Leu
        275                 280                 285
Ala Trp Gln Gly Gly Met Asp Met Cys Ser Ala Gly Trp Leu Ala Asp
    290                 295                 300
Arg Ser Val Arg Tyr Pro Ile Ser Lys Ala Arg Pro Asn Cys Gly Gly
305                 310                 315                 320
Asn Leu Leu Gly Val Arg Thr Val Tyr Leu His Ala Asn Gln Thr Gly
                325                 330                 335
Tyr Pro Asp Pro Ser Ser Arg Tyr Asp Ala Ile Cys Tyr Thr Gly Glu
            340                 345                 350
Asp Phe Val Asp Ile Pro Glu Ser Phe Phe Gly Val Gly Gly Glu Glu
        355                 360                 365
Asp Ile Thr Ile Gln Thr Val Thr Trp Pro Asp Val Glu Leu Pro Leu
    370                 375                 380
Pro Arg Asn Ile Thr Glu Gly Glu Ala Arg Gly Ser Val Ile Leu Thr
385                 390                 395                 400
Ala Lys Pro Asp Phe Glu Val Ser Pro Thr Ala Pro Glu Pro Glu Glu
                405                 410                 415
Pro Phe Thr Phe Val Pro Glu Val Arg Ala Thr Ala Phe Pro Glu Val
            420                 425                 430
Glu Asn Arg Thr Glu Glu Ala Thr Arg Pro Trp Ala Phe Pro Arg Glu
        435                 440                 445
Ser Thr Pro Gly Leu Gly Ala Pro Thr Ala Phe Thr Ser Glu Asp Leu
    450                 455                 460
Val Val Gln Val Thr Leu Ala Pro Gly Ala Ala Glu Val Pro Gly Gln
465                 470                 475                 480
Pro Arg Leu Pro Gly Gly Val Val Phe His Tyr Arg Pro Gly Ser Ser
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                485                 490                 495
Arg Tyr Ser Leu Thr Phe Glu Glu Ala Lys Gln Ala Cys Leu Arg Thr
            500                 505                 510
Gly Ala Ile Ile Ala Ser Pro Glu Gln Leu Gln Ala Ala Tyr Glu Ala
        515                 520                 525
Gly Tyr Glu Gln Cys Asp Ala Gly Trp Leu Gln Asp Gln Thr Val Arg
    530                 535                 540
Tyr Pro Ile Val Ser Pro Arg Thr Pro Cys Val Gly Asp Lys Asp Ser
545                 550                 555                 560
Ser Pro Gly Val Arg Thr Tyr Gly Val Arg Pro Pro Ser Glu Thr Tyr
                565                 570                 575
Asp Val Tyr Cys Tyr Val Asp Arg Leu Glu Gly Glu Val Phe Phe Ala
            580                 585                 590
Thr Arg Leu Glu Gln Phe Thr Phe Trp Glu Ala Gln Glu Phe Cys Glu
        595                 600                 605
Ser Gln Asn Ala Thr Leu Ala Thr Thr Gly Gln Leu Tyr Ala Ala Trp
    610                 615                 620
Ser Arg Gly Leu Asp Lys Cys Tyr Ala Gly Trp Leu Ala Asp Gly Ser
625                 630                 635                 640
Leu Arg Tyr Pro Ile Val Thr Pro Arg Pro Ala Cys Gly Gly Asp Lys
                645                 650                 655
Pro Gly Val Arg Thr Val Tyr Leu Tyr Pro Asn Gln Thr Gly Leu Leu
            660                 665                 670
Asp Pro Leu Ser Arg His His Ala Phe Cys Phe Arg Gly Val Ser Ala
        675                 680                 685
Ala Pro Ser Pro Glu Glu Glu Glu Gly Ser Ala Pro Thr Ala Gly Pro
    690                 695                 700
Asp Val Glu Glu Trp Met Val Thr Gln Val Gly Pro Gly Val Ala Ala
705                 710                 715                 720
Val Pro Ile Gly Glu Glu Thr Thr Ala Ile Pro Gly Phe Thr Val Glu
                725                 730                 735
Pro Glu Asn Lys Thr Glu Trp Glu Leu Ala Tyr Thr Pro Ala Gly Thr
            740                 745                 750
Leu Pro Leu Pro Gly Ile Pro Pro Thr Trp Pro Pro Thr Gly Glu Ala
        755                 760                 765
Thr Glu Glu His Thr Glu Gly Pro Ser Ala Thr Glu Val Pro Ser Ala
    770                 775                 780
Ser Glu Lys Pro Phe Pro Ser Glu Glu Pro Phe Pro Pro Glu Glu Pro
785                 790                 795                 800
Phe Pro Ser Glu Lys Pro Phe Pro Pro Glu Glu Leu Phe Pro Ser Glu
                805                 810                 815
Lys Pro Phe Pro Ser Glu Lys Pro Phe Pro Ser Glu Glu Pro Phe Pro
            820                 825                 830
Ser Glu Lys Pro Phe Pro Pro Glu Glu Leu Phe Pro Ser Glu Lys Pro
        835                 840                 845
Ile Pro Ser Glu Glu Pro Phe Pro Ser Glu Glu Pro Phe Pro Ser Glu
    850                 855                 860
Lys Pro Phe Pro Pro Glu Glu Pro Phe Pro Ser Glu Lys Pro Ile Pro
865                 870                 875                 880
Ser Glu Glu Pro Phe Pro Ser Glu Lys Pro Phe Pro Ser Glu Glu Pro
                885                 890                 895
Phe Pro Ser Glu Glu Pro Ser Thr Leu Ser Ala Pro Val Pro Ser Arg
            900                 905                 910
Thr Glu Leu Pro Ser Ser Gly Glu Val Ser Gly Val Pro Glu Ile Ser
        915                 920                 925
Gly Asp Phe Thr Gly Ser Gly Glu Ile Ser Gly His Leu Asp Phe Ser
    930                 935                 940
Gly Gln Pro Ser Gly Glu Ser Ala Ser Gly Leu Pro Ser Glu Asp Leu
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945 950 955 960
Asp Ser Ser Gly Leu Thr Ser Thr Val Gly Ser Gly Leu Pro Val Glu
965 970 975
Ser Gly Leu Pro Ser Gly Glu Glu Glu Arg Ile Thr Trp Thr Ser Ala
980 985 990
Pro Lys Val Asp Arg Leu Pro Ser Gly Gly Glu Gly Pro Glu Val Ser
995 1000 1005
Gly Val Glu Asp Ile Ser Gly Leu Pro Ser Gly Gly Glu Val His Leu
1010 1015 1020
Glu Ile Ser Ala Ser Gly Val Glu Asp Ile Ser Gly Leu Pro Ser Gly
1025 1030 1035 1040
Gly Glu Val His Leu Glu Ile Ser Ala Ser Gly Val Glu Asp Leu Ser
1045 1050 1055
Arg Ile Pro Ser Gly Glu Gly Pro Glu Ile Ser Ala Ser Gly Val Glu
1060 1065 1070
Asp Ile Ser Gly Leu Pro Ser Gly Glu Glu Gly His Leu Glu Ile Ser
1075 1080 1085
Ala Ser Gly Val Glu Asp Leu Ser Gly Ile Pro Ser Gly Glu Gly Pro
1090 1095 1100
Glu Val Ser Ala Ser Gly Val Glu Asp Leu Ile Gly Leu Pro Ser Gly
1105 1110 1115 1120
Glu Gly Pro Glu Val Ser Ala Ser Gly Val Glu Asp Leu Ser Arg Leu
1125 1130 1135
Pro Ser Gly Glu Gly Pro Glu Val Ser Ala Ser Gly Val Glu Asp Leu
1140 1145 1150
Ser Gly Leu Pro Ser Gly Glu Gly Pro Glu Val Ser Val Ser Gly Val
1155 1160 1165
Glu Asp Leu Ser Arg Leu Pro Ser Gly Glu Gly Pro Glu Val Ser Ala
1170 1175 1180
Ser Gly Val Glu Asp Leu Ser Arg Leu Pro Ser Gly Glu Gly Pro Glu
1185 1190 1195 1200
Ile Ser Val Ser Gly Val Glu Asp Ile Ser Ile Leu Pro Ser Gly Glu
1205 1210 1215
Gly Pro Glu Val Ser Ala Ser Gly Val Glu Asp Leu Ser Val Leu Pro
1220 1225 1230
Ser Gly Glu Gly His Leu Glu Ile Ser Thr Ser Gly Val Glu Asp Leu
1235 1240 1245
Ser Val Leu Pro Ser Gly Glu Gly His Leu Glu Thr Ser Ser Gly Val
1250 1255 1260
Glu Asp Ile Ser Arg Leu Pro Ser Gly Glu Gly Pro Glu Val Ser Ala
1265 1270 1275 1280
Ser Gly Val Glu Asp Leu Ser Val Leu Pro Ser Gly Glu Asp His Leu
1285 1290 1295
Glu Ile Ser Ala Ser Gly Val Glu Asp Leu Gly Val Leu Pro Ser Gly
1300 1305 1310
Glu Asp His Leu Glu Ile Ser Ala Ser Gly Val Glu Asp Ile Ser Arg
1315 1320 1325
Leu Pro Ser Gly Glu Gly Pro Glu Val Ser Ala Ser Gly Val Glu Asp
1330 1335 1340
Leu Ser Val Leu Pro Ser Gly Glu Gly His Leu Glu Ile Ser Ala Ser
1345 1350 1355 1360
Gly Val Glu Asp Leu Ser Arg Leu Pro Ser Gly Gly Glu Asp His Leu
1365 1370 1375
Glu Thr Ser Ala Ser Gly Val Gly Asp Leu Ser Gly Leu Pro Ser Gly
1380 1385 1390
Arg Glu Gly Leu Glu Ile Ser Ala Ser Gly Ala Gly Asp Leu Ser Gly
1395 1400 1405
Leu Thr Ser Gly Lys Glu Asp Leu Thr Gly Ser Ala Ser Gly Ala Leu

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    1410                1415                1420
Asp Leu Gly Arg Ile Pro Ser Val Thr Leu Gly Ser Gly Gln Ala Pro
1425                1430                1435                1440
Glu Ala Ser Gly Leu Pro Ser Gly Phe Ser Gly Glu Tyr Ser Gly Val
                1445                1450                1455
Asp Leu Glu Ser Gly Pro Ser Ser Gly Leu Pro Asp Phe Ser Gly Leu
            1460                1465                1470
Pro Ser Gly Phe Pro Thr Val Ser Leu Val Asp Thr Thr Leu Val Glu
        1475                1480                1485
Val Val Thr Ala Thr Thr Ala Gly Glu Leu Glu Gly Arg Gly Thr Ile
    1490                1495                1500
Asp Ile Ser Gly Ala Gly Glu Thr Ser Gly Leu Pro Phe Ser Glu Leu
1505                1510                1515                1520
Asp Ile Ser Gly Gly Ala Ser Gly Leu Ser Ser Gly Ala Glu Leu Ser
                1525                1530                1535
Gly Gln Ala Ser Gly Ser Pro Asp Ile Ser Gly Glu Thr Ser Gly Leu
            1540                1545                1550
Phe Gly Val Ser Gly Gln Pro Ser Gly Phe Pro Asp Ile Ser Gly Glu
        1555                1560                1565
Thr Ser Gly Leu Leu Glu Val Ser Gly Gln Pro Ser Gly Phe Tyr Gly
    1570                1575                1580
Glu Ile Ser Gly Val Thr Glu Leu Ser Gly Leu Ala Ser Gly Gln Pro
1585                1590                1595                1600
Glu Ile Ser Gly Glu Ala Ser Gly Ile Leu Ser Gly Leu Gly Pro Pro
                1605                1610                1615
Phe Gly Ile Thr Asp Leu Ser Gly Glu Ala Pro Gly Ile Pro Asp Leu
            1620                1625                1630
Ser Gly Gln Pro Ser Gly Leu Pro Glu Phe Ser Gly Thr Ala Ser Gly
        1635                1640                1645
Ile Pro Asp Leu Val Ser Ser Ala Val Ser Gly Ser Gly Glu Ser Ser
    1650                1655                1660
Gly Ile Thr Phe Val Asp Thr Ser Leu Val Glu Val Thr Pro Thr Thr
1665                1670                1675                1680
Phe Lys Glu Glu Glu Gly Leu Gly Ser Val Glu Leu Ser Gly Leu Pro
                1685                1690                1695
Ser Gly Glu Leu Gly Val Ser Gly Thr Ser Gly Leu Ala Asp Val Ser
            1700                1705                1710
Gly Leu Ser Ser Gly Ala Ile Asp Ser Ser Gly Phe Thr Ser Gln Pro
        1715                1720                1725
Pro Glu Phe Ser Gly Leu Pro Ser Gly Val Thr Glu Val Ser Gly Glu
    1730                1735                1740
Ala Ser Gly Ala Glu Ser Gly Ser Ser Leu Pro Ser Gly Ala Tyr Asp
1745                1750                1755                1760
Ser Ser Gly Leu Pro Ser Gly Phe Pro Thr Val Ser Phe Val Asp Arg
                1765                1770                1775
Thr Leu Val Glu Ser Val Thr Gln Ala Pro Thr Ala Gln Glu Ala Gly
            1780                1785                1790
Glu Gly Pro Ser Gly Ile Leu Glu Leu Ser Gly Ala Pro Ser Gly Ala
        1795                1800                1805
Pro Asp Met Ser Gly Asp His Leu Gly Ser Leu Asp Gln Ser Gly Leu
    1810                1815                1820
Gln Ser Gly Leu Val Glu Pro Ser Gly Glu Pro Ala Ser Thr Pro Tyr
1825                1830                1835                1840
Phe Ser Gly Asp Phe Ser Gly Thr Thr Asp Val Ser Gly Glu Ser Ser
                1845                1850                1855
Ala Ala Thr Ser Thr Ser Gly Glu Ala Ser Gly Leu Pro Glu Val Thr
            1860                1865                1870
Leu Ile Thr Ser Glu Leu Val Glu Gly Val Thr Glu Pro Thr Val Ser
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        1875                1880                1885
Gln Glu Leu Gly Gln Arg Pro Pro Val Thr Tyr Thr Pro Gln Leu Phe
    1890                1895                1900
Glu Ser Ser Gly Glu Ala Ser Ala Ser Gly Asp Val Pro Arg Phe Pro
1905                1910                1915                1920
Gly Ser Gly Val Glu Val Ser Ser Val Pro Glu Ser Ser Gly Glu Thr
                1925                1930                1935
Ser Ala Tyr Pro Glu Ala Glu Val Gly Ala Ser Ala Ala Pro Glu Ala
            1940                1945                1950
Ser Gly Gly Ala Ser Gly Ser Pro Asn Leu Ser Glu Thr Thr Ser Thr
        1955                1960                1965
Phe His Glu Ala Asp Leu Glu Gly Thr Ser Gly Leu Gly Val Ser Gly
    1970                1975                1980
Ser Pro Ser Ala Phe Pro Glu Gly Pro Thr Glu Gly Leu Ala Thr Pro
1985                1990                1995                2000
Glu Val Ser Gly Glu Ser Thr Thr Ala Phe Asp Val Ser Val Glu Ala
                2005                2010                2015
Ser Gly Ser Pro Ser Ala Thr Pro Leu Ala Ser Gly Asp Arg Thr Asp
            2020                2025                2030
Thr Ser Gly Asp Leu Ser Gly His Thr Ser Gly Leu Asp Ile Val Ile
        2035                2040                2045
Ser Thr Thr Ile Pro Glu Ser Glu Trp Thr Gln Gln Thr Gln Arg Pro
    2050                2055                2060
Ala Glu Ala Arg Leu Glu Ile Glu Ser Ser Ser Pro Val His Ser Gly
2065                2070                2075                2080
Glu Glu Ser Gln Thr Ala Asp Thr Ala Thr Ser Pro Thr Asp Ala Ser
                2085                2090                2095
Ile Pro Ala Ser Ala Gly Gly Thr Asp Asp Ser Glu Ala Thr Thr Thr
            2100                2105                2110
Asp Ile Asp Glu Cys Leu Ser Ser Pro Cys Leu Asn Gly Ala Thr Cys
        2115                2120                2125
Val Asp Ala Ile Asp Ser Phe Thr Cys Leu Cys Leu Pro Ser Tyr Gln
    2130                2135                2140
Gly Asp Val Cys Glu Ile Gln Lys Leu Cys Glu Glu Gly Trp Thr Lys
2145                2150                2155                2160
Phe Gln Gly His Cys Tyr Arg His Phe Pro Asp Arg Ala Thr Trp Val
                2165                2170                2175
Asp Ala Glu Ser Gln Cys Arg Lys Gln Gln Ser His Leu Ser Ser Ile
            2180                2185                2190
Val Thr Pro Glu Glu Gln Glu Phe Val Asn Asn Asn Ala Gln Asp Tyr
        2195                2200                2205
Gln Trp Ile Gly Leu Asn Asp Lys Thr Ile Glu Gly Asp Phe Arg Trp
    2210                2215                2220
Ser Asp Gly His Ser Leu Gln Phe Glu Asn Trp Arg Pro Asn Gln Pro
2225                2230                2235                2240
Asp Asn Phe Phe Ala Thr Gly Glu Asp Cys Val Val Met Ile Trp His
                2245                2250                2255
Glu Lys Gly Glu Trp Asn Asp Val Pro Cys Asn Tyr Gln Leu Pro Phe
            2260                2265                2270
Thr Cys Lys Lys Gly Thr Val Ala Cys Gly Glu Pro Pro Val Val Glu
        2275                2280                2285
His Ala Arg Ile Phe Gly Gln Lys Lys Asp Arg Tyr Glu Ile Asn Ala
    2290                2295                2300
Leu Val Arg Tyr Gln Cys Thr Glu Gly Phe Ile Gln Gly His Val Pro
2305                2310                2315                2320
Thr Ile Arg Cys Gln Pro Ser Gly His Trp Glu Glu Pro Arg Ile Thr
                2325                2330                2335
Cys Thr Asp Pro Ala Thr Tyr Lys Arg Arg Leu Gln Lys Arg Ser Ser
```

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            2340                2345                2350
Arg Pro Leu Arg Arg Ser His Pro Ser Thr Ala His
        2355                2360
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<210> 289
<211> 2333
<212> PRT
<213> Canis familiaris

<220>
<223> DOG AGGRECAN Q28343

<400> 289

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Met Thr Thr Leu Leu Trp Val Phe Val Thr Leu Arg Val Ile Thr Ala
 1               5                  10                  15
Ala Ser Ser Glu Glu Thr Ser Asp His Asp Asn Ser Leu Ser Val Ser
            20                  25                  30
Ile Pro Glu Pro Ser Pro Met Arg Val Leu Leu Gly Ser Ser Leu Thr
        35                  40                  45
Ile Pro Cys Tyr Phe Ile Asp Pro Met His Pro Val Thr Thr Ala Pro
    50                  55                  60
Ser Thr Ala Pro Leu Ala Pro Arg Ile Lys Trp Ser Arg Ile Thr Lys
65                  70                  75                  80
Glu Lys Glu Val Val Leu Leu Val Ala Thr Glu Gly Gln Val Arg Ile
                85                  90                  95
Asn Ser Ala Tyr Gln Asp Lys Val Ser Leu Pro Asn Tyr Pro Ala Ile
            100                 105                 110
Pro Ser Asp Ala Thr Leu Glu Ile Gln Asn Leu Arg Ser Asn Asp Ser
        115                 120                 125
Gly Ile Tyr Arg Cys Glu Val Met His Gly Ile Glu Asp Ser Glu Ala
    130                 135                 140
Thr Leu Glu Val Val Val Lys Gly Ile Val Phe His Tyr Arg Ala Ile
145                 150                 155                 160
Ser Thr Arg Tyr Thr Leu Asp Phe Asp Arg Ala Gln Arg Ala Cys Leu
                165                 170                 175
Gln Asn Ser Ala Ile Ile Ala Thr Pro Glu Gln Leu Gln Ala Ala Tyr
            180                 185                 190
Glu Asp Gly Phe His Gln Cys Asp Ala Gly Trp Leu Ala Asp Gln Thr
        195                 200                 205
Val Arg Tyr Pro Ile His Thr Pro Arg Glu Gly Cys Tyr Gly Asp Lys
    210                 215                 220
Asp Glu Phe Pro Gly Val Arg Thr Tyr Gly Ile Arg Asp Thr Asn Glu
225                 230                 235                 240
Thr Tyr Asp Val Tyr Cys Phe Ala Glu Glu Met Glu Gly Glu Val Leu
                245                 250                 255
Tyr Ala Thr Ser Pro Glu Lys Phe Thr Phe Gln Glu Ala Ala Asn Glu
            260                 265                 270
Cys Arg Arg Leu Gly Ala Arg Leu Ala Thr Thr Gly Gln Leu Tyr Leu
        275                 280                 285
Ala Trp Gln Gly Gly Met Asp Met Cys Ser Ala Gly Trp Leu Ala Asp
    290                 295                 300
Arg Ser Val Arg Tyr Pro Ile Ser Lys Ala Arg Pro Asn Cys Gly Gly
305                 310                 315                 320
Asn Leu Leu Gly Val Arg Thr Val Tyr Leu His Ala Asn Gln Thr Gly
                325                 330                 335
Tyr Pro Asp Pro Ser Ser Arg Tyr Asp Ala Ile Cys Tyr Thr Gly Glu
```

```
            340                 345                 350
Asp Phe Val Asp Ile Pro Glu Asn Phe Phe Gly Val Gly Gly Glu Glu
        355                 360                 365
Asp Ile Thr Ile Gln Thr Val Thr Trp Pro Asp Val Glu Leu Pro Leu
    370                 375                 380
Pro Arg Asn Ile Thr Glu Gly Glu Ala Arg Gly Asn Val Ile Leu Thr
385                 390                 395                 400
Val Lys Pro Ile Phe Asp Leu Ser Pro Thr Ala Pro Glu Pro Glu Glu
                405                 410                 415
Pro Phe Thr Phe Val Pro Glu Pro Glu Lys Pro Phe Thr Phe Ala Thr
            420                 425                 430
Asp Val Gly Val Thr Ala Phe Pro Glu Ala Glu Asn Arg Thr Gly Glu
        435                 440                 445
Ala Thr Arg Pro Trp Gly Val Pro Glu Glu Ser Thr Pro Gly Pro Ala
    450                 455                 460
Phe Thr Ala Phe Thr Ser Glu Asp His Val Val Gln Val Thr Ala Val
465                 470                 475                 480
Pro Gly Ala Ala Glu Val Pro Gly Gln Pro Arg Leu Pro Gly Gly Val
                485                 490                 495
Val Phe His Tyr Arg Pro Gly Ser Ala Arg Tyr Ser Leu Thr Phe Glu
            500                 505                 510
Glu Ala Gln Gln Ala Cys Leu Arg Thr Gly Ala Val Ile Ala Ser Pro
        515                 520                 525
Glu Gln Leu Gln Ala Ala Tyr Glu Ala Gly Tyr Glu Gln Cys Asp Ala
    530                 535                 540
Gly Trp Leu Gln Asp Gln Thr Val Arg Tyr Pro Ile Val Ser Pro Arg
545                 550                 555                 560
Thr Pro Cys Val Gly Asp Lys Asp Ser Ser Pro Gly Val Arg Thr Tyr
                565                 570                 575
Gly Val Arg Pro Pro Ser Glu Thr Tyr Asp Val Tyr Cys Tyr Val Asp
            580                 585                 590
Lys Leu Glu Gly Glu Val Phe Phe Ile Thr Arg Leu Glu Gln Phe Thr
        595                 600                 605
Phe Gln Glu Ala Leu Ala Phe Cys Glu Ser His Asn Ala Thr Leu Ala
    610                 615                 620
Ser Thr Gly Gln Leu Tyr Ala Ala Trp Arg Gln Gly Leu Asp Lys Cys
625                 630                 635                 640
Tyr Ala Gly Trp Leu Ser Asp Gly Ser Leu Arg Tyr Pro Ile Val Thr
                645                 650                 655
Pro Arg Pro Ser Cys Gly Gly Asp Lys Pro Gly Val Arg Thr Val Tyr
            660                 665                 670
Leu Tyr Pro Asn Gln Thr Gly Leu Pro Asp Pro Leu Ser Arg His His
        675                 680                 685
Val Phe Cys Phe Arg Gly Val Ser Gly Val Pro Ser Pro Gly Glu Glu
    690                 695                 700
Glu Gly Gly Thr Pro Thr Pro Ser Val Val Glu Asp Trp Ile Pro Thr
705                 710                 715                 720
Gln Val Gly Pro Val Val Pro Ser Val Pro Met Gly Glu Glu Thr Thr
                725                 730                 735
Ala Ile Leu Asp Phe Thr Ile Glu Pro Glu Asn Gln Thr Glu Trp Glu
            740                 745                 750
Pro Ala Tyr Ser Pro Ala Gly Thr Ser Pro Leu Pro Gly Ile Pro Pro
        755                 760                 765
Thr Trp Pro Pro Thr Ser Thr Ala Thr Glu Glu Ser Thr Glu Gly Pro
    770                 775                 780
Ser Gly Thr Glu Val Pro Ser Val Ser Glu Glu Pro Ser Pro Ser Glu
785                 790                 795                 800
Glu Pro Phe Pro Trp Glu Glu Leu Ser Thr Leu Ser Pro Pro Gly Pro
```

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                805                 810                 815
Ser Gly Thr Glu Leu Pro Gly Ser Gly Glu Ala Ser Gly Val Pro Glu
            820                 825                 830
Val Ser Gly Asp Phe Thr Gly Ser Gly Glu Val Ser Gly His Pro Asp
        835                 840                 845
Ser Ser Gly Gln Leu Ser Gly Glu Ser Ala Ser Gly Leu Pro Ser Glu
    850                 855                 860
Asp Leu Asp Ser Ser Gly Leu Thr Ser Ala Val Gly Ser Gly Leu Ala
865                 870                 875                 880
Ser Gly Asp Glu Asp Arg Ile Thr Leu Ser Ser Ile Pro Lys Val Glu
                885                 890                 895
Gly Glu Gly Leu Glu Thr Ser Ala Ser Gly Val Glu Asp Leu Ser Gly
            900                 905                 910
Leu Pro Ser Gly Arg Glu Gly Leu Glu Thr Ser Thr Ser Gly Val Gly
        915                 920                 925
Asp Leu Ser Gly Leu Pro Ser Gly Glu Gly Leu Glu Val Ser Ala Ser
    930                 935                 940
Gly Val Glu Asp Leu Ser Gly Leu Pro Ser Gly Glu Gly Pro Glu Thr
945                 950                 955                 960
Ser Thr Ser Gly Val Gly Asp Leu Ser Arg Leu Pro Ser Gly Glu Gly
                965                 970                 975
Pro Glu Val Ser Ala Ser Gly Val Gly Asp Leu Ser Gly Leu Pro Ser
            980                 985                 990
Gly Arg Glu Gly Leu Glu Thr Ser Thr Ser Gly Val Glu Asp Leu Ser
        995                 1000                1005
Gly Leu Pro Ser Gly Glu Gly Pro Glu Ala Ser Thr Ser Gly Val Gly
    1010                1015                1020
Asp Leu Ser Arg Leu Pro Ser Gly Glu Gly Pro Glu Val Ser Ala Ser
1025                1030                1035                1040
Gly Val Glu Asp Leu Ser Gly Leu Pro Ser Gly Glu Gly Leu Glu Ala
                1045                1050                1055
Ser Ala Ser Gly Val Gly Asp Leu Ser Gly Leu Pro Ser Gly Glu Gly
            1060                1065                1070
Pro Glu Ala Ser Ala Ser Gly Val Gly Asp Leu Ser Arg Leu Pro Ser
        1075                1080                1085
Gly Glu Gly Pro Glu Val Ser Ala Ser Gly Val Glu Asp Leu Ser Gly
    1090                1095                1100
Leu Ser Ser Gly Glu Ser Pro Glu Ala Ser Ala Ser Gly Val Gly Asp
1105                1110                1115                1120
Leu Ser Gly Leu Pro Ser Gly Arg Glu Gly Leu Glu Thr Ser Ala Ser
                1125                1130                1135
Gly Val Gly Asp Leu Ser Gly Leu Pro Ser Gly Glu Gly Gln Glu Ala
            1140                1145                1150
Ser Ala Ser Gly Val Glu Asp Leu Ser Arg Leu Pro Ser Gly Glu Gly
        1155                1160                1165
Pro Glu Ala Ser Ala Ser Gly Val Gly Glu Leu Ser Gly Leu Pro Ser
    1170                1175                1180
Gly Arg Glu Gly Leu Glu Thr Ser Ala Ser Gly Val Gly Asp Leu Ser
1185                1190                1195                1200
Gly Leu Pro Ser Gly Glu Gly Pro Glu Ala Phe Ala Ser Gly Val Glu
                1205                1210                1215
Asp Leu Ser Ile Leu Pro Ser Gly Glu Gly Pro Glu Ala Ser Ala Ser
            1220                1225                1230
Gly Val Gly Asp Leu Ser Gly Leu Pro Ser Gly Arg Glu Gly Leu Glu
        1235                1240                1245
Thr Ser Thr Ser Gly Val Gly Asp Leu Ser Gly Leu Pro Ser Gly Arg
    1250                1255                1260
Glu Gly Leu Glu Thr Ser Thr Ser Gly Val Gly Asp Leu Ser Gly Leu
```

1265 1270 1275 1280
Pro Ser Gly Glu Gly Pro Glu Ala Ser Ala Ser Gly Ile Gly Asp Ile
1285 1290 1295
Ser Gly Leu Pro Ser Gly Arg Glu Gly Leu Glu Thr Ser Ser Ser Gly
1300 1305 1310
Val Glu Asp His Pro Glu Thr Ser Ala Ser Gly Val Glu Asp Leu Ser
1315 1320 1325
Gly Leu Pro Ser Gly Val Glu Gly His Pro Glu Thr Ser Ala Ser Gly
1330 1335 1340
Val Glu Asp Leu Ser Asp Leu Ser Ser Gly Gly Glu Gly Leu Glu Thr
1345 1350 1355 1360
Ser Ala Ser Gly Ala Glu Asp Leu Ser Gly Phe Pro Ser Gly Lys Glu
1365 1370 1375
Asp Leu Ile Gly Ser Ala Ser Gly Ala Leu Asp Phe Gly Arg Ile Pro
1380 1385 1390
Ser Gly Thr Leu Gly Ser Gly Gln Ala Pro Glu Ala Ser Ser Leu Pro
1395 1400 1405
Ser Gly Phe Ser Gly Glu Tyr Ser Gly Val Asp Phe Gly Ser Gly Pro
1410 1415 1420
Ile Ser Gly Leu Pro Asp Phe Ser Gly Leu Pro Ser Gly Phe Pro Thr
1425 1430 1435 1440
Ile Ser Leu Val Asp Thr Thr Leu Val Glu Val Ile Thr Thr Thr Ser
1445 1450 1455
Ala Ser Glu Leu Glu Gly Arg Gly Thr Ile Gly Ile Ser Gly Ala Gly
1460 1465 1470
Glu Thr Ser Gly Leu Pro Val Ser Glu Leu Asp Ile Ser Gly Ala Val
1475 1480 1485
Ser Gly Leu Pro Ser Gly Ala Glu Leu Ser Gly Gln Ala Ser Gly Ser
1490 1495 1500
Pro Asp Met Ser Gly Glu Thr Ser Gly Phe Phe Gly Val Ser Gly Gln
1505 1510 1515 1520
Pro Ser Gly Phe Pro Asp Ile Ser Gly Gly Thr Ser Gly Leu Phe Glu
1525 1530 1535
Val Ser Gly Gln Pro Ser Gly Phe Ser Gly Glu Thr Ser Gly Val Thr
1540 1545 1550
Glu Leu Ser Gly Leu Tyr Ser Gly Gln Pro Asp Val Ser Gly Glu Ala
1555 1560 1565
Ser Gly Val Pro Ser Gly Ser Gly Gln Pro Phe Gly Met Thr Asp Leu
1570 1575 1580
Ser Gly Glu Thr Ser Gly Val Pro Asp Ile Ser Gly Gln Pro Ser Gly
1585 1590 1595 1600
Leu Pro Glu Phe Ser Gly Thr Thr Ser Gly Ile Pro Asp Leu Val Ser
1605 1610 1615
Ser Thr Met Ser Gly Ser Gly Glu Ser Ser Gly Ile Thr Phe Val Asp
1620 1625 1630
Thr Ser Leu Val Glu Val Thr Pro Thr Thr Phe Lys Glu Lys Lys Arg
1635 1640 1645
Leu Gly Ser Val Glu Leu Ser Gly Leu Pro Ser Gly Glu Val Asp Leu
1650 1655 1660
Ser Gly Ala Ser Gly Thr Met Asp Ile Ser Gly Gln Ser Ser Gly Ala
1665 1670 1675 1680
Thr Asp Ser Ser Gly Leu Thr Ser His Leu Pro Lys Phe Ser Gly Leu
1685 1690 1695
Pro Ser Gly Ala Ala Glu Val Ser Gly Glu Ser Ser Gly Ala Glu Val
1700 1705 1710
Gly Ser Ser Leu Pro Ser Gly Thr Tyr Glu Gly Ser Gly Asn Phe His
1715 1720 1725
Pro Ala Phe Pro Thr Val Phe Leu Val Asp Arg Thr Leu Val Glu Ser

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    1730                1735                1740
Val Thr Gln Ala Pro Thr Ala Gln Glu Ala Gly Glu Gly Pro Ser Gly
1745                1750                1755                1760
Ile Leu Glu Leu Ser Gly Ala His Ser Gly Ala Pro Asp Val Ser Gly
                1765                1770                1775
Asp His Ser Gly Ser Leu Asp Leu Ser Gly Met Gln Ser Gly Leu Val
            1780                1785                1790
Glu Pro Ser Gly Glu Pro Ser Ser Thr Pro Tyr Phe Ser Gly Asp Phe
        1795                1800                1805
Ser Gly Thr Met Asp Val Thr Gly Glu Pro Ser Thr Ala Met Ser Ala
    1810                1815                1820
Ser Gly Glu Ala Ser Gly Leu Leu Glu Val Thr Leu Ile Thr Ser Glu
1825                1830                1835                1840
Phe Val Glu Gly Val Thr Glu Pro Thr Val Ser Gln Glu Leu Ala Gln
                1845                1850                1855
Arg Pro Pro Val Thr His Thr Pro Gln Leu Phe Glu Ser Ser Gly Glu
            1860                1865                1870
Ala Ser Ala Ser Gly Glu Ile Ser Gly Ala Thr Pro Ala Phe Pro Gly
        1875                1880                1885
Ser Gly Leu Glu Ala Ser Ser Val Pro Glu Ser Ser Ser Glu Thr Ser
    1890                1895                1900
Asp Phe Pro Glu Arg Ala Val Gly Val Ser Ala Ala Pro Glu Ala Ser
1905                1910                1915                1920
Gly Gly Ala Ser Gly Ala Pro Asp Val Ser Glu Ala Thr Ser Thr Phe
                1925                1930                1935
Pro Glu Ala Asp Val Glu Gly Ala Ser Gly Leu Gly Val Ser Gly Gly
            1940                1945                1950
Thr Ser Ala Phe Pro Glu Ala Pro Arg Glu Gly Ser Ala Thr Pro Glu
        1955                1960                1965
Val Gln Glu Glu Pro Thr Thr Ser Tyr Asp Val Gly Arg Glu Ala Leu
    1970                1975                1980
Gly Trp Pro Ser Ala Thr Pro Thr Ala Ser Gly Asp Arg Ile Glu Val
1985                1990                1995                2000
Ser Gly Asp Leu Ser Gly His Thr Ser Gly Leu Asp Val Val Ile Ser
                2005                2010                2015
Thr Ser Val Pro Glu Ser Glu Trp Ile Gln Gln Thr Gln Arg Pro Ala
            2020                2025                2030
Glu Ala His Leu Glu Ile Glu Ala Ser Ser Pro Leu His Ser Gly Glu
        2035                2040                2045
Glu Thr Gln Thr Ala Glu Thr Ala Thr Ser Pro Thr Asp Asp Ala Ser
    2050                2055                2060
Ile Pro Thr Ser Pro Ser Gly Thr Asp Glu Ser Ala Pro Ala Ile Pro
2065                2070                2075                2080
Asp Ile Asp Glu Cys Leu Ser Ser Pro Cys Leu Asn Gly Ala Thr Cys
                2085                2090                2095
Val Asp Ala Ile Asp Ser Phe Thr Cys Leu Cys Leu Pro Ser Tyr Arg
            2100                2105                2110
Gly Asp Leu Cys Glu Ile Asp Gln Glu Leu Cys Glu Glu Gly Trp Thr
        2115                2120                2125
Lys Phe Gln Gly His Cys Tyr Arg Tyr Phe Pro Asp Arg Glu Ser Trp
    2130                2135                2140
Val Asp Ala Glu Ser Arg Cys Arg Ala Gln Gln Ser His Leu Ser Ser
2145                2150                2155                2160
Ile Val Thr Pro Glu Glu Gln Glu Phe Val Asn Asn Asn Ala Gln Asp
                2165                2170                2175
Tyr Gln Trp Ile Gly Leu Asn Asp Arg Thr Ile Glu Gly Asp Phe Arg
            2180                2185                2190
Trp Ser Asp Gly His Ser Leu Gln Phe Glu Asn Trp Arg Pro Asn Gln
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        2195                2200                2205
Pro Asp Asn Phe Phe Val Ser Gly Glu Asp Cys Val Val Met Ile Trp
    2210                2215                2220
His Glu Lys Gly Glu Trp Asn Asp Val Pro Cys Asn Tyr Tyr Leu Pro
2225                2230                2235                2240
Phe Thr Cys Lys Lys Gly Thr Val Ala Cys Gly Asp Pro Pro Val Val
                2245                2250                2255
Glu His Ala Arg Thr Phe Gly Gln Lys Lys Asp Arg Tyr Glu Ile Asn
            2260                2265                2270
Ser Leu Val Arg Tyr Gln Cys Thr Glu Gly Phe Val Gln Arg His Val
        2275                2280                2285
Pro Thr Ile Arg Cys Gln Pro Ser Gly His Trp Glu Lys Pro Arg Ile
    2290                2295                2300
Thr Cys Thr Asp Pro Ser Thr Tyr Lys Arg Arg Leu Gln Lys Arg Ser
2305                2310                2315                2320
Ser Arg Ala Pro Arg Arg Ser Arg Pro Ser Thr Ala His
                2325                2330


<210> 290
<211> 2124
<212> PRT
<213> Rattus norvegicus

<220>
<223> RAT AGGRECAN P07897


<400> 290
Met Thr Thr Leu Leu Leu Val Phe Val Thr Leu Arg Val Ile Ala Ala
 1               5                  10                  15
Val Ile Ser Glu Glu Val Pro Asp His Asp Asn Ser Leu Ser Val Ser
            20                  25                  30
Ile Pro Gln Pro Ser Pro Leu Lys Ala Leu Leu Gly Thr Ser Leu Thr
        35                  40                  45
Ile Pro Cys Tyr Phe Ile Asp Pro Met His Pro Val Thr Thr Ala Pro
    50                  55                  60
Ser Thr Ala Pro Leu Thr Pro Arg Ile Lys Trp Ser Arg Val Ser Lys
65                  70                  75                  80
Glu Lys Glu Val Val Leu Leu Val Ala Thr Glu Gly Gln Val Arg Val
                85                  90                  95
Asn Ser Ile Tyr Gln Asp Lys Val Ser Leu Pro Asn Tyr Pro Ala Ile
            100                 105                 110
Pro Ser Asp Ala Thr Leu Glu Ile Gln Asn Leu Arg Ser Asn Asp Ser
        115                 120                 125
Gly Ile Tyr Arg Cys Glu Val Met His Gly Ile Glu Asp Ser Glu Ala
    130                 135                 140
Thr Leu Glu Val Ile Val Lys Gly Ile Val Phe His Tyr Arg Ala Ile
145                 150                 155                 160
Ser Thr Arg Tyr Thr Leu Asp Phe Asp Arg Ala Gln Arg Ala Cys Leu
                165                 170                 175
Gln Asn Ser Ala Ile Ile Ala Thr Pro Glu Gln Leu Gln Ala Ala Tyr
            180                 185                 190
Glu Asp Gly Phe His Gln Cys Asp Ala Gly Trp Leu Ala Asp Gln Thr
        195                 200                 205
Val Arg Tyr Pro Ile His Thr Pro Arg Glu Gly Cys Tyr Gly Asp Lys
    210                 215                 220
Asp Glu Phe Pro Gly Val Arg Thr Tyr Gly Ile Arg Asp Thr Asn Glu
```

225 230 235 240
Thr Tyr Asp Val Tyr Cys Phe Ala Glu Glu Met Glu Gly Glu Val Phe
245 250 255
Tyr Ala Thr Ser Pro Glu Lys Phe Thr Phe Gln Glu Ala Ala Asn Glu
260 265 270
Cys Arg Thr Val Gly Ala Arg Leu Ala Thr Thr Gly Gln Leu Tyr Leu
275 280 285
Ala Trp Gln Gly Gly Met Asp Met Cys Ser Ala Gly Trp Leu Ala Asp
290 295 300
Arg Ser Val Arg Tyr Pro Ile Ser Lys Ala Arg Pro Asn Cys Gly Gly
305 310 315 320
Asn Leu Leu Gly Val Arg Thr Val Tyr Leu His Ala Asn Gln Thr Gly
325 330 335
Tyr Pro Asp Pro Ser Ser Arg Tyr Asp Ala Ile Cys Tyr Thr Gly Glu
340 345 350
Asp Phe Val Asp Ile Pro Glu Asn Phe Phe Gly Val Gly Gly Glu Glu
355 360 365
Asp Ile Thr Ile Gln Thr Val Thr Trp Pro Asp Leu Glu Leu Pro Leu
370 375 380
Pro Arg Asn Ile Thr Glu Gly Glu Ala Arg Gly Asn Val Ile Leu Thr
385 390 395 400
Ala Lys Pro Ile Phe Asp Met Ser Pro Thr Val Ser Glu Pro Gly Glu
405 410 415
Ala Leu Thr Leu Ala Pro Glu Val Gly Thr Thr Val Phe Pro Glu Ala
420 425 430
Gly Glu Arg Thr Glu Lys Thr Thr Arg Pro Trp Gly Phe Pro Glu Glu
435 440 445
Ala Thr Arg Gly Pro Asp Ser Ala Thr Ala Phe Ala Ser Glu Asp Leu
450 455 460
Val Val Arg Val Thr Ile Ser Pro Gly Ala Val Glu Val Pro Gly Gln
465 470 475 480
Pro Arg Leu Pro Gly Gly Val Val Phe His Tyr Arg Pro Gly Ser Thr
485 490 495
Arg Tyr Ser Leu Thr Phe Glu Glu Ala Gln Gln Ala Cys Ile Arg Thr
500 505 510
Gly Ala Ala Ile Ala Ser Pro Glu Gln Leu Gln Ala Ala Tyr Glu Ala
515 520 525
Gly Tyr Glu Gln Cys Asp Ala Gly Trp Leu Gln Asp Gln Thr Val Arg
530 535 540
Tyr Pro Ile Val Ser Pro Arg Thr Pro Cys Val Gly Asp Lys Asp Ser
545 550 555 560
Ser Pro Gly Val Arg Thr Tyr Gly Val Arg Pro Ser Ser Glu Thr Tyr
565 570 575
Asp Val Tyr Cys Tyr Val Asp Lys Leu Glu Gly Glu Val Phe Phe Ala
580 585 590
Thr Gln Met Glu Gln Phe Thr Phe Gln Glu Ala Gln Ala Phe Cys Ala
595 600 605
Ala Gln Asn Ala Thr Leu Ala Ser Thr Gly Gln Leu Tyr Ala Ala Trp
610 615 620
Ser Gln Gly Leu Asp Lys Cys Tyr Ala Gly Trp Leu Ala Asp Gly Thr
625 630 635 640
Leu Arg Tyr Pro Ile Val Asn Pro Arg Pro Ala Cys Gly Gly Asp Lys
645 650 655
Pro Gly Val Arg Thr Val Tyr Leu Tyr Pro Asn Gln Thr Gly Leu Pro
660 665 670
Asp Pro Leu Ser Lys His His Ala Phe Cys Phe Arg Gly Val Ser Val
675 680 685
Val Pro Ser Pro Gly Gly Thr Pro Thr Ser Pro Ser Asp Ile Glu Asp

```
    690                 695                 700
Trp Ile Val Thr Arg Val Glu Pro Gly Val Asp Ala Val Pro Leu Glu
705                 710                 715                 720
Pro Glu Thr Thr Glu Val Pro Tyr Phe Thr Thr Glu Pro Glu Lys Gln
                725                 730                 735
Thr Glu Trp Glu Pro Ala Tyr Thr Pro Val Gly Thr Ser Pro Leu Pro
            740                 745                 750
Gly Ile Pro Pro Thr Trp Leu Pro Thr Val Pro Ala Ala Glu Glu His
        755                 760                 765
Thr Glu Ser Pro Ser Ala Ser Gln Glu Pro Ser Ala Ser Gln Val Pro
    770                 775                 780
Ser Thr Ser Glu Glu Pro Tyr Thr Pro Ser Leu Ala Val Pro Ser Gly
785                 790                 795                 800
Thr Glu Leu Pro Ser Ser Gly Asp Thr Ser Gly Ala Pro Asp Leu Ser
                805                 810                 815
Gly Asp Phe Thr Gly Ser Thr Asp Thr Ser Gly Arg Leu Asp Ser Ser
            820                 825                 830
Gly Glu Pro Ser Gly Gly Ser Glu Ser Gly Leu Pro Ser Gly Asp Leu
        835                 840                 845
Asp Ser Ser Gly Leu Gly Pro Thr Val Ser Ser Gly Leu Pro Val Glu
    850                 855                 860
Ser Gly Ser Ala Ser Gly Asp Gly Glu Ile Pro Trp Ser Ser Thr Pro
865                 870                 875                 880
Thr Val Asp Arg Leu Pro Ser Gly Gly Glu Ser Leu Glu Gly Ser Ala
                885                 890                 895
Ser Ala Ser Gly Thr Gly Asp Leu Ser Gly Leu Pro Ser Gly Gly Glu
            900                 905                 910
Ile Thr Glu Thr Ser Ala Ser Gly Thr Glu Glu Ile Ser Gly Leu Pro
        915                 920                 925
Ser Gly Gly Asp Asp Leu Glu Thr Ser Thr Ser Gly Ile Asp Gly Ala
    930                 935                 940
Ser Val Leu Pro Thr Gly Arg Gly Gly Leu Glu Thr Ser Ala Ser Gly
945                 950                 955                 960
Val Glu Asp Leu Ser Gly Leu Pro Ser Gly Glu Glu Gly Ser Glu Thr
                965                 970                 975
Ser Thr Ser Gly Ile Glu Asp Ile Ser Val Leu Pro Thr Gly Glu Ser
            980                 985                 990
Pro Glu Thr Ser Ala Ser Gly Val Gly Asp Leu Ser Gly Leu Pro Ser
        995                 1000                1005
Gly Gly Glu Ser Leu Glu Thr Ser Ala Ser Gly Val Glu Asp Val Thr
    1010                1015                1020
Gln Leu Pro Thr Glu Arg Gly Gly Leu Glu Thr Ser Ala Ser Gly Ile
1025                1030                1035                1040
Glu Asp Ile Thr Val Leu Pro Thr Gly Arg Glu Asn Leu Glu Thr Ser
                1045                1050                1055
Ala Ser Gly Val Glu Asp Val Ser Gly Leu Pro Ser Gly Lys Glu Gly
            1060                1065                1070
Leu Glu Thr Ser Ala Ser Gly Ile Glu Asp Ile Ser Val Phe Pro Thr
        1075                1080                1085
Glu Ala Glu Gly Leu Glu Thr Ser Ala Ser Gly Gly Tyr Val Ser Gly
    1090                1095                1100
Ile Pro Ser Gly Glu Asp Gly Thr Glu Thr Ser Thr Ser Gly Val Glu
1105                1110                1115                1120
Gly Val Ser Gly Leu Pro Ser Gly Gly Glu Gly Leu Glu Thr Ser Ala
                1125                1130                1135
Ser Gly Val Glu Asp Leu Gly Leu Pro Thr Arg Asp Ser Leu Glu Thr
            1140                1145                1150
Ser Ala Ser Gly Val Asp Val Thr Gly Tyr Pro Ser Gly Arg Glu Asp
```

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        1155                1160                1165
Thr Glu Thr Ser Val Pro Gly Val Gly Asp Asp Leu Ser Gly Leu Pro
    1170                1175                1180
Ser Gly Gln Glu Gly Leu Glu Thr Ser Ala Ser Gly Ala Glu Asp Leu
1185                1190                1195                1200
Gly Gly Leu Pro Ser Gly Lys Glu Asp Leu Val Gly Ser Ala Ser Gly
                1205                1210                1215
Ala Leu Asp Phe Gly Lys Leu Pro Ser Gly Thr Leu Gly Ser Gly Gln
            1220                1225                1230
Thr Pro Glu Ala Ser Gly Leu Pro Ser Gly Phe Ser Gly Glu Tyr Ser
        1235                1240                1245
Gly Val Asp Ile Gly Ser Gly Pro Ser Ser Gly Leu Pro Asp Phe Ser
    1250                1255                1260
Gly Leu Pro Ser Gly Phe Pro Thr Val Ser Leu Val Asp Ser Thr Leu
1265                1270                1275                1280
Val Glu Val Ile Thr Ala Thr Thr Ala Ser Glu Leu Glu Gly Arg Gly
                1285                1290                1295
Thr Ile Ser Val Ser Gly Ser Gly Glu Glu Ser Gly Pro Pro Leu Ser
            1300                1305                1310
Glu Leu Asp Ser Ser Ala Asp Ile Ser Gly Leu Pro Ser Gly Thr Glu
        1315                1320                1325
Leu Ser Gly Gln Thr Ser Gly Ser Leu Asp Val Ser Gly Glu Thr Ser
    1330                1335                1340
Gly Phe Phe Asp Val Ser Gly Gln Pro Phe Gly Ser Ser Gly Thr Gly
1345                1350                1355                1360
Glu Gly Thr Ser Gly Ile Pro Glu Val Ser Gly Gln Ala Val Arg Ser
                1365                1370                1375
Pro Asp Thr Thr Glu Ile Ser Glu Leu Ser Gly Leu Ser Ser Gly Gln
            1380                1385                1390
Pro Asp Val Ser Gly Glu Gly Ser Gly Ile Leu Phe Gly Ser Gly Gln
        1395                1400                1405
Ser Ser Gly Ile Thr Ser Val Ser Gly Glu Thr Ser Gly Ile Ser Asp
    1410                1415                1420
Leu Ser Gly Gln Pro Ser Gly Phe Pro Val Leu Ser Gly Thr Thr Pro
1425                1430                1435                1440
Gly Thr Pro Asp Leu Ala Ser Gly Ala Met Ser Gly Ser Gly Asp Ser
                1445                1450                1455
Ser Gly Ile Thr Phe Val Asp Thr Ser Leu Ile Glu Val Thr Pro Thr
            1460                1465                1470
Thr Phe Arg Glu Glu Glu Gly Leu Gly Ser Val Glu Leu Ser Gly Leu
        1475                1480                1485
Pro Ser Gly Glu Thr Asp Leu Ser Gly Thr Ser Gly Met Val Asp Val
    1490                1495                1500
Ser Gly Gln Ser Ser Gly Ala Ile Asp Ser Ser Gly Leu Ile Ser Pro
1505                1510                1515                1520
Thr Pro Glu Phe Ser Gly Leu Pro Ser Gly Val Ala Glu Val Ser Gly
                1525                1530                1535
Glu Val Ser Gly Val Glu Thr Gly Ser Ser Leu Ser Ser Gly Ala Phe
            1540                1545                1550
Asp Gly Ser Gly Leu Val Ser Gly Phe Pro Thr Val Ser Leu Val Asp
        1555                1560                1565
Arg Thr Leu Val Glu Ser Ile Thr Leu Ala Pro Thr Ala Gln Glu Ala
    1570                1575                1580
Gly Glu Gly Pro Ser Ser Ile Leu Glu Phe Ser Gly Ala His Ser Gly
1585                1590                1595                1600
Thr Pro Asp Ile Ser Gly Asp Leu Ser Gly Ser Leu Asp Gln Ser Thr
                1605                1610                1615
Trp Gln Pro Gly Trp Thr Glu Ala Ser Thr Glu Pro Pro Ser Ser Pro
```

```
            1620                1625                1630
Tyr Phe Ser Gly Asp Phe Ser Ser Thr Thr Asp Ala Ser Gly Glu Ser
        1635                1640                1645
Ile Thr Ala Pro Thr Gly Ser Gly Glu Thr Ser Gly Leu Pro Glu Val
    1650                1655                1660
Thr Leu Ile Thr Ser Glu Leu Val Glu Gly Val Thr Glu Pro Thr Val
1665                1670                1675                1680
Ser Gln Glu Leu Gly His Gly Pro Ser Met Thr Tyr Thr Pro Arg Leu
                1685                1690                1695
Phe Glu Ala Ser Gly Glu Ala Ser Ala Ser Gly Asp Leu Gly Gly Pro
            1700                1705                1710
Val Thr Ile Phe Pro Gly Ser Gly Val Glu Ala Ser Val Pro Glu Gly
        1715                1720                1725
Ser Ser Asp Pro Ser Ala Tyr Pro Glu Ala Gly Val Gly Val Ser Ala
    1730                1735                1740
Ala Pro Glu Ala Ser Ser Gln Leu Ser Glu Phe Pro Asp Leu His Gly
1745                1750                1755                1760
Ile Thr Ser Ala Ser Arg Glu Thr Asp Leu Glu Met Thr Thr Pro Gly
                1765                1770                1775
Thr Glu Val Ser Ser Asn Pro Trp Thr Phe Gln Glu Gly Thr Arg Glu
            1780                1785                1790
Gly Ser Ala Ala Pro Glu Val Ser Gly Glu Ser Ser Thr Thr Ser Asp
        1795                1800                1805
Ile Asp Ala Gly Thr Ser Gly Val Pro Phe Ala Thr Pro Met Thr Ser
    1810                1815                1820
Gly Asp Arg Thr Glu Ile Ser Gly Glu Trp Ser Asp His Thr Ser Glu
1825                1830                1835                1840
Val Asn Val Thr Val Ser Thr Thr Val Pro Glu Ser Arg Trp Ala Gln
                1845                1850                1855
Ser Thr Gln His Pro Thr Glu Thr Leu Gln Glu Ile Gly Ser Pro Asn
            1860                1865                1870
Pro Ser Tyr Ser Gly Glu Glu Thr Gln Thr Ala Glu Thr Ala Lys Ser
        1875                1880                1885
Leu Thr Asp Thr Pro Thr Leu Ala Ser Pro Glu Gly Ser Gly Glu Thr
    1890                1895                1900
Glu Ser Thr Ala Ala Asp Gln Glu Gln Cys Glu Glu Gly Trp Thr Lys
1905                1910                1915                1920
Phe Gln Gly His Cys Tyr Arg His Phe Pro Asp Arg Glu Thr Trp Val
                1925                1930                1935
Asp Ala Glu Arg Arg Cys Arg Glu Gln Gln Ser His Leu Ser Ser Ile
            1940                1945                1950
Val Thr Pro Glu Glu Gln Glu Phe Val Asn Lys Asn Ala Gln Asp Tyr
        1955                1960                1965
Gln Trp Ile Gly Leu Asn Asp Arg Thr Ile Glu Gly Asp Phe Arg Trp
    1970                1975                1980
Ser Asp Gly His Ser Leu Gln Phe Glu Lys Trp Arg Pro Asn Gln Pro
1985                1990                1995                2000
Asp Asn Phe Phe Ala Thr Gly Glu Asp Cys Val Val Met Ile Trp His
                2005                2010                2015
Glu Arg Gly Glu Trp Asn Asp Val Pro Cys Asn Tyr Gln Leu Pro Phe
            2020                2025                2030
Thr Cys Lys Lys Gly Thr Val Ala Cys Gly Glu Pro Pro Ala Val Glu
        2035                2040                2045
His Ala Arg Thr Leu Gly Gln Lys Lys Asp Arg Tyr Glu Ile Ser Ser
    2050                2055                2060
Leu Val Arg Tyr Gln Cys Thr Glu Gly Phe Val Gln Arg His Val Pro
2065                2070                2075                2080
Thr Ile Arg Cys Gln Pro Ser Ala Asp Trp Glu Glu Pro Arg Ile Thr
```

```
                2085                2090                2095
Cys Thr Asp Pro Asn Thr Tyr Lys His Arg Leu Gln Lys Arg Thr Met
            2100                2105                2110
Arg Pro Thr Arg Arg Ser Arg Pro Ser Met Ala His
        2115                2120
```

<210> 291
<211> 394
<212> PRT
<213> Oryctolagus cuniculus

<220>
<223> RABBIT AGGRECAN Q28670

<220>
<221> VARIANT
<222> 289
<223> Xaa = any amino acid

<400> 291

```
Ser Thr Ala Pro Leu Thr Pro Arg Ile Lys Trp Ser Arg Ile Ser Lys
 1               5                  10                  15
Asp Lys Glu Val Val Leu Leu Val Ala Asn Glu Gly Arg Val Arg Ile
            20                  25                  30
Asn Ser Ala Tyr Gln Asp Lys Val Ser Leu Pro Asn Tyr Pro Ala Ile
        35                  40                  45
Pro Ser Asp Ala Thr Leu Glu Ile Gln Ser Leu Arg Ser Asn Asp Ser
    50                  55                  60
Gly Ile Tyr Arg Cys Glu Val Met His Gly Leu Glu Asp Ser Glu Ala
65                  70                  75                  80
Thr Leu Glu Val Val Val Lys Gly Val Val Phe His Tyr Arg Ala Ile
                85                  90                  95
Ser Thr Arg Tyr Thr Leu Asp Phe Asp Arg Ala Gln Arg Ala Cys Leu
            100                 105                 110
Gln Asn Ser Ala Ile Ile Ala Thr Pro Glu Gln Leu Gln Ala Ala Tyr
        115                 120                 125
Glu Asp Gly Phe His Gln Cys Asp Ala Gly Trp Leu Ala Asp Gln Thr
    130                 135                 140
Val Arg Tyr Pro Ile His Thr Pro Arg Glu Gly Cys Tyr Gly Asp Lys
145                 150                 155                 160
Asp Glu Phe Pro Gly Val Arg Thr Tyr Gly Ile Arg Asp Thr Asn Glu
                165                 170                 175
Thr Tyr Asp Val Tyr Cys Phe Ala Glu Glu Met Glu Gly Glu Val Phe
            180                 185                 190
Tyr Ala Thr Ser Pro Glu Lys Phe Thr Phe Gln Glu Ala Ala Ser Glu
        195                 200                 205
Cys Arg Arg Leu Gly Ala Arg Leu Ala Thr Thr Gly Gln Leu Tyr Leu
    210                 215                 220
Ala Trp Gln Ala Gly Met Asp Met Cys Ser Ala Gly Trp Leu Ala Asp
225                 230                 235                 240
Arg Ser Val Arg Tyr Pro Ile Ser Lys Ala Arg Pro Asn Cys Gly Gly
                245                 250                 255
Asn Leu Leu Gly Val Arg Thr Val Tyr Val His Ala Asn Gln Thr Gly
            260                 265                 270
Tyr Pro Asp Pro Ser Ser Arg Tyr Asp Ala Ile Cys Tyr Thr Gly Glu
        275                 280                 285
```

Xaa Phe Met Asp Ile Pro Glu Asn Phe Phe Gly Val Gly Gly Glu Glu
290 295 300
Asp Ile Thr Val Gln Thr Val Thr Trp Pro Asp Val Glu Leu Pro Val
305 310 315 320
Pro Arg Asn Ile Thr Glu Gly Glu Ala Arg Gly Ser Val Val Leu Thr
325 330 335
Ala Lys Pro Val Leu Asp Val Ser Pro Thr Ala Pro Gln Pro Glu Glu
340 345 350
Thr Phe Ala Pro Gly Leu Gly Ala Thr Ala Phe Pro Gly Val Glu Asn
355 360 365
Gly Thr Glu Glu Ala Thr Arg Pro Arg Gly Phe Ala Asp Glu Ala Ala
370 375 380
Leu Gly Pro Ser Ser Ala Thr Ala Phe Thr
385 390

<210> 292
<211> 883
<212> PRT
<213> Rattus norvegicus

<220>
<223> RAT BREVICAN P55068

<400> 292
Met Ile Pro Leu Leu Leu Ser Leu Leu Ala Ala Leu Val Leu Thr Gln
1 5 10 15
Ala Pro Ala Ala Leu Ala Asp Asp Leu Lys Glu Asp Ser Ser Glu Asp
20 25 30
Arg Ala Phe Arg Val Arg Ile Gly Ala Ala Gln Leu Arg Gly Val Leu
35 40 45
Gly Gly Ala Leu Ala Ile Pro Cys His Val His His Leu Arg Pro Pro
50 55 60
Pro Ser Arg Arg Ala Ala Pro Gly Phe Pro Arg Val Lys Trp Thr Phe
65 70 75 80
Leu Ser Gly Asp Arg Glu Val Glu Val Leu Val Ala Arg Gly Leu Arg
85 90 95
Val Lys Val Asn Glu Ala Tyr Arg Phe Arg Val Ala Leu Pro Ala Tyr
100 105 110
Pro Ala Ser Leu Thr Asp Val Ser Leu Val Leu Ser Glu Leu Arg Pro
115 120 125
Asn Asp Ser Gly Val Tyr Arg Cys Glu Val Gln His Gly Ile Asp Asp
130 135 140
Ser Ser Asp Ala Val Glu Val Lys Val Lys Gly Val Val Phe Leu Tyr
145 150 155 160
Arg Glu Gly Ser Ala Arg Tyr Ala Phe Ser Phe Ala Gly Ala Gln Glu
165 170 175
Ala Cys Ala Arg Ile Gly Ala Arg Ile Ala Thr Pro Glu Gln Leu Tyr
180 185 190
Ala Ala Tyr Leu Gly Gly Tyr Glu Gln Cys Asp Ala Gly Trp Leu Ser
195 200 205
Asp Gln Thr Val Arg Tyr Pro Ile Gln Asn Pro Arg Glu Ala Cys Tyr
210 215 220
Gly Asp Met Asp Gly Tyr Pro Gly Val Arg Asn Tyr Gly Val Val Gly
225 230 235 240
Pro Asp Asp Leu Tyr Asp Val Tyr Cys Tyr Ala Glu Asp Leu Asn Gly
245 250 255

```
Glu Leu Phe Leu Gly Ala Pro Pro Gly Lys Leu Thr Trp Glu Glu Ala
            260                 265                 270
Arg Asp Tyr Cys Leu Glu Arg Gly Ala Gln Ile Ala Ser Thr Gly Gln
        275                 280                 285
Leu Tyr Ala Ala Trp Asn Gly Gly Leu Asp Arg Cys Ser Pro Gly Trp
    290                 295                 300
Leu Ala Asp Gly Ser Val Arg Tyr Pro Ile Ile Thr Pro Ser Gln Arg
305                 310                 315                 320
Cys Gly Gly Gly Leu Pro Gly Val Lys Thr Leu Phe Leu Phe Pro Asn
                325                 330                 335
Gln Thr Gly Phe Pro Ser Lys Gln Asn Arg Phe Asn Val Tyr Cys Phe
            340                 345                 350
Arg Asp Ser Ala His Pro Ser Ala Phe Ser Glu Ala Ser Ser Pro Ala
        355                 360                 365
Ser Asp Gly Leu Glu Ala Ile Val Thr Val Thr Glu Lys Leu Glu Glu
    370                 375                 380
Leu Gln Leu Pro Gln Glu Ala Val Glu Ser Glu Ser Arg Gly Ala Ile
385                 390                 395                 400
Tyr Ser Ile Pro Ile Thr Glu Asp Gly Gly Gly Gly Ser Ser Thr Pro
                405                 410                 415
Glu Asp Pro Ala Glu Ala Pro Arg Thr Pro Leu Glu Ser Glu Thr Gln
            420                 425                 430
Ser Val Ala Pro Pro Thr Gly Ser Ser Glu Glu Glu Gly Glu Ala Leu
        435                 440                 445
Glu Glu Glu Glu Arg Phe Lys Asp Thr Glu Thr Pro Lys Glu Glu Lys
    450                 455                 460
Glu Gln Glu Asn Leu Trp Val Trp Pro Thr Glu Leu Ser Ser Pro Leu
465                 470                 475                 480
Pro Thr Gly Leu Glu Thr Glu His Ser Leu Ser Gln Val Ser Pro Pro
                485                 490                 495
Ala Gln Ala Val Leu Gln Val Gly Ala Ser Pro Ser Pro Arg Pro Pro
            500                 505                 510
Arg Val His Gly Pro Thr Val Glu Thr Leu Gln Pro Pro Gly Glu Gly
        515                 520                 525
Ser Leu Thr Ser Thr Pro Asp Gly Ala Arg Glu Val Gly Gly Glu Thr
    530                 535                 540
Gly Ser Pro Glu Leu Ser Gly Val Pro Arg Glu Arg Glu Glu Ala Gly
545                 550                 555                 560
Ser Ser Ser Leu Glu Asp Gly Pro Ser Leu Leu Pro Glu Thr Trp Ala
                565                 570                 575
Pro Val Gly Thr Arg Glu Val Glu Thr Pro Ser Glu Glu Lys Ser Gly
            580                 585                 590
Arg Thr Val Leu Thr Gly Thr Ser Val Gln Ala Gln Pro Val Leu Pro
        595                 600                 605
Thr Asp Ser Ala Ser Arg Gly Gly Val Ala Val Ala Pro Ser Ser Gly
    610                 615                 620
Asp Cys Ile Pro Ser Pro Cys His Asn Gly Gly Thr Cys Leu Glu Glu
625                 630                 635                 640
Lys Glu Gly Phe Arg Cys Leu Cys Val Pro Gly Tyr Gly Gly Asp Leu
                645                 650                 655
Cys Asp Val Gly Leu His Phe Cys Ser Pro Gly Trp Glu Pro Phe Gln
            660                 665                 670
Gly Ala Cys Tyr Lys His Phe Ser Thr Arg Arg Ser Trp Glu Glu Ala
        675                 680                 685
Glu Ser Gln Cys Arg Ala Leu Gly Ala His Leu Thr Ser Ile Cys Thr
    690                 695                 700
Pro Glu Glu Gln Asp Phe Val Asn Asp Arg Tyr Arg Glu Tyr Gln Trp
705                 710                 715                 720
```

```
Ile Gly Leu Asn Asp Arg Thr Ile Glu Gly Asp Phe Leu Trp Ser Asp
                725                 730                 735
Gly Pro Pro Leu Leu Tyr Glu Asn Trp Asn Pro Gly Gln Pro Asp Ser
            740                 745                 750
Tyr Phe Leu Ser Gly Glu Asn Cys Val Val Met Val Trp His Asp Gln
        755                 760                 765
Gly Gln Trp Ser Asp Val Pro Cys Asn Tyr His Leu Ser Tyr Thr Cys
    770                 775                 780
Lys Met Gly Leu Val Ser Cys Gly Pro Pro Pro Gln Leu Pro Leu Ala
785                 790                 795                 800
Gln Ile Phe Gly Arg Pro Arg Leu Arg Tyr Ala Val Asp Thr Val Leu
                805                 810                 815
Arg Tyr Arg Cys Arg Asp Gly Leu Ala Gln Arg Asn Leu Pro Leu Ile
            820                 825                 830
Arg Cys Gln Glu Asn Gly Leu Trp Glu Ala Pro Gln Ile Ser Cys Val
        835                 840                 845
Pro Arg Arg Pro Ala Arg Ala Leu Arg Ser Met Thr Ala Pro Glu Gly
    850                 855                 860
Pro Arg Gly Gln Leu Pro Arg Gln Arg Lys Ala Leu Leu Thr Pro Pro
865                 870                 875                 880
Ser Ser Leu
```

<210> 293
<211> 883
<212> PRT
<213> Mus musculus

<220>
<223> MOUSE BREVICAN Q61361

<400> 293

```
Met Ile Pro Leu Leu Leu Ser Leu Leu Ala Ala Leu Val Leu Thr Gln
 1                5                  10                  15
Ala Pro Ala Ala Leu Ala Asp Asp Leu Lys Glu Asp Ser Ser Glu Asp
            20                  25                  30
Arg Ala Phe Arg Val Arg Ile Gly Ala Thr Gln Leu Arg Gly Val Leu
        35                  40                  45
Gly Gly Ala Leu Ala Ile Pro Cys His Val His His Leu Arg Pro Pro
    50                  55                  60
His Ser Arg Arg Ala Ala Pro Gly Phe Pro Arg Val Lys Trp Thr Phe
65                  70                  75                  80
Leu Ser Gly Asp Arg Glu Val Glu Val Leu Val Ala Arg Gly Leu Arg
                85                  90                  95
Val Lys Val Asn Glu Ala Tyr Arg Phe Arg Val Ala Leu Pro Ala Tyr
            100                 105                 110
Pro Ala Ser Leu Thr Asp Val Ser Leu Val Leu Ser Glu Leu Arg Pro
        115                 120                 125
Asn Asp Ser Gly Val Tyr Arg Cys Glu Val Gln His Gly Ile Asp Asp
    130                 135                 140
Ser Ser Asp Ala Val Glu Val Lys Val Lys Gly Val Val Phe Leu Tyr
145                 150                 155                 160
Arg Glu Gly Ser Ala Arg Tyr Ala Phe Ser Phe Ala Gly Ala Gln Glu
                165                 170                 175
Ala Cys Ala Arg Ile Gly Ala Arg Ile Ala Thr Pro Glu Gln Leu Tyr
            180                 185                 190
```

```
Ala Ala Tyr Leu Gly Gly Tyr Glu Gln Cys Asp Ala Gly Trp Leu Ser
        195                 200                 205
Asp Gln Thr Val Arg Tyr Pro Ile Gln Asn Pro Arg Glu Ala Cys Ser
    210                 215                 220
Gly Asp Met Asp Gly Tyr Pro Gly Val Arg Asn Tyr Gly Val Val Gly
225                 230                 235                 240
Pro Asp Asp Leu Tyr Asp Val Tyr Cys Tyr Ala Glu Asp Leu Asn Gly
                245                 250                 255
Glu Leu Phe Leu Gly Ala Pro Pro Ser Lys Leu Thr Trp Glu Glu Ala
            260                 265                 270
Arg Asp Tyr Cys Leu Glu Arg Gly Ala Gln Ile Ala Ser Thr Gly Gln
        275                 280                 285
Leu Tyr Ala Ala Trp Asn Gly Gly Leu Asp Arg Cys Ser Pro Gly Trp
    290                 295                 300
Leu Ala Asp Gly Ser Val Arg Tyr Pro Ile Ile Thr Pro Ser Gln Arg
305                 310                 315                 320
Cys Gly Gly Gly Leu Pro Gly Val Lys Thr Leu Phe Leu Phe Pro Asn
                325                 330                 335
Gln Thr Gly Phe Pro Ser Lys Gln Asn Arg Phe Asn Val Tyr Cys Phe
            340                 345                 350
Arg Asp Ser Ala His Pro Ser Ala Ser Ser Glu Ala Ser Ser Pro Ala
        355                 360                 365
Ser Asp Gly Leu Glu Ala Ile Val Thr Val Thr Glu Lys Leu Glu Glu
    370                 375                 380
Leu Gln Leu Pro Gln Glu Ala Met Glu Ser Glu Ser Arg Gly Ala Ile
385                 390                 395                 400
Tyr Ser Ile Pro Ile Ser Glu Asp Gly Gly Gly Gly Ser Ser Thr Pro
                405                 410                 415
Glu Asp Pro Ala Glu Ala Pro Arg Thr Pro Leu Glu Ser Glu Thr Gln
            420                 425                 430
Ser Ile Ala Pro Pro Thr Glu Ser Ser Glu Glu Glu Gly Val Ala Leu
        435                 440                 445
Glu Glu Glu Glu Arg Phe Lys Asp Leu Glu Ala Leu Glu Glu Glu Lys
    450                 455                 460
Glu Gln Glu Asp Leu Trp Val Trp Pro Arg Glu Leu Ser Ser Pro Leu
465                 470                 475                 480
Pro Thr Gly Ser Glu Thr Glu His Ser Leu Ser Gln Val Ser Pro Pro
                485                 490                 495
Ala Gln Ala Val Leu Gln Leu Gly Ala Ser Pro Ser Pro Gly Pro Pro
            500                 505                 510
Arg Val Arg Gly Pro Pro Ala Glu Thr Leu Leu Pro Pro Arg Glu Gly
        515                 520                 525
Ser Pro Thr Ser Thr Pro Gly Gly Ala Arg Glu Val Gly Gly Glu Thr
    530                 535                 540
Gly Ser Pro Glu Leu Ser Gly Val Pro Arg Glu Ser Glu Glu Ala Gly
545                 550                 555                 560
Ser Ser Ser Leu Glu Asp Gly Pro Ser Leu Leu Pro Ala Thr Trp Ala
                565                 570                 575
Pro Val Gly Pro Arg Glu Leu Glu Thr Pro Ser Glu Glu Lys Ser Gly
            580                 585                 590
Arg Thr Val Leu Ala Gly Thr Ser Val Gln Ala Gln Pro Val Leu Pro
        595                 600                 605
Thr Asp Ser Ala Ser His Gly Gly Val Ala Val Ala Pro Ser Ser Gly
    610                 615                 620
Asp Cys Ile Pro Ser Pro Cys His Asn Gly Gly Thr Cys Leu Glu Glu
625                 630                 635                 640
Lys Glu Gly Phe Arg Cys Leu Cys Leu Pro Gly Tyr Gly Gly Asp Leu
                645                 650                 655
```

```
Cys Asp Val Gly Leu His Phe Cys Ser Pro Gly Trp Glu Ala Phe Gln
            660                 665                 670
Gly Ala Cys Tyr Lys His Phe Ser Thr Arg Arg Ser Trp Glu Glu Ala
        675                 680                 685
Glu Ser Gln Cys Arg Ala Leu Gly Ala His Leu Thr Ser Ile Cys Thr
    690                 695                 700
Pro Glu Glu Gln Asp Phe Val Asn Asp Arg Tyr Arg Glu Tyr Gln Trp
705                 710                 715                 720
Ile Gly Leu Asn Asp Arg Thr Ile Glu Gly Asp Phe Leu Trp Ser Asp
                725                 730                 735
Gly Ala Pro Leu Leu Tyr Glu Asn Trp Asn Pro Gly Gln Pro Asp Ser
            740                 745                 750
Tyr Phe Leu Ser Gly Glu Asn Cys Val Val Met Val Trp His Asp Gln
        755                 760                 765
Gly Gln Trp Ser Asp Val Pro Cys Asn Tyr His Leu Ser Tyr Thr Cys
    770                 775                 780
Lys Met Gly Leu Val Ser Cys Gly Pro Pro Pro Gln Leu Pro Leu Ala
785                 790                 795                 800
Gln Ile Phe Gly Arg Pro Arg Leu Arg Tyr Ala Val Asp Thr Val Leu
                805                 810                 815
Arg Tyr Arg Cys Arg Asp Gly Leu Ala Gln Arg Asn Leu Pro Leu Ile
            820                 825                 830
Arg Cys Gln Glu Asn Gly Leu Trp Glu Ala Pro Gln Ile Ser Cys Val
        835                 840                 845
Pro Arg Arg Pro Gly Arg Ala Leu Arg Ser Met Asp Ala Pro Glu Gly
    850                 855                 860
Pro Arg Gly Gln Leu Ser Arg His Arg Lys Ala Pro Leu Thr Pro Pro
865                 870                 875                 880
Ser Ser Leu
```

<210> 294
<211> 912
<212> PRT
<213> Bos taurus

<220>
<223> COW BREVICAN Q28062

```
<400> 294
Met Ala Pro Leu Phe Leu Pro Leu Leu Ala Thr Leu Val Leu Ala Trp
 1               5                  10                  15
Ile Pro Val Ala Leu Ala Asp Ala Leu Glu Gly Asp Ser Ser Glu Asp
            20                  25                  30
Arg Ala Phe Arg Val Arg Ile Ala Gly Asp Ala Pro Leu Gln Gly Val
        35                  40                  45
Leu Gly Gly Ala Leu Thr Ile Pro Cys His Val His Tyr Leu Arg Pro
    50                  55                  60
Ser Pro Ser Arg Arg Ala Ala Gln Gly Ser Pro Arg Val Lys Trp Thr
65                  70                  75                  80
Phe Leu Ser Gly Gly Arg Glu Ala Glu Val Leu Val Ala Arg Gly Leu
                85                  90                  95
Arg Val Lys Val Ser Glu Ala Tyr Arg Phe Arg Val Ala Leu Pro Ala
            100                 105                 110
Tyr Pro Ala Ser Leu Thr Asp Val Ser Leu Val Leu Ser Glu Leu Arg
        115                 120                 125
```

```
Pro Asn Asp Ser Gly Ile Tyr Arg Cys Glu Val Gln His Gly Ile Asp
    130                 135                 140
Asp Ser Ser Asp Ala Val Glu Val Lys Val Lys Gly Val Val Phe Leu
145                 150                 155                 160
Tyr Arg Glu Gly Ser Ala Arg Tyr Ala Phe Ser Phe Ala Gly Ala Gln
                165                 170                 175
Glu Ala Cys Ala Arg Ile Gly Ala Arg Ile Ala Thr Pro Glu Gln Leu
            180                 185                 190
Tyr Ala Ala Tyr Leu Gly Gly Tyr Glu Gln Cys Asp Ala Gly Trp Leu
        195                 200                 205
Ser Asp Gln Thr Val Arg Tyr Pro Ile Gln Thr Pro Arg Glu Ala Cys
    210                 215                 220
Tyr Gly Asp Met Asp Gly Phe Pro Gly Val Arg Asn Tyr Gly Val Val
225                 230                 235                 240
Asp Pro Asp Asp Leu Tyr Asp Val Tyr Cys Tyr Ala Glu Glu Leu Asn
                245                 250                 255
Gly Glu Leu Phe Leu Gly Ala Pro Pro Asp Lys Leu Thr Leu Glu Glu
            260                 265                 270
Ala Arg Thr Tyr Cys Gln Glu Arg Gly Ala Lys Ile Ala Thr Thr Gly
        275                 280                 285
Gln Leu Tyr Ala Ala Trp Asp Gly Gly Leu Asp Arg Cys Ser Ser Gly
    290                 295                 300
Trp Leu Ser Asp Gly Ser Val Arg Tyr Pro Ile Val Thr Pro Ser Gln
305                 310                 315                 320
Arg Cys Gly Gly Gly Leu Pro Gly Val Lys Thr Leu Phe Leu Phe Pro
                325                 330                 335
Asn Gln Thr Gly Phe Pro Asn Lys His Ser Arg Phe Asn Val Tyr Cys
            340                 345                 350
Phe Arg Asp Ser Ala Gln Pro Ser Ala Ile Pro Glu Ala Ala Asn Pro
        355                 360                 365
Ala Ser His Leu Ala Ser Asp Ala Leu Glu Ala Ile Val Thr Val Thr
    370                 375                 380
Glu Thr Leu Glu Glu Leu Lys Leu Pro Gln Glu Ala Val Glu Ser Glu
385                 390                 395                 400
Ser Arg Gly Ala Ile Tyr Ser Ile Pro Ile Ile Glu Asp Gly Gly Gly
                405                 410                 415
Gly Ser Ser Thr Pro Glu Asp Pro Ala Glu Ala Pro Arg Thr Leu Leu
            420                 425                 430
Glu Phe Glu Thr Gln Ser Ile Val Pro Pro Leu Gly Ser Ser Glu Glu
        435                 440                 445
Glu Gly Lys Val Leu Glu Gln Glu Glu Lys Tyr Arg Gly Glu Glu Glu
    450                 455                 460
Lys Glu Glu Glu Glu Glu Glu Glu Glu Val Glu Asp Glu Ala Leu Trp
465                 470                 475                 480
Ala Trp Pro Ser Glu Leu Ser Ser Leu Asp Pro Glu Ala Pro Leu Pro
                485                 490                 495
Thr Glu Pro Val Pro Glu Glu Ser Leu Thr Gln Ala Ser Pro Pro Val
            500                 505                 510
Arg Ala Ala Leu Gln Pro Gly Val Ser Pro Pro Pro Tyr Asp Glu Pro
        515                 520                 525
Glu Ala Pro Arg Pro Pro Arg Val Leu Gly Pro Pro Thr Lys Thr Leu
    530                 535                 540
Pro Thr Pro Arg Glu Gly Asn Leu Ala Ser Pro Pro Pro Ser Thr Leu
545                 550                 555                 560
Val Gly Ala Arg Glu Ile Glu Glu Glu Thr Gly Gly Pro Glu Leu Ser
                565                 570                 575
Gly Ala Pro Arg Gly Glu Ser Glu Glu Thr Gly Ser Ser Glu Asp Ala
            580                 585                 590
```

```
Pro Ser Leu Leu Pro Ala Thr Arg Ala Pro Gly Asp Thr Arg Asp Leu
        595                 600                 605
Glu Thr Pro Ser Glu Glu Asn Ser Arg Arg Thr Val Pro Ala Gly Thr
    610                 615                 620
Ser Val Arg Ala Gln Pro Val Leu Pro Thr Asp Ser Ala Ser Arg Gly
625                 630                 635                 640
Gly Val Ala Val Ala Pro Ser Ser Gly Asp Cys Val Pro Ser Pro Cys
                645                 650                 655
His Asn Gly Gly Thr Cys Leu Glu Glu Glu Glu Gly Val Arg Cys Leu
            660                 665                 670
Cys Leu Pro Gly Tyr Gly Gly Asp Leu Cys Asp Val Gly Leu His Phe
        675                 680                 685
Cys Ser Pro Gly Trp Asp Ala Phe Gln Gly Ala Cys Tyr Lys His Phe
    690                 695                 700
Ser Ala Arg Arg Ser Trp Glu Glu Ala Glu Asn Lys Cys Arg Met Tyr
705                 710                 715                 720
Gly Ala His Leu Ala Ser Ile Ser Thr Pro Glu Glu Gln Asp Phe Ile
                725                 730                 735
Asn Asn Arg Tyr Arg Glu Tyr Gln Trp Ile Gly Leu Asn Asp Arg Thr
            740                 745                 750
Ile Glu Gly Asp Phe Leu Trp Ser Asp Gly Val Pro Leu Leu Tyr Glu
        755                 760                 765
Asn Trp Asn Pro Gly Gln Pro Asp Ser Tyr Phe Leu Ser Gly Glu Asn
    770                 775                 780
Cys Val Val Met Val Trp His Asp Gln Gly Gln Trp Ser Asp Val Pro
785                 790                 795                 800
Cys Asn Tyr His Leu Ser Tyr Thr Cys Lys Met Gly Leu Val Ser Cys
                805                 810                 815
Gly Pro Pro Pro Glu Leu Pro Leu Ala Glu Val Phe Gly Arg Pro Arg
            820                 825                 830
Leu Arg Tyr Glu Val Asp Thr Val Leu Arg Tyr Arg Cys Arg Glu Gly
        835                 840                 845
Leu Thr Gln Arg Asn Leu Pro Leu Ile Arg Cys Gln Glu Asn Gly Arg
    850                 855                 860
Trp Gly Leu Pro Gln Ile Ser Cys Val Pro Arg Arg Pro Ala Arg Ala
865                 870                 875                 880
Leu Arg Pro Val Glu Ala Gln Glu Gly Arg Pro Trp Arg Leu Val Gly
                885                 890                 895
His Trp Lys Ala Arg Leu Asn Pro Ser Pro Asn Pro Ala Pro Gly Pro
            900                 905                 910


<210> 295
<211> 417
<212> PRT
<213> Felis catus

<220>
<223> CAT BREVICAN P41725


<220>
<221> VARIANT
<222> 367
<223> Xaa = any amino acid

<400> 295
Met Ala Pro Leu Phe Leu Pro Leu Leu Ile Ala Leu Ala Leu Ala Pro
```

```
 1               5                  10                  15
Gly Pro Thr Ala Ser Ala Asp Val Leu Glu Gly Asp Ser Ser Glu Asp
            20                  25                  30
Arg Ala Phe Arg Val Arg Ile Ser Gly Asn Ala Pro Leu Gln Gly Val
        35                  40                  45
Leu Gly Gly Ala Leu Thr Ile Ser Cys His Val His Tyr Leu Arg Pro
    50                  55                  60
Pro Pro Gly Arg Arg Ala Val Leu Gly Ser Pro Arg Val Lys Trp Thr
65                  70                  75                  80
Phe Leu Ser Gly Gly Arg Glu Ala Glu Val Leu Val Ala Arg Gly Leu
                85                  90                  95
Arg Val Lys Val Ser Glu Ala Tyr Arg Phe Arg Val Ala Leu Pro Ala
            100                 105                 110
Tyr Pro Ala Ser Leu Thr Asp Val Ser Leu Ala Leu Ser Glu Leu Arg
        115                 120                 125
Pro Asn Asp Ser Gly Ile Tyr Arg Cys Glu Val Gln His Gly Ile Asp
    130                 135                 140
Asp Ser Ser Asp Ala Val Glu Val Lys Val Lys Gly Val Val Phe Leu
145                 150                 155                 160
Tyr Arg Glu Gly Ser Ala Arg Tyr Ala Phe Ser Phe Ala Arg Ala Gln
                165                 170                 175
Glu Ala Cys Ala Arg Ile Gly Ala Arg Ile Ala Thr Pro Glu Gln Leu
            180                 185                 190
Tyr Ala Ala Tyr Leu Gly Gly Tyr Glu Gln Cys Asp Ala Gly Trp Leu
        195                 200                 205
Ser Asp Gln Thr Val Arg Tyr Pro Ile Gln Thr Pro Arg Glu Ala Cys
    210                 215                 220
Tyr Gly Asp Met Asp Gly Phe Pro Gly Val Arg Asn Tyr Gly Leu Val
225                 230                 235                 240
Asp Pro Asp Asp Leu Tyr Asp Ile Tyr Cys Tyr Ala Glu Asp Leu Asn
                245                 250                 255
Gly Glu Leu Phe Leu Gly Ala Pro Pro Asp Asn Val Thr Leu Glu Glu
            260                 265                 270
Ala Thr Ala Tyr Cys Arg Glu Arg Gly Ala Glu Ile Ala Thr Thr Gly
        275                 280                 285
Gln Leu Tyr Ala Ala Trp Asp Gly Gly Leu Asp Arg Cys Ser Pro Gly
    290                 295                 300
Trp Leu Ala Asp Gly Ser Val Arg Tyr Pro Ile Val Thr Pro Ser Gln
305                 310                 315                 320
Arg Cys Gly Gly Gly Leu Pro Gly Val Lys Thr Leu Phe Leu Phe Pro
                325                 330                 335
Asn Gln Thr Gly Phe Pro Asn Lys Tyr Ser Arg Phe Asn Val Tyr Cys
            340                 345                 350
Phe Arg Asp Ser Gly Gln Pro Ser Thr Thr Pro Glu Ala Ser Xaa Pro
        355                 360                 365
Ala Ser Asp Gly Leu Glu Ala Ile Val Thr Val Thr Glu Thr Leu Glu
    370                 375                 380
Glu Leu His Val Pro Arg Glu Ala Val Glu Ser Glu Ser Arg Gly Ala
385                 390                 395                 400
Ile Tyr Ser Val Pro Ile Val Glu Asp Gly Gly Gly Ala Arg Ser Pro
                405                 410                 415
Pro
```

<210> 296
<211> 3357
<212> PRT

<213> Mus musculus

<220>
<223> MOUSE VERSICAN Q62059

<400> 296
Met Leu Ile Asn Met Lys Gly Ile Leu Trp Met Cys Ser Thr Leu Leu
 1   5   10   15
Leu Thr His Ala Leu His Gln Ala Lys Met Glu Thr Ser Pro Pro Val
            20   25   30
Lys Gly Ser Leu Ser Gly Lys Val Val Leu Pro Cys His Phe Ser Thr
        35   40   45
Leu Pro Thr Leu Pro Pro Asn Tyr Asn Thr Ser Glu Phe Leu Arg Ile
    50   55   60
Lys Trp Ser Lys Met Glu Val Asp Lys Asn Gly Lys Asp Ile Lys Glu
65   70   75   80
Thr Thr Val Leu Val Ala Gln Asn Gly Asn Ile Lys Ile Gly Gln Asp
                85   90   95
Tyr Lys Gly Arg Val Ser Val Pro Thr His Pro Asp Asp Val Gly Asp
            100   105   110
Ala Ser Leu Thr Met Val Lys Leu Arg Ala Ser Asp Ala Ala Val Tyr
        115   120   125
Arg Cys Asp Val Met Tyr Gly Ile Glu Asp Thr Gln Asp Thr Met Ser
    130   135   140
Leu Ala Val Asp Gly Val Val Phe His Tyr Arg Ala Ala Thr Ser Arg
145   150   155   160
Tyr Thr Leu Asn Phe Ala Ala Ala Gln Gln Ala Cys Leu Asp Ile Gly
                165   170   175
Ala Val Ile Ala Ser Pro Glu Gln Leu Phe Ala Ala Tyr Glu Asp Gly
            180   185   190
Phe Glu Gln Cys Asp Ala Gly Trp Leu Ser Asp Gln Thr Val Arg Tyr
        195   200   205
Pro Ile Arg Ala Pro Arg Glu Gly Cys Tyr Gly Asp Met Met Gly Lys
    210   215   220
Glu Gly Val Arg Thr Tyr Gly Phe Arg Ser Pro Gln Glu Thr Tyr Asp
225   230   235   240
Val Tyr Cys Tyr Val Asp His Leu Asp Gly Asp Val Phe His Ile Thr
                245   250   255
Ala Pro Ser Lys Phe Thr Phe Glu Glu Ala Glu Ala Glu Cys Thr Ser
            260   265   270
Arg Asp Ala Arg Leu Ala Thr Val Gly Glu Leu Gln Ala Ala Trp Arg
        275   280   285
Asn Gly Phe Asp Gln Cys Asp Tyr Gly Trp Leu Ser Asp Ala Ser Val
    290   295   300
Arg His Pro Val Thr Val Ala Arg Ala Gln Cys Gly Gly Gly Leu Leu
305   310   315   320
Gly Val Arg Thr Leu Tyr Arg Phe Glu Asn Gln Thr Cys Phe Pro Leu
                325   330   335
Pro Asp Ser Arg Phe Asp Ala Tyr Cys Phe Lys Pro Lys Gln Asn Ile
            340   345   350
Ser Glu Ala Thr Thr Ile Glu Met Asn Ile Leu Ala Glu Thr Ser Ser
        355   360   365
Pro Ser Leu Ser Lys Glu Pro His Met Val Pro Asp Arg Ala Thr Pro
    370   375   380
Val Ile Pro Leu Ala Thr Glu Leu Pro Ile Phe Thr Thr His Phe Pro
385   390   395   400
Pro Ala Gly Asn Ile Val Asn Ser Glu Gln Lys Ser Val Val Tyr Ser

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                405                 410                 415
Gln Ala Ile Thr Gly Arg Leu Ala Thr Glu Ser Pro Thr Thr Thr Arg
            420                 425                 430
Asn Thr Ile Asn Ser Trp Asp Leu Asn Asp Ser Leu Ala Ser Gly Ser
        435                 440                 445
Gly Pro Leu Gly Met Pro Asp Ile Ser Glu Ile Lys Glu Glu Glu Leu
    450                 455                 460
Arg Ser Thr Thr Val Ile Ser Gln His Ala Thr Gly Ser Gln Ala Val
465                 470                 475                 480
Ile Thr Glu Asp Thr Gln Thr His Glu Ser Val Ser Gln Ile Glu Gln
                485                 490                 495
Ile Glu Val Gly Pro Leu Val Thr Ser Met Glu Ile Thr Asn His Ile
            500                 505                 510
Ser Leu Lys Glu Leu Pro Glu Lys Asn Lys Thr Pro Tyr Glu Ser Thr
        515                 520                 525
Glu Val Thr Leu Glu His Thr Thr Glu Met Pro Thr Val Ser Ala Ser
    530                 535                 540
Pro Glu Leu Ala Thr Thr Ser His Tyr Gly Phe Thr Leu Arg Glu Asp
545                 550                 555                 560
Asp Arg Glu Asp Arg Thr Leu Thr Val Arg Ser Asp Gln Ser Thr Arg
                565                 570                 575
Val Phe Ser Gln Ile Pro Glu Val Ile Thr Val Ser Lys Thr Ser Glu
            580                 585                 590
Asp Thr Thr Tyr Ser Gln Leu Gly Asp Leu Glu Ser Ile Ser Thr Ser
        595                 600                 605
Thr Ile Thr Met Leu Gly Thr Asp Arg Ser Leu Ile Asp Lys Glu Lys
    610                 615                 620
Glu Pro Lys Thr Asn Gly Lys Val Thr Glu Asp Glu Phe Gly Gln Ser
625                 630                 635                 640
Gln Pro Thr Thr Thr Phe Pro Ser Gln His Leu Thr Glu Val Glu Leu
                645                 650                 655
Leu Pro Tyr Ser Gly Asp Thr Thr Ser Val Glu Gly Ile Ser Thr Val
            660                 665                 670
Ile Tyr Pro Ser Leu Gln Thr Asp Val Thr Gln Gly Arg Glu Arg Thr
        675                 680                 685
Glu Thr Pro Arg Pro Glu Leu Lys Lys Asp Pro Tyr Thr Val Asp Glu
    690                 695                 700
Ile Pro Glu Lys Val Thr Lys Asp Pro Phe Ile Gly Lys Thr Glu Glu
705                 710                 715                 720
Val Phe Ser Gly Met Pro Leu Ser Thr Ser Ser Ser Glu Ser Ser Val
                725                 730                 735
Glu Arg Thr Glu Ser Val Ser Pro Ala Leu Thr Ile Glu Lys Leu Thr
            740                 745                 750
Gly Lys Pro Thr Glu Ala Arg Asp Val Glu Glu Met Thr Thr Leu Thr
        755                 760                 765
Arg Leu Glu Thr Asp Val Thr Lys Ser Asp Lys Asp Val Thr Arg Val
    770                 775                 780
His Leu Thr His Ser Thr Leu Asn Val Glu Val Val Thr Val Ser Lys
785                 790                 795                 800
Trp Pro Gly Asp Glu Asp Asn Ser Thr Ser Lys Pro Leu Pro Ser Thr
                805                 810                 815
Glu His Ala Gly Phe Thr Lys Leu Pro Pro Val Pro Leu Ser Thr Ile
            820                 825                 830
Gly Ile Asn Gly Lys Asp Lys Glu Ile Pro Ser Phe Thr Asp Gly Gly
        835                 840                 845
Gly Glu Tyr Thr Leu Phe Pro Asp Gly Thr Pro Lys Pro Leu Glu Lys
    850                 855                 860
Val Ser Glu Glu Asp Leu Ala Ser Gly Glu Leu Thr Val Thr Phe His
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865                 870                 875                 880
Thr Ser Thr Ser Ile Gly Ser Ala Glu Lys Ser Ala Ser Gly Glu Pro
                885                 890                 895
Thr Thr Gly Asp Arg Phe Leu Pro Thr Thr Ser Thr Glu Asp Gln Val
            900                 905                 910
Ile Asn Ala Thr Ala Glu Gly Ser Ala Leu Gly Glu Asp Thr Glu Ala
        915                 920                 925
Ser Lys Pro Leu Phe Thr Gly Pro Pro Phe Val His Thr Ser Asp Val
    930                 935                 940
Glu Glu Leu Ala Phe Val Asn Tyr Ser Ser Thr Gln Glu Pro Thr Thr
945                 950                 955                 960
Tyr Val Asp Ile Ser His Thr Ser Pro Leu Ser Ile Ile Pro Lys Thr
                965                 970                 975
Glu Trp Ser Val Leu Glu Thr Ser Val Pro Leu Glu Asp Glu Ile Leu
            980                 985                 990
Gly Lys Ser Asp Gln Asp Ile Leu Glu Gln Thr His Leu Glu Ala Thr
        995                 1000                1005
Met Ser Pro Gly Ala Leu Arg Thr Thr Gly Val Ser Gln Gly Glu Thr
    1010                1015                1020
Gln Glu Glu Pro Gln Thr Pro Gly Ser Pro Phe Pro Thr Phe Ser Ser
1025                1030                1035                1040
Thr Ala Val Met Ala Lys Glu Thr Thr Ala Phe Glu Glu Gly Glu Gly
                1045                1050                1055
Ser Thr Tyr Thr Pro Ser Glu Gly Arg Leu Met Thr Gly Ser Glu Arg
            1060                1065                1070
Val Pro Gly Leu Glu Thr Thr Pro Val Gly Thr Ser Tyr Pro Pro Gly
        1075                1080                1085
Ala Ile Thr Asp Gln Glu Val Glu Met Asp Thr Met Val Thr Leu Met
    1090                1095                1100
Ser Thr Ile Arg Pro Thr Val Val Ser Ser Thr Glu Ser Glu Val Ile
1105                1110                1115                1120
Tyr Glu Ala Glu Gly Ser Ser Pro Thr Glu Phe Ala Ser Thr Leu Arg
                1125                1130                1135
Pro Phe Gln Thr His Val Thr Gln Leu Met Glu Glu Thr Thr Glu Glu
            1140                1145                1150
Gly Lys Lys Ala Ser Leu Asp Tyr Thr Asp Leu Gly Ser Gly Leu Phe
        1155                1160                1165
Glu Pro Arg Ala Thr Glu Leu Pro Lys Phe Pro Ser Thr Pro Ser Asp
    1170                1175                1180
Ile Ser Val Phe Thr Ala Ile Asp Ser Leu His Arg Thr Pro Pro Leu
1185                1190                1195                1200
Ser Pro Ser Ser Ser Phe Thr Glu Glu Gln Arg Val Phe Glu Glu Glu
                1205                1210                1215
Ser Ser Glu Lys Thr Thr Gly Asp Ile Leu Pro Gly Glu Ser Val Thr
            1220                1225                1230
Gln His Pro Val Thr Thr Leu Ile Asp Ile Val Ala Met Lys Thr Glu
        1235                1240                1245
Ser Asp Ile Asp His Met Thr Ser Lys Pro Pro Val Thr Gln Pro Thr
    1250                1255                1260
Arg Pro Ser Val Val Glu Arg Lys Thr Thr Ser Lys Thr Gln Glu Leu
1265                1270                1275                1280
Ser Thr Ser Thr Pro Ala Ala Gly Thr Lys Phe His Pro Asp Ile Asn
                1285                1290                1295
Val Tyr Ile Ile Glu Val Arg Glu Asn Lys Thr Gly Arg Leu Ser Asp
            1300                1305                1310
Met Ile Val Ser Gly His Pro Ile Asp Ser Glu Ser Lys Glu Glu Glu
        1315                1320                1325
Pro Cys Ser Glu Glu Thr Asp Pro Leu His Asp Leu Phe Ala Glu Ile
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    1330                1335                1340
Leu Pro Glu Leu Pro Asp Ser Phe Glu Ile Asp Ile Tyr His Ser Glu
1345                1350                1355                1360
Glu Asp Glu Asp Gly Glu Glu Asp Cys Val Asn Ala Thr Asp Val Thr
                1365                1370                1375
Thr Thr Pro Ser Val Gln Tyr Ile Asn Gly Lys Gln Leu Val Thr Thr
            1380                1385                1390
Val Pro Lys Asp Pro Glu Ala Ala Glu Ala Arg Arg Gly Gln Tyr Glu
        1395                1400                1405
Ser Val Ala Pro Ser Gln Asn Phe Pro Asp Ser Ser Ala Thr Asp Thr
    1410                1415                1420
His Gln Phe Ile Leu Ala Glu Thr Glu Ser Ser Thr Thr Met Gln Phe
1425                1430                1435                1440
Lys Lys Ser Lys Glu Gly Thr Glu Leu Leu Glu Ile Thr Trp Lys Pro
                1445                1450                1455
Glu Thr Tyr Pro Glu Thr Pro Asp His Val Ser Ser Gly Glu Pro Asp
            1460                1465                1470
Val Phe Pro Thr Leu Ser Ser His Asp Gly Lys Thr Thr Arg Trp Ser
        1475                1480                1485
Glu Ser Ile Thr Glu Ser Ser Pro Asn Leu Glu Asn Pro Val His Lys
    1490                1495                1500
Gln Pro Lys Pro Val Pro Leu Phe Pro Glu Glu Ser Ser Gly Glu Gly
1505                1510                1515                1520
Ala Ile Glu Gln Ala Ser Gln Glu Thr Ile Leu Ser Arg Ala Thr Glu
                1525                1530                1535
Val Ala Leu Gly Lys Glu Thr Asp Gln Ser Pro Thr Leu Ser Thr Ser
            1540                1545                1550
Ser Ile Leu Ser Ser Ser Val Ser Val Asn Val Leu Glu Glu Glu Pro
        1555                1560                1565
Leu Thr Leu Thr Gly Ile Ser Gln Thr Asp Glu Ser Met Ser Thr Ile
    1570                1575                1580
Glu Ser Trp Val Glu Ile Thr Pro Ser Gln Thr Val Lys Phe Ser Glu
1585                1590                1595                1600
Ser Ser Ser Ala Pro Ile Ile Glu Gly Ser Gly Glu Val Glu Glu Asn
                1605                1610                1615
Lys Asn Lys Ile Phe Asn Met Val Thr Asp Leu Pro Gln Arg Asp Pro
            1620                1625                1630
Thr Asp Thr Leu Ser Pro Leu Asp Met Ser Lys Ile Met Ile Thr Asn
        1635                1640                1645
His His Ile Tyr Ile Pro Ala Thr Ile Ala Pro Leu Asp Ser Lys Leu
    1650                1655                1660
Pro Ser Pro Asp Ala Arg Pro Thr Thr Val Trp Asn Ser Asn Ser Thr
1665                1670                1675                1680
Ser Glu Trp Val Ser Asp Lys Ser Phe Glu Gly Arg Lys Lys Lys Glu
                1685                1690                1695
Asn Glu Asp Glu Glu Gly Ala Val Asn Ala Ala His Gln Gly Glu Val
            1700                1705                1710
Arg Ala Ala Thr Glu Arg Ser Asp His Leu Leu Leu Thr Pro Glu Leu
        1715                1720                1725
Glu Ser Ser Asn Val Asp Ala Ser Ser Asp Leu Ala Thr Trp Glu Gly
    1730                1735                1740
Phe Ile Leu Glu Thr Thr Pro Thr Glu Ser Glu Lys Glu Met Ala Asn
1745                1750                1755                1760
Ser Thr Pro Val Phe Arg Glu Thr Ile Gly Val Ala Asn Val Glu Ala
                1765                1770                1775
Gln Pro Phe Glu His Ser Ser Ser Ser His Pro Arg Val Gln Glu Glu
            1780                1785                1790
Leu Thr Thr Leu Ser Gly Asn Pro Pro Ser Leu Phe Thr Asp Leu Gly
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1795 1800 1805
Ser Gly Asp Ala Ser Thr Gly Met Glu Leu Ile Thr Ala Ser Leu Phe
1810 1815 1820
Thr Leu Asp Leu Glu Ser Glu Thr Lys Val Lys Lys Glu Leu Pro Ser
1825 1830 1835 1840
Thr Pro Ser Pro Ser Val Glu Ile Ser Ser Ser Phe Glu Pro Thr Gly
1845 1850 1855
Leu Thr Pro Ser Thr Val Leu Asp Ile Glu Ile Ala Gly Val Met Ser
1860 1865 1870
Gln Thr Ser Gln Lys Thr Leu Ile Ser Glu Ile Ser Gly Lys Pro Thr
1875 1880 1885
Ser Gln Ser Gly Val Arg Asp Leu Tyr Thr Gly Phe Pro Met Gly Glu
1890 1895 1900
Asp Phe Ser Gly Asp Phe Ser Glu Tyr Pro Thr Val Ser Tyr Pro Thr
1905 1910 1915 1920
Met Lys Glu Glu Thr Val Gly Met Gly Gly Ser Asp Asp Glu Arg Val
1925 1930 1935
Arg Asp Thr Gln Thr Ser Ser Ser Ile Pro Thr Thr Ser Asp Asn Ile
1940 1945 1950
Tyr Pro Val Pro Asp Ser Lys Gly Pro Asp Ser Thr Val Ala Ser Thr
1955 1960 1965
Thr Ala Phe Pro Trp Glu Glu Val Met Ser Ser Ala Glu Gly Ser Gly
1970 1975 1980
Glu Gln Leu Ala Ser Val Arg Ser Ser Val Gly Pro Val Leu Pro Leu
1985 1990 1995 2000
Ala Val Asp Ile Phe Ser Gly Thr Glu Ser Pro Tyr Phe Asp Glu Glu
2005 2010 2015
Phe Glu Glu Val Ala Ala Val Thr Glu Ala Asn Glu Arg Pro Thr Val
2020 2025 2030
Leu Pro Thr Ala Ala Ser Gly Asn Thr Val Asp Leu Thr Glu Asn Gly
2035 2040 2045
Tyr Ile Glu Val Asn Ser Thr Met Ser Leu Asp Phe Pro Gln Thr Met
2050 2055 2060
Glu Pro Ser Lys Leu Trp Ser Lys Pro Glu Val Asn Leu Asp Lys Gln
2065 2070 2075 2080
Glu Ile Gly Arg Glu Thr Val Thr Lys Glu Lys Ala Gln Gly Gln Lys
2085 2090 2095
Thr Phe Glu Ser Leu His Ser Ser Phe Ala Pro Glu Gln Thr Ile Leu
2100 2105 2110
Glu Thr Gln Ser Leu Ile Glu Thr Glu Phe Gln Thr Ser Asp Tyr Ser
2115 2120 2125
Met Leu Thr Thr Leu Lys Thr Tyr Ile Thr Asn Lys Glu Val Glu Glu
2130 2135 2140
Glu Gly Met Ser Ile Ala His Met Ser Thr Pro Gly Pro Gly Ile Lys
2145 2150 2155 2160
Asp Leu Glu Ser Tyr Thr Thr His Pro Glu Ala Pro Gly Lys Ser His
2165 2170 2175
Ser Phe Ser Ala Thr Ala Leu Val Thr Glu Ser Gly Ala Ala Arg Ser
2180 2185 2190
Val Leu Met Asp Ser Ser Thr Gln Glu Glu Glu Ser Ile Lys Leu Phe
2195 2200 2205
Gln Lys Gly Val Lys Leu Thr Asn Lys Glu Ser Asn Ala Asp Leu Ser
2210 2215 2220
Phe Ser Gly Leu Gly Ser Gly Gly Ala Leu Pro Pro Leu Pro Thr Thr
2225 2230 2235 2240
Ser Val Asn Leu Thr Asp Met Lys Gln Ile Ile Ser Thr Leu Tyr Ala
2245 2250 2255
Glu Thr Ser His Met Glu Ser Leu Gly Thr Ser Ile Leu Gly Asp Lys

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            2260                2265                2270
Met Glu Asp His Glu Arg Met Glu Asp Val Ser Ser Asn Glu Val Arg
        2275                2280                2285
Met Leu Ile Ser Lys Ile Gly Ser Ile Ser Gln Asp Ser Thr Glu Ala
    2290                2295                2300
Leu Asp Thr Thr Leu Ser His Thr Gly Thr Glu Glu Pro Thr Thr Ser
2305                2310                2315                2320
Thr Leu Pro Phe Val Lys Leu Met Asp Leu Glu Arg Ser Pro Lys Gln
                2325                2330                2335
Asp Pro Ser Gly Gly Lys Arg Lys Pro Lys Thr His Arg Pro Gln Thr
            2340                2345                2350
Met Ser Gly Leu Ile Ser Asn Glu Asn Ser Ser Ala Ser Glu Ala Glu
        2355                2360                2365
Glu Gly Ala Thr Ser Pro Thr Ala Phe Leu Pro Gln Thr Tyr Ser Val
    2370                2375                2380
Glu Met Thr Lys His Phe Ala Pro Ser Glu Ser Gln Pro Ser Asp Leu
2385                2390                2395                2400
Phe Asn Val Asn Ser Gly Glu Gly Ser Gly Glu Val Asp Thr Leu Asp
                2405                2410                2415
Leu Val Tyr Thr Ser Gly Thr Thr Gln Ala Ser Ser Gln Gly Asp Ser
            2420                2425                2430
Met Leu Ala Ser His Gly Phe Leu Glu Lys His Pro Glu Val Ser Lys
        2435                2440                2445
Thr Glu Ala Gly Ala Thr Asp Val Ser Pro Thr Ala Ser Ala Met Phe
    2450                2455                2460
Leu His His Ser Glu Tyr Lys Ser Ser Leu Tyr Pro Thr Ser Thr Leu
2465                2470                2475                2480
Pro Ser Thr Glu Pro Tyr Lys Ser Pro Ser Glu Gly Ile Glu Asp Gly
                2485                2490                2495
Leu Gln Asp Asn Ile Gln Phe Glu Gly Ser Thr Leu Lys Pro Ser Arg
            2500                2505                2510
Arg Lys Thr Thr Glu Ser Ile Ile Ile Asp Leu Asp Lys Glu Asp Ser
        2515                2520                2525
Lys Asp Leu Gly Leu Thr Ile Thr Glu Ser Ala Ile Val Lys Ser Leu
    2530                2535                2540
Pro Glu Leu Thr Ser Asp Lys Asn Ile Ile Ile Asp Ile Asp His Thr
2545                2550                2555                2560
Lys Pro Val Tyr Glu Tyr Ile Pro Gly Ile Gln Thr Asp Leu Asp Pro
                2565                2570                2575
Glu Ile Lys Leu Glu Ser His Gly Ser Ser Glu Glu Ser Leu Gln Val
            2580                2585                2590
Gln Glu Lys Tyr Glu Gly Ala Val Thr Leu Ser Pro Thr Glu Glu Ser
        2595                2600                2605
Phe Glu Gly Ser Gly Asp Ala Leu Leu Ala Gly Tyr Thr Gln Ala Ile
    2610                2615                2620
Tyr Asn Glu Ser Val Thr Pro Asn Asp Gly Lys Gln Ala Glu Asp Ile
2625                2630                2635                2640
Ser Phe Ser Phe Ala Thr Gly Ile Pro Val Ser Ser Thr Glu Thr Glu
                2645                2650                2655
Leu His Thr Phe Phe Pro Thr Ala Ser Thr Leu His Ile Pro Ser Lys
            2660                2665                2670
Leu Thr Thr Ala Ser Pro Glu Ile Asp Lys Pro Asn Ile Glu Ala Ile
        2675                2680                2685
Ser Leu Asp Asp Ile Phe Glu Ser Ser Thr Leu Ser Asp Gly Gln Ala
    2690                2695                2700
Ile Ala Asp Gln Ser Glu Val Ile Ser Thr Leu Gly His Leu Glu Lys
2705                2710                2715                2720
Thr Gln Glu Glu Tyr Glu Glu Lys Lys Tyr Gly Gly Pro Ser Phe Gln
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                2725                2730                2735
Pro Glu Phe Phe Ser Gly Val Gly Glu Val Leu Thr Asp Pro Pro Ala
            2740                2745                2750
Tyr Val Ser Ile Gly Ser Thr Tyr Leu Ile Ala Gln Thr Leu Thr Glu
        2755                2760                2765
Leu Pro Asn Val Val Arg Pro Ser Asp Ser Thr His Tyr Thr Glu Ala
    2770                2775                2780
Thr Pro Glu Val Ser Ser Leu Ala Glu Leu Ser Pro Gln Ile Pro Ser
2785                2790                2795                2800
Ser Pro Phe Pro Val Tyr Val Asp Asn Gly Val Ser Lys Phe Pro Glu
                2805                2810                2815
Val Pro His Thr Ser Ala Gln Pro Val Ser Thr Val Thr Ser Ser Gln
            2820                2825                2830
Lys Ser Ile Glu Ser Pro Phe Lys Glu Val His Ala Asn Ile Glu Glu
        2835                2840                2845
Thr Ile Lys Pro Leu Gly Gly Asn Val His Arg Thr Glu Pro Pro Ser
    2850                2855                2860
Met Ser Arg Asp Pro Ala Leu Asp Val Ser Glu Asp Glu Ser Lys His
2865                2870                2875                2880
Lys Leu Leu Glu Glu Leu Glu Thr Ser Pro Thr Lys Pro Glu Thr Ser
                2885                2890                2895
Gln Asp Phe Pro Asn Lys Ala Lys Asp His Ile Pro Gly Glu Thr Val
            2900                2905                2910
Gly Met Leu Ala Gly Ile Arg Thr Thr Glu Ser Glu Pro Val Ile Thr
        2915                2920                2925
Ala Asp Asp Met Glu Leu Gly Gly Ala Thr Gln Gln Pro His Ser Ala
    2930                2935                2940
Ser Ala Ala Phe Arg Val Glu Thr Gly Met Val Pro Gln Pro Ile Gln
2945                2950                2955                2960
Gln Glu Pro Glu Arg Pro Thr Phe Pro Ser Leu Glu Ile Asn His Glu
                2965                2970                2975
Thr His Thr Ser Leu Phe Gly Glu Ser Ile Leu Ala Thr Ser Glu Lys
            2980                2985                2990
Gln Val Ser Gln Lys Ile Leu Asp Asn Ser Asn Gln Ala Thr Val Ser
        2995                3000                3005
Ser Thr Leu Asp Leu His Thr Ala His Ala Leu Ser Pro Phe Ser Ile
    3010                3015                3020
Leu Asp Asn Ser Asn Glu Thr Ala Phe Leu Ile Gly Ile Ser Glu Glu
3025                3030                3035                3040
Ser Val Glu Gly Thr Ala Val Tyr Leu Pro Gly Pro Asp Leu Cys Lys
                3045                3050                3055
Thr Asn Pro Cys Leu Asn Gly Gly Thr Cys Tyr Pro Thr Glu Thr Ser
            3060                3065                3070
Tyr Val Cys Thr Cys Ala Pro Gly Tyr Ser Gly Asp Gln Cys Glu Leu
        3075                3080                3085
Asp Phe Asp Glu Cys His Ser Asn Pro Cys Arg Asn Gly Ala Thr Cys
    3090                3095                3100
Val Asp Gly Phe Asn Thr Phe Arg Cys Leu Cys Leu Pro Ser Tyr Val
3105                3110                3115                3120
Gly Ala Leu Cys Glu Gln Asp Thr Glu Thr Cys Asp Tyr Gly Trp His
                3125                3130                3135
Lys Phe Gln Gly Gln Cys Tyr Lys Tyr Phe Ala His Arg Arg Thr Trp
            3140                3145                3150
Asp Ala Ala Glu Arg Glu Cys Arg Leu Gln Gly Ala His Leu Thr Ser
        3155                3160                3165
Ile Leu Ser His Glu Glu Gln Met Phe Val Asn Arg Val Gly His Asp
    3170                3175                3180
Tyr Gln Trp Ile Gly Leu Asn Asp Lys Met Phe Glu His Asp Phe Arg
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3185 3190 3195 3200
Trp Thr Asp Gly Ser Ala Leu Gln Tyr Glu Asn Trp Arg Pro Asn Gln
3205 3210 3215
Pro Asp Ser Phe Phe Ser Ala Gly Glu Asp Cys Val Val Ile Ile Trp
3220 3225 3230
His Glu Asn Gly Gln Trp Asn Asp Val Pro Cys Asn Tyr His Leu Thr
3235 3240 3245
Tyr Thr Cys Lys Lys Gly Thr Val Ala Cys Gly Gln Pro Pro Val Val
3250 3255 3260
Glu Asn Ala Lys Thr Phe Gly Lys Met Lys Pro Arg Tyr Glu Ile Asn
3265 3270 3275 3280
Ser Leu Ile Arg Tyr His Cys Lys Asp Gly Phe Ile Gln Arg His Leu
3285 3290 3295
Pro Thr Ile Arg Cys Leu Gly Asn Gly Arg Trp Ala Met Pro Lys Ile
3300 3305 3310
Thr Cys Met Asn Pro Ser Ala Tyr Gln Arg Thr Tyr Ser Lys Lys Tyr
3315 3320 3325
Leu Lys Asn Ser Ser Ser Ala Lys Asp Asn Ser Ile Asn Thr Ser Lys
3330 3335 3340
His Glu His Arg Trp Ser Arg Arg Gln Glu Thr Arg Arg
3345 3350 3355

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<212> PRT
<213> Rattus norvegicus

<220>
<223> RAT VERSICAN Q9ERB4

<400> 297
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Leu Thr His Ala Leu His Lys Ala Lys Met Glu Glu Asn Pro Pro Val
20 25 30
Lys Gly Ser Leu Ser Gly Lys Val Ile Leu Pro Cys His Phe Ser Thr
35 40 45
Leu Pro Thr Leu Pro Pro Asp Tyr Asn Thr Ser Glu Phe Leu Arg Ile
50 55 60
Lys Trp Ser Lys Ile Glu Val Asp Lys Asn Gly Lys Asp Ile Lys Glu
65 70 75 80
Thr Thr Val Leu Val Ala Gln Asp Gly Asn Ile Lys Ile Gly Gln Asp
85 90 95
Tyr Lys Gly Arg Val Ser Val Pro Thr His Pro Asp Asp Val Gly Asp
100 105 110
Ala Ser Leu Thr Met Val Lys Leu Arg Ala Ser Asp Ala Gly Val Tyr
115 120 125
Arg Cys Asp Val Met Tyr Gly Ile Glu Asp Thr Gln Asn Thr Met Ser
130 135 140
Leu Ala Val Asp Gly Val Val Phe His Tyr Arg Ala Ala Thr Ser Arg
145 150 155 160
Tyr Thr Leu Asn Phe Glu Ser Ala Gln Gln Ala Cys Leu Asp Ile Gly
165 170 175
Ala Val Ile Ala Thr Pro Glu Gln Leu Phe Ala Ala Tyr Glu Asp Gly
180 185 190

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Phe Glu Gln Cys Asp Ala Gly Trp Leu Ser Asp Gln Thr Val Arg Tyr
        195                 200                 205
Pro Ile Arg Ala Pro Arg Glu Gly Cys Tyr Gly Asp Met Met Gly Lys
    210                 215                 220
Glu Gly Val Arg Thr Tyr Gly Phe Arg Ser Pro Gln Glu Thr Tyr Asp
225                 230                 235                 240
Val Tyr Cys Tyr Val Asp His Leu Asp Gly Asp Val Phe His Ile Thr
                245                 250                 255
Ala Pro Ser Lys Phe Thr Phe Glu Glu Ala Glu Ala Glu Cys Ala Asn
            260                 265                 270
Arg Asp Ala Arg Leu Ala Thr Val Gly Glu Leu His Ala Ala Trp Arg
        275                 280                 285
Asn Gly Phe Asp Gln Cys Asp Tyr Gly Trp Leu Ser Asp Ala Ser Val
    290                 295                 300
Arg His Pro Val Thr Val Ala Arg Ala Gln Cys Gly Gly Gly Leu Leu
305                 310                 315                 320
Gly Val Arg Thr Leu Tyr Arg Phe Glu Asn Gln Thr Cys Phe Pro Leu
                325                 330                 335
Pro Asp Ser Arg Phe Asp Ala Tyr Cys Phe Lys Arg Ser Pro Leu Ser
            340                 345                 350
Ile Ile Pro Lys Thr Glu Trp Ser Val Ser Glu Thr Ser Val Pro Leu
        355                 360                 365
Glu Asp Glu Val Leu Gly Lys Ser Asp Gln Asp Thr Leu Glu Gln Thr
    370                 375                 380
His Leu Glu Ala Thr Met Ser Pro Glu Ala Leu Ser Thr Ile Glu Val
385                 390                 395                 400
Thr Gln Gly Glu Thr Gln Glu Glu Pro Gln Thr Pro Gly Ile Pro Phe
                405                 410                 415
Pro Ala Leu Ser Ser Thr Ala Val Met Thr Lys Glu Thr Thr Ala Phe
            420                 425                 430
Glu Glu Glu Gly Glu Gly Ser Thr Tyr Thr Leu Ser Glu Asp Arg Leu
        435                 440                 445
Met Thr Asp Ser Glu Ile Val Pro Ser Leu Glu Thr Thr Pro Val Gly
    450                 455                 460
Thr Ser Tyr Pro Gly Gly Ala Met Thr Gln Gln Glu Val Glu Met Asp
465                 470                 475                 480
Thr Met Val Thr Gln Met Ser Ser Ile Arg Pro Thr Val Val Leu Ser
                485                 490                 495
Thr Glu Pro Glu Val Ser Tyr Glu Ala Glu Gly Ser Ser Pro Met Glu
            500                 505                 510
Phe Ala Ser Thr Leu Lys Pro Phe Gly Thr Gln Val Thr Gln Leu Val
        515                 520                 525
Glu Glu Thr Thr Glu Glu Gly Lys Lys Thr Pro Leu Asp Tyr Thr Asp
    530                 535                 540
Leu Gly Ser Gly Leu Phe Glu Gln Pro Arg Val Thr Glu Leu Pro Asp
545                 550                 555                 560
Phe Ser Met Thr Pro Ser Asp Ile Ser Val Phe Thr Ala Ile Asp Ser
                565                 570                 575
Leu His Arg Thr Thr Pro Leu Arg Pro Pro Ser Pro Phe Thr Glu Glu
            580                 585                 590
Pro His Ile Phe Glu Lys Glu Pro Ser Glu Lys Thr Thr Gly Asp Ile
        595                 600                 605
Ile Leu Pro Arg Glu Ser Val Thr Gln His Pro Leu Thr Thr Leu Met
    610                 615                 620
Asp Ile Ile Ala Lys Lys Thr Glu Ser Asp Ile Asp His Glu Tyr His
625                 630                 635                 640
Met Thr Ser Lys Pro Pro Val Met Gln Pro Thr Arg Pro Ser Val Val
                645                 650                 655
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Glu Arg Lys Thr Thr Ser Lys Pro Gln Glu Leu Ser Thr Ser Pro Pro
            660                 665                 670
Pro Ala Gly Thr Lys Phe His Pro Asp Ile Asn Val Tyr Ile Ile Glu
        675                 680                 685
Val Arg Glu Asn Lys Thr Gly Arg Met Ser Asp Met Val Val Asn Gly
    690                 695                 700
His Pro Ile Asp Ser Glu Ser Lys Glu Glu Glu Pro Cys Ser Glu Glu
705                 710                 715                 720
Thr Asp Pro Leu His Asp Leu Phe Ala Glu Ile Leu Pro Glu Leu Pro
                725                 730                 735
Asp Ser Phe Glu Ile Asp Ile Tyr His Ser Glu Glu Asp Glu Asp Gly
            740                 745                 750
Glu Glu Asp Cys Val Asn Ala Thr Asp Val Thr Thr Thr Pro Ser Val
        755                 760                 765
Gln Tyr Ile Thr Gly Lys Pro His Val Thr Thr Val Pro Lys Asn Pro
    770                 775                 780
Glu Ala Ala Glu Ala Arg Arg Gly Leu Tyr Glu Ser Val Ala Pro Ser
785                 790                 795                 800
Gln Asn Phe Ser Asn Thr Ser Ala Thr Asp Thr His Gln Phe Ile Pro
                805                 810                 815
Ala Glu Thr Glu Leu Ser Thr Thr Met Gln Phe Thr Lys Ser Lys Glu
            820                 825                 830
Ala Thr Glu Leu Leu Glu Ile Thr Trp Lys Pro Glu Thr Tyr Pro Glu
        835                 840                 845
Thr Pro Glu His Phe Ser Ser Gly Glu Pro Asp Val Phe Pro Thr Leu
    850                 855                 860
Pro Ser His Asp Gly Lys Thr Thr Lys Trp Ser Glu Phe Ile Thr Glu
865                 870                 875                 880
Ser Asn Pro Asn Thr Glu Asn Pro Glu His Lys Gln Pro Lys Pro Ile
                885                 890                 895
Pro Leu Phe Pro Glu Glu Phe Ser Gly Glu Gly Ala Ile Asp Gln Ala
            900                 905                 910
Ser Gln Gln Thr Ile Phe Ser Arg Ala Thr Glu Val Ala Leu Gly Lys
        915                 920                 925
Glu Thr Asp Gln Ser Pro Thr Ile Ser Thr Ser Ser Ile Arg Ser Gly
    930                 935                 940
Ser Val Ser Val His Ala Leu Glu Glu Asp Pro Ile Ala Leu Thr Gly
945                 950                 955                 960
Ile Ser Gln Thr Asp Glu Ser Met Ser Thr Val Glu Ser Trp Val Glu
                965                 970                 975
Met Thr Pro Ser Gln Thr Val Glu Phe Ser Gly Ser Ser Ser Ala Pro
            980                 985                 990
Thr Ile Glu Gly Ser Gly Glu Val Glu Glu Tyr Thr Asn Lys Ile Phe
        995                 1000                1005
Asn Thr Val Thr Asp Leu Pro Gln Arg Glu Pro Thr Asp Thr Leu Ile
    1010                1015                1020
Pro Leu Asp Met Ser Asn Ile Met Ile Thr Asp His His Ile Tyr Thr
1025                1030                1035                1040
Pro Ala Thr Thr Ala Pro Leu Asp Ser Gln Leu Pro Ser Thr Asp Ala
                1045                1050                1055
Arg Pro Thr Gln Phe Gly Ile Gln Thr Thr Thr Ser Glu Trp Val Ser
            1060                1065                1070
Ser Thr Ser Phe Glu Gly Arg Lys Thr Glu Glu Asp Lys Glu Arg Asp
        1075                1080                1085
Thr Asn Ala Ala His Thr Gly Glu Val Gln Pro Ala Thr Glu Arg Ser
    1090                1095                1100
Asp Arg Leu Leu Leu Thr Ser Glu Leu Glu Ser Ser Asn Val Ala Ala
1105                1110                1115                1120
```

```
Ser Ser Pro Leu Asp Thr Trp Glu Gly Phe Val Pro Glu Thr Thr Ser
                1125                1130                1135
Thr Val Ser Glu Lys Glu Met Ala Asn Thr Thr Pro Val Phe Thr Glu
            1140                1145                1150
Thr Ser Asp Val Ala Asn Leu Glu Thr Gln Ser Phe Glu His Ser Ser
        1155                1160                1165
Ser Ser Gln Pro Arg Val Gln Glu Glu Leu Thr Thr Leu Ser Gly Lys
    1170                1175                1180
Pro Pro Leu Ile Phe Met Asp Leu Gly Ser Gly Asp Ala Ser Thr Asp
1185                1190                1195                1200
Met Glu Phe Ile Thr Ala Ser Ser Phe Thr Leu Asp Leu Glu Ser Asp
                1205                1210                1215
Thr Lys Val Lys Lys Glu Leu Pro Ser Thr Leu Ser Pro Ser Val Glu
            1220                1225                1230
Thr Ser Ser Ser Ser Glu Pro Ile Gly Leu Ala Pro Ser Thr Val Leu
        1235                1240                1245
Asp Ile Glu Ile Val Glu Val Met Asn Gln Thr Ser Lys Lys Thr Leu
    1250                1255                1260
Ile Ser Glu Leu Ser Gly Lys Pro Thr Ser Gln Ala Glu Val Arg Asp
1265                1270                1275                1280
Leu Tyr Pro Gly Leu Gly Glu Asp Phe Ser Gly Asp Ser Ser Glu Tyr
                1285                1290                1295
Pro Thr Val Ser Ser Thr Thr Met Lys Glu Glu Thr Val Gly Met Gly
            1300                1305                1310
Gly Ser Glu Asn Glu Arg Val Lys Asp Thr Gln Thr Leu Ser Ser Ile
        1315                1320                1325
Pro Pro Thr Ser Asp Asn Ile Asn Pro Val Pro Asp Ser Lys Gly Phe
    1330                1335                1340
Gly Ser Thr Val Ala Ser Thr Thr Ala Phe Pro Trp Glu Glu Phe Met
1345                1350                1355                1360
Thr Ser Ala Glu Gly Ser Gly Glu Glu Leu Ser Ser Val Arg Ser Ser
                1365                1370                1375
Val Ser Leu Val Leu Pro Leu Gly Val Asp Ile Leu Pro Thr Thr Glu
            1380                1385                1390
Ser Pro Tyr Phe Asp Gln Glu Phe Glu Glu Ala Ala Ala Val Thr Glu
        1395                1400                1405
Ala Gly Lys Gln Ser Ala Leu Pro Ile Ala Val Ser Gly Asn Thr Val
    1410                1415                1420
Asp Leu Thr Glu Asn Arg Asp Ile Glu Val Asn Ser Thr Met Ser Val
1425                1430                1435                1440
Asp Leu Pro Gln Thr Met Glu Pro Ala Lys Leu Trp Ser Lys Pro Glu
                1445                1450                1455
Val Asn Pro Glu Lys Gln Glu Ile Gly Ser Glu Thr Val Thr Gln Asp
            1460                1465                1470
Lys Ala Gln Gly Gln Lys Ser Phe Glu Ser Leu His Ser Ser Leu Ala
        1475                1480                1485
Pro Glu Gln Thr Thr Leu Glu Ser Gln Ser Leu Ile Glu Thr Glu Val
    1490                1495                1500
Gln Thr Ser Tyr Tyr Ser Met Leu Thr Thr Met Lys Thr Tyr Asn Thr
1505                1510                1515                1520
Asn Glu Glu Val Glu Glu Glu Gly Thr Ser Ile Ala His Met Ser Thr
                1525                1530                1535
Pro Gly Pro Gly Ile Lys Gly Leu Glu Ser Tyr Pro Thr His Pro Glu
            1540                1545                1550
Ala Thr Gly Lys Ser Tyr Ser Phe Ser Ala Ser Ala Leu Val Thr Glu
        1555                1560                1565
Ser Gly Pro Ala Arg Ser Val Val Met Asp Ser Ser Thr Gln Glu Glu
    1570                1575                1580
```

```
Glu Ser Ile Lys Leu Phe Gln Lys Asp Met Ile Leu Thr His Lys Glu
1585                1590                1595                1600
Ser Asn Ser Asp Leu Ser Phe Ser Gly Leu Gly Ser Gly Glu Ala Leu
                 1605                1610                1615
Pro Pro Leu Pro Thr Thr Ser Val Ser Leu Thr Asp Met Gly Lys Ile
             1620                1625                1630
Asn Ser Thr Leu Tyr Pro Glu Thr Ser His Met Glu Ser Leu Gly Thr
         1635                1640                1645
Ser Ile Leu Gly Asp Asn His Glu Arg Met Lys Asn Val Ser Asn Glu
     1650                1655                1660
Val Arg Thr Leu Ile Ser Glu Thr Gly Ser Ile Ser Gln Asp Ser Thr
1665                1670                1675                1680
Glu Ala Pro Asn Thr Thr Leu Ser Asp Thr Arg Thr Glu Glu Ser Thr
                 1685                1690                1695
Thr Ser Pro Leu Pro Phe Met Lys Leu Met Asp Thr Glu His Ser Pro
             1700                1705                1710
Lys Gln Thr Leu Arg Trp Glu Glu Glu Ile Gln Thr His Arg Pro Gln
         1715                1720                1725
Thr Met Thr Gly Gln Met Thr Asn Asp Asn Ser Ser Val Ser Glu Ala
     1730                1735                1740
Glu Ala Ala Ala Thr Ser Ala Pro Ala Phe Leu Pro Glu Thr Tyr Ser
1745                1750                1755                1760
Val Glu Met Thr Lys Ala Phe Ala Thr Ser Pro Ser Gln Thr Ser Asp
                 1765                1770                1775
Leu Phe Asp Ala Asn Ser Gly Glu Gly Ser Gly Glu Val Asp Gly Leu
             1780                1785                1790
Asp Leu Val Tyr Thr Ser Arg Thr Thr Gln Ala Ser Ser Gln Gly Asp
         1795                1800                1805
Ser Met Phe Ala Ser His Gly Phe Ile Glu Lys His Pro Glu Val Ser
     1810                1815                1820
Arg Thr Glu Thr Gly Ala Thr Asp Gly Ser Pro Thr Ala Ser Ala Met
1825                1830                1835                1840
Phe Leu His Gln Ser Glu Tyr Asn Glu Ser Ser Leu Tyr Pro Thr Ser
                 1845                1850                1855
Thr Leu Pro Ser Thr Val Thr Tyr Glu Ser Pro Ser Glu Gly Ile Ala
             1860                1865                1870
Asp Gly Leu Gln Asp His Ile Arg Phe Glu Val Ser Thr Leu Lys Pro
         1875                1880                1885
Ser Arg Arg Lys Ala Thr Glu Ser Val Ile Ile Asp Leu Asp Lys Glu
     1890                1895                1900
Asp Ser Lys Asp Leu Gly Leu Ala Ile Thr Glu Ser Ala Ile Val Glu
1905                1910                1915                1920
Ile Leu Pro Glu Leu Thr Ser Asp Arg Asn Ile Ile Ile Asp Ile Asp
                 1925                1930                1935
His Thr Lys Pro Val Tyr Glu Tyr Ile Pro Gly Ile Gln Thr Asp Leu
             1940                1945                1950
Asp Ser Asp Ile Pro Leu Gly Ser His Gly Ser Ser Glu Glu Ser Leu
         1955                1960                1965
Glu Val Gln Glu Lys Tyr Glu Ala Thr Ile Asn Leu Ser Pro Thr Glu
     1970                1975                1980
Glu Ala Phe Asp Gly Ser Gly Asp Ala Leu Pro Ala Gly His Thr Gln
1985                1990                1995                2000
Ala Ile Tyr Asn Glu Ser Val Thr Pro Ser Asp Gly Lys Gln Pro Glu
                 2005                2010                2015
Asp Ile Ser Phe Ser Phe Ala Thr Gly Ile Pro Val Ser Ser Thr Glu
             2020                2025                2030
Thr Glu Leu Asn Thr Phe Phe Pro Thr Val Ser Thr Leu His Ile Pro
         2035                2040                2045
```

```
Ser Lys Leu Thr Thr Ala Ser Pro Glu Ile Asp Lys Pro Asn Ile Glu
    2050                2055                2060
Ala Ile Ser Leu Asp Asp Ile Phe Glu Ser Ser Thr Leu Ser Asp Gly
2065                2070                2075                2080
Gln Ala Ile Ala Asp Gln Ser Glu Val Ile Ser Thr Leu Gly His Leu
                2085                2090                2095
Glu Lys Thr Gln Glu Glu Tyr Glu Glu Lys Lys Tyr Gly Gly Pro Ser
            2100                2105                2110
Phe Gln Pro Glu Phe Phe Ser Gly Val Gly Glu Val Phe Thr Asp Ala
        2115                2120                2125
Pro Ala Tyr Val Ser Ile Gly Arg Thr Tyr Ser Val Ala Gln Pro Leu
    2130                2135                2140
Thr Glu Phe Pro Asn Val Val Gly Gln Ser Asp Ser Thr His Tyr Thr
2145                2150                2155                2160
Glu Ala Thr Ser Ala Val Ser Ser Val Thr Glu Leu Ser Pro Gln Thr
                2165                2170                2175
Pro Ser Ser Pro Ser Pro Val Tyr Ile Asp Ser Gly Val Ser Glu Phe
            2180                2185                2190
Thr Glu Val Pro His Lys Ser Ala Gln Pro Ala Pro Thr Ala Ala Ser
        2195                2200                2205
Ser Gln Lys Leu Ile Glu Gly Ser Phe Lys Lys Val Arg Ala Asn Ile
    2210                2215                2220
Glu Ala Thr Ile Lys Ser Leu Gly Glu Asn Asp His Gly Thr Glu Ser
2225                2230                2235                2240
Pro Ser Met Ser Pro Ser Pro Ala Leu Asp Ile Ser Glu Asp Asp Ser
                2245                2250                2255
Lys Pro Lys Leu Leu Glu Asp Leu Glu Thr Ser Pro Thr Lys Thr Glu
            2260                2265                2270
Thr Ser Gln Asp Ser Pro Asn Lys Ala Asn Asp Gln Ile Pro Gly Lys
        2275                2280                2285
Thr Ala Gly Ile Leu Ala Gly Ile Lys Thr Thr Glu Ser Gly Pro Val
    2290                2295                2300
Val Thr Ala Ala Asp Asp Met Glu Leu Gly Asp Ala Thr Gln Arg Pro
2305                2310                2315                2320
His Ser Ala Ser Ala Pro Ala Ala Phe Arg Val Glu Thr Ser Met Val
                2325                2330                2335
Pro Gln Pro Ile Pro Gln Glu Pro Glu Arg Pro Thr Phe Pro Ser Leu
            2340                2345                2350
Glu Ile Asn His Glu Thr His Thr Ser Leu Phe Glu Glu Ser Ile Leu
        2355                2360                2365
Ala Thr Ser Glu Lys Gln Val Ser Gln Arg Ile Leu Asp Tyr Ser Asn
    2370                2375                2380
Gln Ala Thr Val Ser Thr Leu Asp Leu Asn Thr Glu His Ser Ile Pro
2385                2390                2395                2400
Pro Phe Ser Ile Leu Asp Asn Ser Asn Glu Thr Ala Phe Leu Ile Gly
                2405                2410                2415
Ile Ser Glu Glu Thr Val Glu Gly Thr Ala Val Tyr Leu Pro Gly Pro
            2420                2425                2430
Asp Leu Cys Lys Thr Asn Pro Cys Leu Asn Gly Gly Thr Cys Tyr Pro
        2435                2440                2445
Thr Glu Thr Ser Tyr Val Cys Thr Cys Ala Pro Gly Tyr Ser Gly Asp
    2450                2455                2460
Gln Cys Glu Leu Asp Phe Asp Glu Cys His Ser Asn Pro Cys Arg Asn
2465                2470                2475                2480
Gly Ala Thr Cys Val Asp Gly Leu Asn Thr Phe Arg Cys Leu Cys Leu
                2485                2490                2495
Pro Ser Tyr Val Gly Ala Leu Cys Glu Gln Asp Thr Glu Thr Cys Asp
            2500                2505                2510
```

Tyr Gly Trp His Lys Phe Gln Gly Gln Cys Tyr Lys Tyr Phe Ala His
2515 2520 2525
Arg Arg Thr Trp Asp Ala Ala Glu Arg Glu Cys Arg Leu Gln Gly Ala
2530 2535 2540
His Leu Thr Ser Ile Leu Ser His Glu Glu Gln Met Phe Val Asn Arg
2545 2550 2555 2560
Val Gly His Asp Tyr Gln Trp Ile Gly Leu Asn Asp Lys Met Phe Glu
2565 2570 2575
His Asp Phe Arg Trp Thr Asp Gly Ser Ala Leu Gln Tyr Glu Asn Trp
2580 2585 2590
Arg Pro Asn Gln Pro Asp Ser Phe Phe Ser Ala Gly Glu Asp Cys Val
2595 2600 2605
Val Ile Ile Trp His Glu Asn Gly Gln Trp Asn Asp Val Pro Cys Asn
2610 2615 2620
Tyr His Leu Thr Tyr Thr Cys Lys Lys Gly Thr Val Ala Cys Gly Gln
2625 2630 2635 2640
Pro Pro Val Val Glu Asn Ala Lys Thr Phe Gly Lys Met Lys Pro Arg
2645 2650 2655
Tyr Glu Ile Asn Ser Leu Ile Arg Tyr His Cys Lys Asp Gly Phe Ile
2660 2665 2670
Gln Arg His Leu Pro Thr Ile Arg Cys Leu Gly Asn Gly Arg Trp Ala
2675 2680 2685
Met Pro Lys Ile Thr Cys Met Asn Pro Ser Ala Tyr Gln Arg Thr Tyr
2690 2695 2700
Ser Lys Lys Tyr Leu Lys Asn Ser Ser Ser Val Lys Asp Asn Ser Ile
2705 2710 2715 2720
Asn Thr Ser Lys His Glu His Arg Trp Ser Arg Arg Trp Gln Glu Thr
2725 2730 2735
Arg Arg

<210> 298
<211> 862
<212> PRT
<213> Macaca nemestrina

<220>
<223> PIG-TAILED MACAQUE VERSICAN Q28858

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Lys Ala Gly Val Arg Thr Tyr Gly Phe Arg Ser Pro Gln Glu Thr Tyr
20 25 30
Asp Val Tyr Cys Tyr Val Asp His Leu Asp Gly Asp Val Phe His Leu
35 40 45
Thr Ala Pro Ser Lys Phe Thr Phe Glu Glu Ala Ala Lys Glu Cys Glu
50 55 60
Asn Gln Asp Ala Arg Leu Ala Thr Val Gly Glu Leu Gln Ala Ala Trp
65 70 75 80
Arg Asn Gly Phe Asp Gln Cys Asp Tyr Gly Trp Leu Ser Asp Ala Ser
85 90 95
Val Arg His Pro Val Thr Val Ala Arg Ala Gln Cys Gly Gly Gly Leu
100 105 110
Leu Gly Val Arg Thr Leu Tyr Arg Phe Glu Asn Gln Thr Gly Phe Pro
115 120 125

```
Pro Pro Asp Ser Arg Phe Asp Ala Tyr Cys Phe Lys Arg Arg Met Ser
    130                 135                 140
Asp Leu Ser Val Ile Gly His Pro Ile Asp Ser Glu Ser Lys Glu Asp
145                 150                 155                 160
Glu Pro Cys Ser Glu Glu Thr Asp Pro Val His Asp Leu Met Ala Glu
                165                 170                 175
Ile Leu Pro Glu Phe Pro Asp Ile Ile Glu Ile Asp Leu Tyr His Ser
            180                 185                 190
Glu Glu Asn Glu Glu Glu Glu Glu Glu Cys Ala Asn Ala Thr Asp Val
        195                 200                 205
Thr Thr Thr Pro Ser Val Gln Tyr Ile Asn Gly Lys His Leu Val Thr
    210                 215                 220
Thr Val Pro Lys Asp Pro Glu Ala Ala Ser Gly Thr Ile Ser Thr Asn
225                 230                 235                 240
Phe Pro Gln Thr Met Glu Pro Ala Lys Leu Trp Ser Arg Gln Glu Val
                245                 250                 255
Asn Pro Glu Arg Gln Glu Ile Glu Ser Glu Thr Thr Ser Glu Glu Gln
            260                 265                 270
Ile Gln Glu Glu Lys Ser Phe Glu Ser Pro Gln Asn Ser Pro Ala Thr
        275                 280                 285
Glu Gln Thr Ile Phe Asp Ser Gln Thr Phe Thr Glu Thr Glu Leu Lys
    290                 295                 300
Thr Thr Gly Tyr Ser Val Leu Thr Thr Lys Lys Thr Tyr Ser Asp Asp
305                 310                 315                 320
Lys Glu Met Glu Glu Glu Gly Thr Ser Leu Ala Asn Met Ser Thr Pro
                325                 330                 335
Val Pro Asp Ala Asn Gly Val Glu Ser Phe Thr Thr Leu Pro Glu Ala
            340                 345                 350
Thr Glu Lys Ser His Phe Phe Leu Ala Thr Ala Leu Val Thr Glu Ser
        355                 360                 365
Ile Pro Ala Glu His Val Val Thr Asp Ser Pro Ile Lys Glu Glu Glu
    370                 375                 380
Ser Thr Lys His Phe Pro Lys Gly Met Arg Pro Thr Ile Gln Glu Leu
385                 390                 395                 400
Asp Thr Glu Leu Leu Phe Ser Gly Leu Gly Ser Gly Glu Glu Val Leu
                405                 410                 415
Pro Thr Leu Pro Thr Lys Ser Val Asn Phe Thr Glu Val Glu Gln Ile
            420                 425                 430
Arg Asn Thr Phe Tyr Pro His Thr Ser Gln Val Glu Ser Thr Ser Ser
        435                 440                 445
Asp Lys Leu Glu Asp Phe Asn Arg Met Glu Asn Val Ala Lys Glu Val
    450                 455                 460
Gly Pro Leu Gly Ser Gln Thr Asp Ile Phe Glu Gly Asn Glu Ser Val
465                 470                 475                 480
Thr Ser Thr Thr Leu Ile Glu Ile Leu Ser Asp Pro Gly Ala Glu Gly
                485                 490                 495
Pro Thr Val Ala Pro Leu Pro Phe Phe Ala Asn Ile Gly His Pro Gln
            500                 505                 510
Asn Gln Thr Leu Arg Trp Ala Glu Glu Ile Gln Thr Ser Lys Leu Glu
        515                 520                 525
Pro Ser Glu Glu Asp Gly Lys Pro Glu Leu Leu Glu Glu Thr Glu Ala
    530                 535                 540
Ser Pro Thr Glu Phe Ile Ala Val Glu Gly Thr Glu Ile Leu Gln Asp
545                 550                 555                 560
Phe Gln Asn Lys Thr Asp Gly Gln Val Ser Gly Glu Ala Ile Lys Met
                565                 570                 575
Phe Pro Thr Ile Lys Thr Pro Glu Ala Gly Thr Val Ile Thr Thr Ala
            580                 585                 590
```

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Asn Glu Ile Lys Leu Glu Gly Ala Thr Gln Trp Pro His Ser Thr Ser
        595                 600                 605
Ala Ser Ala Thr Tyr Gly Ile Glu Ala Gly Val Met Pro Trp Leu Ser
    610                 615                 620
Pro Gln Thr Ser Glu Arg Pro Thr Leu Ser Ser Ser Pro Glu Ile Asn
625                 630                 635                 640
Pro Glu Thr Gln Ala Ala Leu Ile Arg Gly Gln Asp Ser Thr Val Ala
                645                 650                 655
Ala Ser Glu Gln Gln Val Thr Ala Arg Ile Leu Asp Thr Asn Asp Gln
            660                 665                 670
Ala Thr Val Ser Pro Val Glu Phe Asn Thr Glu Val Ala Thr Pro Pro
        675                 680                 685
Phe Ser Leu Leu Glu Thr Ser Asn Glu Thr Asp Phe Leu Ile Gly Ile
    690                 695                 700
Asn Glu Glu Ser Val Glu Gly Thr Ala Ile Tyr Leu Pro Gly Pro Asp
705                 710                 715                 720
Arg Cys Lys Met Asn Pro Cys Leu Asn Gly Gly Thr Cys Tyr Pro Thr
                725                 730                 735
Glu Thr Ser Tyr Val Cys Thr Cys Val Pro Gly Tyr Ser Gly Asp Gln
            740                 745                 750
Cys Glu Leu Asp Phe Asp Glu Cys His Ser Asn Pro Cys Arg Asn Gly
        755                 760                 765
Ala Thr Cys Ala Asp Gly Phe Asn Thr Phe Arg Cys Leu Cys Leu Pro
    770                 775                 780
Ser Tyr Val Gly Ala Leu Cys Glu Gln Asp Ile Glu Thr Cys Asp Tyr
785                 790                 795                 800
Gly Trp His Lys Phe Gln Gly Gln Cys Tyr Lys Tyr Phe Ala His Arg
                805                 810                 815
Arg Thr Trp Asp Ala Ala Glu Arg Glu Cys Arg Leu Gln Gly Ala His
            820                 825                 830
Leu Thr Ser Ile Leu Ser His Glu Glu Gln Met Phe Val Asn Arg Val
        835                 840                 845
Gly His Asp Tyr Gln Trp Ile Gly Leu Asn Asp Lys Met Phe
    850                 855                 860


<210> 299
<211> 3381
<212> PRT
<213> Bos taurus

<220>
<223> COW VERSICAN P81282


<400> 299
Met Leu Ile Asn Ile Lys Ser Ile Leu Trp Met Cys Ser Thr Leu Ile
 1               5                  10                  15
Ala Ala His Ala Leu Gln Lys Val Asn Met Glu Lys Ser Pro Pro Val
            20                  25                  30
Lys Gly Ser Leu Ser Gly Lys Val Asn Leu Pro Cys His Phe Ser Thr
        35                  40                  45
Met Pro Thr Leu Pro Pro Ser Tyr Asn Thr Thr Ser Glu Phe Leu Arg
    50                  55                  60
Ile Lys Trp Ser Lys Ile Glu Leu Asp Lys Thr Gly Lys Asp Leu Lys
65                  70                  75                  80
Glu Thr Thr Val Leu Val Ala Gln Asn Gly Asn Ile Lys Ile Gly Gln
                85                  90                  95
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Asp Tyr Lys Gly Arg Val Ser Val Pro Thr His Pro Glu Asp Val Gly
            100                 105                 110
Asp Ala Ser Leu Thr Met Val Lys Leu Leu Ala Ser Asp Ala Gly Arg
        115                 120                 125
Tyr Arg Cys Asp Val Met Tyr Gly Ile Glu Asp Thr Gln Asp Thr Val
    130                 135                 140
Ser Leu Thr Val Glu Gly Val Val Phe His Tyr Arg Ala Ala Thr Ser
145                 150                 155                 160
Arg Tyr Thr Leu Asn Phe Glu Met Ala Gln Lys Ala Cys Val Asp Ile
                165                 170                 175
Gly Ala Val Ile Ala Thr Pro Glu Gln Leu His Ala Ala Tyr Glu Asp
            180                 185                 190
Gly Phe Glu Gln Cys Asp Ala Gly Trp Leu Ser Asp Gln Thr Val Arg
        195                 200                 205
Tyr Pro Ile Arg Val Pro Arg Glu Gly Cys Tyr Gly Asp Met Met Gly
    210                 215                 220
Lys Glu Gly Val Arg Thr Tyr Gly Phe Arg Ala Pro His Glu Thr Tyr
225                 230                 235                 240
Asp Val Tyr Cys Tyr Val Asp His Leu Asp Gly Asp Val Phe His Ile
                245                 250                 255
Thr Ala Pro Asn Lys Phe Thr Phe Glu Glu Ala Gly Glu Glu Cys Lys
            260                 265                 270
Thr Gln Asp Ala Arg Leu Ala Thr Val Gly Glu Leu Gln Ala Ala Trp
        275                 280                 285
Arg Asn Gly Phe Asp Arg Cys Asp Tyr Gly Trp Leu Leu Asp Ala Ser
    290                 295                 300
Val Arg His Pro Val Thr Val Ala Arg Ala Gln Cys Gly Gly Gly Leu
305                 310                 315                 320
Leu Gly Val Arg Thr Leu Tyr Arg Phe Glu Asn Gln Thr Gly Phe Pro
                325                 330                 335
Thr Pro Asp Ser Arg Phe Asp Ala Tyr Cys Phe Lys Pro Lys Gln Asn
            340                 345                 350
Ile Ser Glu Ala Thr Thr Ile Glu Leu Asn Met Leu Ala Glu Thr Val
        355                 360                 365
Ser Pro Thr Leu Leu Glu Glu Leu Gln Val Gly Leu Asp Arg Met Thr
    370                 375                 380
Pro Ile Val Pro Leu Ile Thr Glu Leu Pro Val Ile Thr Thr Lys Val
385                 390                 395                 400
Pro Pro Ile Gly Asn Ile Val Asn Phe Glu Gln Lys Ser Thr Val Gln
                405                 410                 415
Pro Leu Thr Ser Thr His Arg Ser Ala Thr Glu Ser Leu Pro Pro Asp
            420                 425                 430
Gly Ser Met Lys Lys Pro Trp Asp Met Asp Tyr Tyr Ser Pro Ser Ala
        435                 440                 445
Ser Gly Pro Leu Gly Glu Pro Asp Val Ser Glu Ile Lys Glu Glu Val
    450                 455                 460
Pro Gln Ser Thr Thr Val Val Ser His His Ala Pro Asp Ser Trp Asp
465                 470                 475                 480
Gly Val Lys Glu Asp Leu Gln Ile Lys Asp Ser Val Thr Gln Ile Glu
                485                 490                 495
Gln Ile Glu Val Gly Pro Leu Val Thr Ser Met Glu Ile Ser Lys His
            500                 505                 510
Ile Pro Ser Lys Glu Phe Thr Val Thr Val Thr Pro Phe Val Ser Thr
        515                 520                 525
Thr Met Thr Leu Glu Ser Lys Thr Glu Lys Lys Ala Ile Ser Thr Val
    530                 535                 540
Ser Glu Ser Val Thr Thr Ser His Tyr Gly Phe Thr Leu Arg Glu Gly
545                 550                 555                 560
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Asp Gly Glu Asp Arg Ile Ser Thr Val Arg Ser Gly Gln Ser Thr Ser
                565                 570                 575
Ile Phe Ser Gln Ile Pro Glu Val Ile Thr Val Ser Lys Thr Ser Glu
            580                 585                 590
Asp Thr Thr Arg Gly Gln Leu Glu Asp Val Glu Ser Val Ser Ala Ser
        595                 600                 605
Thr Ile Val Ser Pro Asp Ser Asp Gly Ser Pro Met Asp His Arg Gln
    610                 615                 620
Glu Lys Gln Thr His Gly Arg Ile Thr Glu Gly Phe Leu Gly Gln Tyr
625                 630                 635                 640
Val Ser Thr Thr Pro Phe Pro Ser Gln His His Thr Glu Val Glu Leu
                645                 650                 655
Phe Pro Tyr Ser Gly Asp Lys Arg Leu Val Glu Gly Thr Ser Thr Val
            660                 665                 670
Ile Ser Pro Thr Pro Arg Thr Gly Arg Glu Arg Thr Glu Thr Leu Arg
        675                 680                 685
Pro Ala Met Arg Thr Val Thr Tyr Thr Asn Asp Glu Ile Gln Glu Lys
    690                 695                 700
Ile Thr Lys Asp Ser Ser Ile Glu Lys Ile Glu Glu Glu Gly Phe Ser
705                 710                 715                 720
Gly Met Lys Phe Pro Thr Ala Ser Pro Glu Gln Ile His His Thr Lys
                725                 730                 735
Tyr Ser Val Gly Met Thr Lys Ser Phe Glu Ser Pro Ala Leu Met Thr
            740                 745                 750
Thr Thr Lys Pro Gly Val Thr Pro Thr Glu Ala Thr Asp Val Glu Glu
        755                 760                 765
Asp Phe Thr Thr Pro Ser Gly Leu Glu Thr Asp Gly Tyr Gln Asp Thr
    770                 775                 780
Thr Glu Tyr Glu Glu Gly Ile Thr Thr Val His Leu Ile Gln Ser Thr
785                 790                 795                 800
Leu Asn Val Glu Val Val Thr Val Ser Lys Trp Ser Leu Asp Glu Asp
                805                 810                 815
Asn Thr Thr Ser Lys Pro Leu Gly Ser Thr Glu His Val Gly Ser Pro
            820                 825                 830
Lys Leu Pro Pro Ala Leu Ile Thr Thr Thr Gly Val Ser Gly Lys Asp
        835                 840                 845
Lys Glu Met Pro Ser Leu Thr Glu Asp Gly Arg Asp Glu Phe Thr Arg
    850                 855                 860
Ile Pro Gly Ser Thr Gln Arg Pro Leu Glu Glu Phe Thr Glu Glu Asp
865                 870                 875                 880
Thr Thr Asp His Glu Lys Phe Thr Val Arg Phe Gln Pro Thr Thr Ser
                885                 890                 895
Ile Ala Thr Thr Glu Lys Ser Thr Leu Arg Asp Ser Ile Thr Glu Glu
            900                 905                 910
Arg Val Pro Pro Phe Thr Ser Thr Glu Val Arg Val Thr His Ala Thr
        915                 920                 925
Ile Glu Gly Ser Ala Leu Asp Glu Gly Glu Asp Val Asp Val Ser Lys
    930                 935                 940
Pro Leu Ser Thr Val Pro Gln Phe Ala His Pro Ser Asp Val Glu Gly
945                 950                 955                 960
Ser Thr Phe Val Asn Tyr Ser Ser Thr Gln Glu Pro Thr Thr Tyr Val
                965                 970                 975
Asp Thr Ser His Thr Ile Pro Leu Pro Val Ile Pro Lys Thr Glu Trp
            980                 985                 990
Gly Val Leu Val Pro Ser Ile Pro Ser Glu Gly Glu Val Leu Gly Glu
        995                 1000                1005
Pro Ser Gln Asp Ile Arg Val Ile Asn Gln Thr His Phe Glu Ala Ser
    1010                1015                1020
```

```
Met Tyr Pro Glu Thr Val Arg Thr Thr Thr Glu Ile Thr Gln Glu Ala
1025                1030                1035                1040
Thr Arg Glu Asp Phe Leu Trp Lys Glu Gln Thr Pro Glu Lys Pro Val
                1045                1050                1055
Ser Pro Pro Ser Ser Thr Thr Asp Thr Ala Lys Glu Thr Thr Pro Pro
            1060                1065                1070
Leu Asp Glu Gln Glu Ser Asp Gly Ser Ala Tyr Thr Val Phe Glu Asp
        1075                1080                1085
Arg Ser Val Met Gly Ser Asp Arg Val Ser Val Leu Val Thr Thr Pro
    1090                1095                1100
Ile Gly Lys Phe Glu Gln His Thr Ser Phe Pro Pro Gly Ala Val Thr
1105                1110                1115                1120
Lys Ala Lys Thr Asp Glu Val Val Thr Leu Thr Pro Thr Thr Gly Ser
                1125                1130                1135
Lys Val Thr Phe Ser Pro Trp Pro Lys Gln Lys Tyr Glu Thr Glu Gly
            1140                1145                1150
Thr Ser Pro Arg Gly Phe Val Ser Pro Phe Ser Ile Gly Val Thr Gln
        1155                1160                1165
Leu Ile Glu Glu Thr Thr Thr Glu Lys Arg Glu Lys Thr Ser Leu Asp
    1170                1175                1180
Tyr Ile Asp Leu Gly Ser Gly Leu Phe Glu Lys Pro Lys Ala Thr Glu
1185                1190                1195                1200
Leu Pro Glu Phe Ser Thr Val Lys Ala Thr Val Pro Ser Asp Thr Ala
                1205                1210                1215
Ala Phe Ser Ser Ala Asp Arg Leu His Thr Pro Ser Ala Ser Thr Glu
            1220                1225                1230
Lys Pro Pro Leu Ile Asp Arg Glu Pro Asp Glu Glu Thr Thr Ser Asp
        1235                1240                1245
Met Val Ile Ile Gly Glu Ser Thr Ser Arg Val Pro Pro Thr Thr Leu
    1250                1255                1260
Glu Asp Ile Val Ala Lys Lys Thr Glu Thr Asp Ile Asp Arg Glu Tyr
1265                1270                1275                1280
Phe Thr Thr Ser Ser Thr Ser Thr Thr Gln Pro Thr Arg Pro Pro Thr
                1285                1290                1295
Val Glu Gly Lys Glu Ala Phe Gly Pro Gln Ala Phe Ser Thr Pro Glu
            1300                1305                1310
Pro Pro Ala Gly Thr Lys Phe His Pro Asp Ile Asn Val Tyr Ile Ile
        1315                1320                1325
Glu Val Arg Glu Asn Lys Thr Gly Arg Met Ser Asp Phe Ser Val Ser
    1330                1335                1340
Gly His Pro Ile Asp Ser Glu Ser Lys Glu Asp Glu Pro Cys Ser Glu
1345                1350                1355                1360
Glu Thr Asp Pro Glu His Asp Leu Ile Ala Glu Ile Leu Pro Glu Leu
                1365                1370                1375
Leu Gly Met Leu His Ser Glu Glu Asp Glu Glu Asp Glu Glu Cys Ala
            1380                1385                1390
Asn Ala Thr Asp Val Thr Thr Thr Pro Ser Val Gln Tyr Ile Asn Gly
        1395                1400                1405
Lys His Val Val Thr Thr Val Pro Lys Asp Pro Glu Ala Ala Glu Ala
    1410                1415                1420
Arg Arg Gly Gln Phe Glu Ser Val Ala Pro Ser Gln Asn Phe Ser Asp
1425                1430                1435                1440
Ser Ser Glu Ser Asp Ser His Gln Phe Ile Ile Thr His Ala Gly Leu
                1445                1450                1455
Pro Thr Ala Met Gln Pro Asn Glu Ser Lys Glu Thr Thr Glu Ser Leu
            1460                1465                1470
Glu Ile Thr Trp Arg Pro Glu Ile Tyr Pro Glu Thr Ala Glu Pro Phe
        1475                1480                1485
```

```
Ser Ser Gly Glu Pro Asp Ile Phe Pro Thr Ala Ser Ile His Glu Gly
    1490                1495                1500
Glu Ala Thr Glu Gly Pro Asp Ser Ile Thr Glu Lys Asn Pro Glu Leu
1505                1510                1515                1520
Asp His Leu Val His Glu His Ala Glu Ser Val Pro Leu Phe Pro Glu
                1525                1530                1535
Glu Ser Ser Gly Asp Ala Ala Ile Asp Gln Glu Ser Gln Lys Ile Ile
            1540                1545                1550
Phe Ser Gly Ala Thr Glu Gly Thr Phe Gly Glu Glu Ala Glu Lys Ser
        1555                1560                1565
Ser Thr Thr His Thr Pro Ser Met Val Ala Ser Ser Val Ser Ala Pro
    1570                1575                1580
Val Ser Glu Asp Ala Ser Phe Ile Leu Thr Gly Thr Pro Gln Ser Asp
1585                1590                1595                1600
Glu Pro Leu Ser Thr Val Glu Ser Trp Val Glu Ile Thr Pro Arg His
                1605                1610                1615
Thr Val Glu Phe Ser Gly Ser Pro Ser Ile Pro Ile Pro Glu Gly Ser
            1620                1625                1630
Gly Glu Ala Glu Glu Asp Lys Asp Lys Ile Phe Ala Met Ile Thr Asp
        1635                1640                1645
Leu Ser Gln Arg Asn Thr Thr Asp Pro Arg Val Thr Ser Asp Thr Ser
    1650                1655                1660
Lys Ile Met Ile Thr Glu Ser Leu Val Asp Val Pro Thr Thr Thr Ile
1665                1670                1675                1680
Tyr Ser Ile Ser Glu Gln Val Ser Ala Val Val Pro Thr Lys Phe Val
                1685                1690                1695
Arg Glu Thr Asp Thr Tyr Glu Trp Val Phe Ser Pro Pro Leu Glu Glu
            1700                1705                1710
Thr Thr Arg Lys Glu Glu Glu Lys Gly Thr Thr Gly Thr Ala Ser Thr
        1715                1720                1725
Val Glu Val His Ser Pro Thr Gln Arg Leu Asp Gln Phe Val Ser Pro
    1730                1735                1740
Ser Glu Leu Glu Ser Ser Ser Glu Thr Pro Pro Asp Asp Ser Ala Ala
1745                1750                1755                1760
Ala Thr Arg Lys Ser Phe Thr Ser Gln Met Thr Pro Thr Gln Ser Glu
                1765                1770                1775
Arg Glu Thr Thr Ser Ser Thr Val Val Phe Lys Glu Thr Glu Val Leu
            1780                1785                1790
Asp Asn Leu Ala Ala Gln Thr Thr Asp Pro Ser Leu Ser Ser Gln Pro
        1795                1800                1805
Gly Val Leu Glu Val Ser Pro Thr Val Pro Gly Ser Pro Val Ser Leu
    1810                1815                1820
Phe Met Glu Gln Gly Ser Gly Glu Ala Ala Val Asp Pro Glu Thr Thr
1825                1830                1835                1840
Thr Val Ser Ser Leu Ser Leu Asn Ile Glu Pro Glu Ile Leu Ala Lys
                1845                1850                1855
Glu Glu Ala Ala Gly Ala Trp Ser Pro Asn Val Glu Thr Val Phe Pro
            1860                1865                1870
Phe Glu Pro Thr Glu Gln Val Leu Ser Thr Ala Val Asp Arg Glu Val
        1875                1880                1885
Ala Glu Thr Ile Ser Gln Thr Ser Lys Glu Asn Leu Val Ser Glu Ile
    1890                1895                1900
Ser Gly Glu Pro Thr His Arg Ala Glu Ile Lys Gly Phe Ser Thr Asp
1905                1910                1915                1920
Phe Pro Leu Glu Glu Asp Phe Ser Gly Asp Phe Arg Glu Tyr Ser Thr
                1925                1930                1935
Val Ser Tyr Pro Ile Thr Lys Glu Glu Ile Val Met Met Glu Gly Ser
            1940                1945                1950
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Gly Asp Ala Ala Phe Lys Asp Thr Gln Met Leu Pro Ser Val Thr Pro
        1955                1960                1965
Thr Ser Asp Leu Ser Asn His Thr Ala Asp Ser Glu Glu Pro Gly Ser
    1970                1975                1980
Thr Leu Val Ser Thr Ser Ala Phe Pro Trp Glu Glu Phe Thr Ala Ser
1985                1990                1995                2000
Ala Glu Gly Ser Gly Glu Pro Leu Leu Ser Val Ser Ser Ser Val Asp
                2005                2010                2015
Gln Val Phe Pro Ser Ala Ala Gly Lys Ala Ser Gly Thr Asp Ser Pro
            2020                2025                2030
Phe Ile Asp Gln Arg Leu Gly Glu Glu Gly Ala Ile Asn Glu Thr Asp
        2035                2040                2045
Gln Arg Ser Thr Ile Leu Pro Thr Ala Glu Ala Glu Ser Thr Lys Ala
    2050                2055                2060
Ser Thr Glu Glu Gly Glu Val Lys Glu Asn His Thr Val Ser Met Asp
2065                2070                2075                2080
Phe Pro Pro Thr Val Glu Pro Asp Glu Leu Trp Pro Arg Gln Glu Val
                2085                2090                2095
Asn Pro Val Arg Gln Gly Asn Gly Ser Glu Ile Val Ser Glu Glu Lys
            2100                2105                2110
Thr Gln Glu Gln Glu Ser Phe Glu Pro Leu Gln Ser Ser Val Ala Pro
        2115                2120                2125
Glu Gln Thr Thr Phe Asp Ser Gln Thr Phe Pro Glu Pro Gly Leu Gln
    2130                2135                2140
Thr Thr Gly Tyr Phe Thr Leu Thr Thr Lys Lys Thr Tyr Ser Thr Asp
2145                2150                2155                2160
Glu Arg Met Glu Glu Glu Val Ile Ser Leu Ala Asp Val Ser Thr Pro
                2165                2170                2175
Thr Leu Asp Ser Lys Gly Leu Val Leu Tyr Thr Thr Leu Pro Glu Val
            2180                2185                2190
Thr Glu Lys Ser His Phe Phe Leu Ala Thr Ala Ser Val Thr Glu Ser
        2195                2200                2205
Val Pro Ala Glu Ser Val Ile Ala Gly Ser Thr Ile Lys Glu Glu Glu
    2210                2215                2220
Ser Ile Lys Pro Phe Pro Lys Val Thr Ser Pro Ile Ile Lys Glu Ser
2225                2230                2235                2240
Asp Thr Asp Leu Ile Phe Ser Gly Leu Gly Ser Gly Glu Glu Val Leu
                2245                2250                2255
Pro Thr Leu Gly Ser Val Asn Phe Thr Glu Ile Glu Gln Val Leu Ser
            2260                2265                2270
Thr Leu Tyr Pro Leu Thr Ser Gln Val Gln Ser Leu Glu Ala Ser Ile
        2275                2280                2285
Leu Asn Asp Thr Ser Gly Asp Tyr Glu Gly Met Glu Asn Val Ala Asn
    2290                2295                2300
Glu Met Arg Pro Leu Ile Ser Lys Thr Asp Ser Ile Phe Glu Asp Gly
2305                2310                2315                2320
Glu Thr Ala Ser Ser Thr Thr Leu Pro Glu Ile Leu Ser Asp Ala Arg
                2325                2330                2335
Thr Glu Gly Pro Phe Thr Ala Pro Leu Thr Phe Ser Thr Gly Pro Gly
            2340                2345                2350
Gln Pro Gln Asn Gln Thr His Arg Arg Ala Glu Glu Ile Gln Thr Ser
        2355                2360                2365
Arg Pro Gln Pro Leu Thr Asp Gln Val Ser Ser Glu Asn Ser Val Thr
    2370                2375                2380
Ala Glu Thr Lys Glu Thr Ala Thr Pro Ala Thr Asp Phe Leu Ala Arg
2385                2390                2395                2400
Thr Tyr Asp Leu Glu Met Ala Lys Gly Phe Val Thr Pro Thr Pro Lys
                2405                2410                2415
```

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Pro Ser Asp Leu Phe Tyr Glu His Ser Gly Glu Gly Ser Gly Glu Leu
            2420                2425                2430
Asp Ala Val Gly Ala Glu Val His Ala Ser Gly Met Thr Gln Ala Thr
        2435                2440                2445
Arg Gln Gly Ser Thr Thr Phe Val Ser Asp Arg Ser Leu Glu Lys His
    2450                2455                2460
Pro Lys Val Pro Ser Val Glu Ala Val Thr Val Asn Gly Phe Pro Thr
2465                2470                2475                2480
Val Ser Met Val Leu Pro Leu His Pro Glu Gln Arg Glu Gly Ser Pro
                2485                2490                2495
Glu Ala Thr Gly Thr Pro Ala Ser Thr Ala Ser Tyr Glu Lys Ala Thr
            2500                2505                2510
Glu Gly Ala Ala Asp Ser Phe Gln Asp His Phe Trp Gly Phe Lys Asp
        2515                2520                2525
Ser Thr Leu Lys Pro Asp Lys Arg Lys Ala Thr Glu Ser Ile Ile Ile
    2530                2535                2540
Asp Leu Asp Lys Glu Asp Lys Asp Leu Ile Leu Thr Met Thr Glu Ser
2545                2550                2555                2560
Thr Ile Leu Glu Ile Ile Pro Glu Leu Thr Ser Asp Lys Asn Thr Val
                2565                2570                2575
Ile Asp Ile Asp His Thr Lys Pro Ile Tyr Glu Asp Ile Leu Gly Met
            2580                2585                2590
Gln Thr Asp Leu Asp Pro Glu Val Pro Ser Gly Pro Pro Asp Ser Ser
        2595                2600                2605
Glu Glu Ser Thr Gln Val Gln Glu Lys Tyr Glu Ala Ala Val Asn Leu
    2610                2615                2620
Ser Ser Thr Glu Glu Asn Phe Glu Ala Ser Gly Asp Ile Leu Leu Ala
2625                2630                2635                2640
Asn Tyr Thr Gln Ala Thr Pro Glu Ser Lys Ala Pro Glu Asp Arg Asn
                2645                2650                2655
Pro Leu Asp His Thr Asp Phe Ile Phe Thr Thr Gly Ile Pro Ile Leu
            2660                2665                2670
Ser Ser Glu Thr Glu Leu Asp Val Leu Leu Pro Thr Ala Thr Ser Leu
        2675                2680                2685
Pro Ile Pro Ser Lys Ser Ala Thr Val Asn Pro Glu Ser Lys Thr Glu
    2690                2695                2700
Ala Lys Thr Leu Glu Asp Ile Phe Glu Ser Ser Thr Leu Ser Asp Gly
2705                2710                2715                2720
Gln Ala Ile Ala Asp Gln Ser Glu Val Ile Ser Thr Leu Gly Tyr Leu
                2725                2730                2735
Glu Arg Thr Gln Asn Glu Asp Glu Ala Lys Lys Tyr Val Ser Pro Ser
            2740                2745                2750
Phe Gln Pro Glu Phe Ser Ser Gly Ala Glu Glu Ala Leu Thr Asp Pro
        2755                2760                2765
Thr Pro Tyr Val Ser Ile Gly Thr Thr Tyr Leu Thr Ala Gln Ser Leu
    2770                2775                2780
Thr Glu Ala Pro Asp Val Met Glu Gly Ala Arg Leu Pro Asp Ser Ile
2785                2790                2795                2800
Asp Thr Ser Thr Val Ser Ala Phe Ser Glu Leu Leu Ser Gln Thr Pro
                2805                2810                2815
Ser Phe Pro Pro Leu Ser Ile His Leu Gly Ser Gly Asp Ser Glu His
            2820                2825                2830
Ser Glu Asp Leu Gln Pro Ser Ala Leu Pro Ser Thr Asp Ala Ser Thr
        2835                2840                2845
Pro Pro Val Ser Ser Gly Glu Leu Ala Asn Ile Glu Ala Thr Phe Lys
    2850                2855                2860
Pro Ser Ser Glu Glu Asp Phe Tyr Ile Thr Glu Pro Pro Ser Leu Pro
2865                2870                2875                2880
```

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Pro Asp Thr Glu Pro Ser Glu Asp Glu Ser Lys Pro Lys Leu Leu Glu
                2885                2890                2895
Pro Thr Glu Ala Ser Ala Thr Glu Leu Ile Ala Gln Glu Glu Ile Glu
            2900                2905                2910
Ile Phe Gln Asn Ser Asp Asn Thr Thr Ser Val Gln Val Ser Gly Glu
        2915                2920                2925
Ala Val Lys Val Phe Pro Ser Ile Glu Thr Pro Glu Ala Glu Ala Ile
    2930                2935                2940
Val Thr Ala Ala Ser Glu Thr Lys Leu Glu Gly Ala Thr Leu Arg Pro
2945                2950                2955                2960
His Ser Thr Ser Ala Ser Val Ile His Gly Val Glu Ala Gly Val Val
                2965                2970                2975
Pro Gln Pro Ser Pro Gln Thr Ser Glu Arg Pro Thr Ile Leu Ser Pro
            2980                2985                2990
Leu Glu Ile Ser Pro Glu Thr Gln Ala Ala Leu Ile Arg Gly Glu Asp
        2995                3000                3005
Ser Thr Val Ala Ala Pro Lys Gln Gln Val Pro Thr Arg Met Leu Asp
    3010                3015                3020
Ser Asn Lys Gln Ala Thr Leu Ser Thr Thr Glu Leu Asn Thr Glu Leu
3025                3030                3035                3040
Ala Thr Pro Ser Phe Pro Leu Leu Glu Thr Ser Asn Glu Thr Ser Phe
                3045                3050                3055
Leu Ile Gly Ile Asn Glu Glu Ser Val Glu Gly Thr Ala Val Tyr Leu
            3060                3065                3070
Pro Gly Pro Asp Arg Cys Lys Met Asn Pro Cys Leu Asn Gly Gly Thr
        3075                3080                3085
Cys Tyr Pro Thr Glu Thr Ser Tyr Val Cys Thr Cys Val Pro Gly Tyr
    3090                3095                3100
Ser Gly Asp Arg Cys Glu Leu Asp Phe Asp Glu Cys His Ser Asn Pro
3105                3110                3115                3120
Cys Arg Asn Gly Ala Thr Cys Ile Asp Gly Phe Asn Thr Phe Arg Cys
                3125                3130                3135
Leu Cys Leu Pro Ser Tyr Val Gly Ala Leu Cys Glu Gln Asp Thr Glu
            3140                3145                3150
Thr Cys Asp Tyr Gly Trp His Lys Phe Gln Gly Gln Cys Tyr Lys Tyr
        3155                3160                3165
Phe Ala His Arg Arg Thr Trp Asp Ala Ala Glu Arg Glu Cys Arg Leu
    3170                3175                3180
Gln Gly Ala His Leu Thr Ser Ile Leu Ser His Glu Glu Gln Met Phe
3185                3190                3195                3200
Val Asn Arg Val Gly His Asp Tyr Gln Trp Ile Gly Leu Asn Asp Lys
                3205                3210                3215
Met Phe Glu His Asp Phe Arg Trp Thr Asp Gly Ser Thr Leu Gln Tyr
            3220                3225                3230
Glu Asn Trp Arg Pro Asn Gln Pro Asp Ser Phe Phe Ser Thr Gly Glu
        3235                3240                3245
Asp Cys Val Val Ile Ile Trp His Glu Asn Gly Gln Trp Asn Asp Val
    3250                3255                3260
Pro Cys Asn Tyr His Leu Thr Tyr Thr Cys Lys Lys Gly Thr Val Ala
3265                3270                3275                3280
Cys Gly Gln Pro Pro Val Val Glu Asn Ala Lys Thr Phe Gly Lys Met
                3285                3290                3295
Lys Pro Arg Tyr Glu Ile Asn Ser Leu Ile Arg Tyr His Cys Lys Asp
            3300                3305                3310
Gly Phe Ile Gln Arg His Leu Pro Thr Ile Arg Cys Leu Gly Asn Gly
        3315                3320                3325
Arg Trp Ala Met Pro Lys Ile Thr Cys Leu Asn Pro Ser Ala Tyr Gln
    3330                3335                3340
```

```
Arg Thr Tyr Ser Lys Lys Tyr Phe Lys Asn Ser Ser Ser Ala Lys Asp
3345                3350                3355                3360
Asn Ser Ile Asn Thr Ser Lys His Asp His Arg Trp Ser Arg Arg Trp
                3365                3370                3375
Gln Glu Ser Arg Arg
            3380
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<210> 300
<211> 3562
<212> PRT
<213> Gallus gallus

<220>
<223> CHICKEN VERSICAN Q90953

<400> 300

```
Met Leu Leu Asn Ile Lys Ser Ile Ile Trp Met Cys Ser Thr Leu Ala
 1               5                  10                  15
Ile Thr Tyr Met Leu Pro Lys Val Lys Ala Glu Lys Lys Thr Leu Val
            20                  25                  30
Lys Gly Ser Leu Ser Gly Thr Ser Val Leu Pro Cys Phe Phe Ser Thr
        35                  40                  45
Thr Pro Thr Ile Ala Ser Ser Tyr Ala Ala Glu Tyr Leu Arg Ile Lys
    50                  55                  60
Trp Ser Lys Val Glu Leu Asp Lys Ser Gly Lys Asp Ala Lys Glu Thr
65                  70                  75                  80
Thr Val Leu Val Ala Gln Asn Gly Asn Ile Lys Ile Gly Gln Asn Tyr
                85                  90                  95
Lys Asp Arg Val Ser Val Pro Thr His Ser Glu Glu Thr Gly Asp Ala
            100                 105                 110
Ser Leu Thr Phe Ser Arg Leu Arg Ala Ser Asp Ala Gly Val Tyr Arg
        115                 120                 125
Cys Asp Val Met Tyr Gly Val Glu Asp Thr Gln Gly Ile Val Ser Leu
    130                 135                 140
Ala Val Asp Gly Val Val Phe His Tyr Arg Ala Ala Thr Ser Arg Tyr
145                 150                 155                 160
Thr Leu Asn Phe Thr Gln Ala Gln Gln Thr Cys Leu Asp Asn Gly Ala
                165                 170                 175
Val Ile Ala Ser Pro Glu Gln Leu Lys Ala Ala Tyr Glu Asp Gly Phe
            180                 185                 190
Glu Gln Cys Asp Ala Gly Trp Leu Ser Asp Gln Thr Val Arg Tyr Pro
        195                 200                 205
Ile Arg His Pro Arg Ile Gly Cys Phe Gly Asp Lys Met Gly Lys Lys
    210                 215                 220
Gly Val Arg Thr Tyr Gly Arg Arg Phe Pro Asn Glu Thr Tyr Asp Val
225                 230                 235                 240
Tyr Cys Tyr Val Glu His Met Gln Asp Glu Val Val His Val Ser Val
                245                 250                 255
Pro Glu Lys Leu Thr Phe Glu Glu Ala Lys Glu Leu Cys Arg Lys Arg
            260                 265                 270
Asp Gly Val Leu Ala Ser Val Gly Asn Met Tyr Val Ala Trp Arg Asn
        275                 280                 285
Gly Phe Asp Gln Cys Asp Tyr Gly Trp Leu Ala Asp Gly Ser Val Arg
    290                 295                 300
Tyr Pro Ala Ser Val Ala Arg Pro Gln Cys Gly Gly Gly Leu Leu Gly
305                 310                 315                 320
```

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Val Arg Thr Leu Tyr Arg Tyr Glu Asn Gln Thr Gly Phe Pro Tyr Pro
                325                 330                 335
Asp Ser Lys Phe Asp Ala Tyr Cys Tyr Glu Arg Lys Lys Ile Val Ser
            340                 345                 350
Glu Pro Thr Thr Val Lys Leu Val Thr Thr Leu Lys Thr Asp Ser Val
        355                 360                 365
Glu Leu Ser Ser Ala Lys Val Thr Leu Lys Pro Ser Val Phe Glu Ser
    370                 375                 380
Ser Val Thr Glu Val Ala Val Thr Lys Thr Lys Val Pro Ala Trp Glu
385                 390                 395                 400
Glu Ala Thr Leu Glu Thr Glu Asp Thr Lys Met Thr Thr Glu Val Ala
                405                 410                 415
Glu Glu Lys Arg Glu Met Glu Val Leu Met Glu Asn Ile Lys Leu Thr
            420                 425                 430
Thr Leu Leu Pro Gln Thr Val Thr Asp Gly Glu Ile Ser Pro Tyr Asp
        435                 440                 445
Thr Leu Gly Arg Thr Glu Tyr Asp Val Ser Pro Arg Leu Thr Glu Ser
    450                 455                 460
Thr Ser Ala Ala Leu Glu Val Glu His Thr Tyr Ser Glu Ala Glu Leu
465                 470                 475                 480
Ser Glu Glu Gln Gly Arg Ser Glu Ser Thr Glu Asp Ala Phe Leu Thr
                485                 490                 495
Ser Val Val Phe Gln Asp Ser Thr Ala Val Ala Lys Ser Ser Thr Gly
            500                 505                 510
Ser Trp Glu Asp Ile Glu Thr Gly Asp Thr Gln Lys His Asp Gly Asp
        515                 520                 525
Asn Gln Thr Glu Gln Ile Glu Val Gly Pro Val Met Thr Ala Thr Asp
    530                 535                 540
Ser Leu Val Pro Ala Ser Gln Arg Glu Leu Pro Arg Thr Gly Ser Ser
545                 550                 555                 560
Val Ser Leu Thr Lys Glu Asn Leu Tyr Leu Gly Ser His Ser Thr Lys
                565                 570                 575
Glu Pro Thr Lys Lys Ser Met Glu Ala Lys Ser Asp Lys Lys Leu Thr
            580                 585                 590
Thr Val Val Ile Pro Lys Ala Leu Phe Thr Asp Gln Tyr Asp Leu Thr
        595                 600                 605
Thr Gly Gly Glu Gly Arg Glu Ser Met Tyr Thr Val Met Pro Asp Arg
    610                 615                 620
Val Ser Gly Val Ala Leu Val Ser Ile Pro Glu Ser Asp Val Pro Ala
625                 630                 635                 640
Val Ser Glu Thr Leu Met Asp Glu Leu Ala Val Thr Thr Gly Gln Ser
                645                 650                 655
Ser Thr Ala Asp Glu Ser Thr Pro Phe Ile Lys Phe Ser Ser Ser Ala
            660                 665                 670
Thr Glu Leu Asp Asn Glu Ala Ser Ala Glu Gly Ser Arg Glu Asp Leu
        675                 680                 685
Lys Asp Val His Leu Thr Thr Ser Ser Gly Ile Pro Val Ser Phe Thr
    690                 695                 700
Leu Phe Thr Ala Asn Glu Thr Gly Ser Glu Val Thr Ala Leu Ser Glu
705                 710                 715                 720
Ser Thr Ser Ala Pro Gln Lys Phe Glu Glu Gly Ile Thr Ser Val Leu
                725                 730                 735
His Ser Ser Gln Gln Thr Glu Gly Ser Ala Ile Leu Glu Lys Gln Glu
            740                 745                 750
Lys Thr Lys Glu Pro Glu Met Ser Thr Ile Asp Ala Lys Val Leu Tyr
        755                 760                 765
Ile Thr Thr Val Val Pro Ala Ser Val Thr Ala Gly Ser Glu Gly Arg
    770                 775                 780
```

```
Phe Gly Ser Glu Lys Phe Thr His Thr Pro Pro Val Ser Gly Met Trp
785                 790                 795                 800
Leu Gln Thr Asp Lys Asp Gln Val Tyr Met Thr Glu Glu Thr Ser His
                805                 810                 815
Thr Lys Arg Ile Glu Leu Asp Thr Glu Asp Asp Ile Ser Gly Met Glu
            820                 825                 830
Pro Thr Ser Ser Pro Gly Gln Ile Ile Glu Tyr Thr Lys His Leu Gly
        835                 840                 845
Ala Pro Val Ser Ala Val Thr Asp Glu Thr Lys Thr Ser Met Glu Thr
    850                 855                 860
Ala Glu Thr Glu Ser Asp Glu Glu Val Val Ser Ala Asp Phe Asp Gln
865                 870                 875                 880
Thr Lys Gly Thr Thr Glu Val Phe His Thr Ser Ser Ser Leu Asp Leu
                885                 890                 895
Glu Lys Phe Thr Leu Ser Lys Ile Pro Glu Asp Glu Ser Ser Ala Thr
            900                 905                 910
Val Lys Ser Phe Ser Ser Ser Ser Gly Thr Val Leu Pro Thr Ala Val
        915                 920                 925
Ala Thr Val Leu Glu Val Thr Asp His Glu Ala Asp Glu Thr Ser Gly
    930                 935                 940
Tyr Val Leu Asn Met Thr Phe Ser Thr Pro Glu Gly Glu Gln Arg Lys
945                 950                 955                 960
Ala Thr Glu Lys Ser Pro Ala Thr Ser Ala Glu Asp Glu Val Ser Thr
                965                 970                 975
Gly Thr Glu Ile Ser Lys Tyr Thr Met Thr Glu Gly Gly Gln Ile Ser
            980                 985                 990
Ser Val Thr Ser Ala Glu Lys Glu Ser Val Ala Ala Leu Gln Glu Arg
        995                 1000                1005
Glu Glu Gln Pro Ser Val Gly Leu Pro Glu Thr Lys Glu Pro Phe Lys
    1010                1015                1020
Phe Thr Asp Val Thr Glu Ile Glu Thr Thr Val Pro Gln Arg Glu Gly
1025                1030                1035                1040
Asp Thr Ser Leu Val Pro Val Thr Val Gly Ser Glu Asp Ile Gly Glu
                1045                1050                1055
Met Gln Val Thr Asp His Thr Ser Phe Asp Ser Ile Ile His Thr Glu
            1060                1065                1070
Ala Thr Val Thr Ser Thr Lys Ala Ser Glu Val Phe Pro Lys Glu Leu
        1075                1080                1085
Ser Thr Lys Asp Gln Asp Arg Glu Leu Gly Thr Ala Met Gly Ser Thr
    1090                1095                1100
Leu Pro Val Thr Ser Val Gln Met His Glu Gln Lys Thr Thr Ala Gly
1105                1110                1115                1120
Phe Glu Ser Pro Gln Thr Thr Thr Gln Glu Lys His Asp Glu Met Gly
                1125                1130                1135
Ser Ala Tyr Asp Glu Met Tyr Pro Ala Thr Glu Leu Ser Val Pro Ala
            1140                1145                1150
Leu Met Leu Thr Glu Tyr Gly Gln Val Ser Gly Pro Val Glu Thr Ser
        1155                1160                1165
Thr Arg Ser Leu His Leu Thr Gly Thr Pro Lys Ala Glu Thr Ala Thr
    1170                1175                1180
Asp Gln Glu Glu Lys Ile Thr Glu Ala Val Pro Val Thr Phe Gly Thr
1185                1190                1195                1200
Gln Ala Lys Val Tyr Glu Ser Lys Gly Thr Thr Thr Arg Glu Glu Asp
                1205                1210                1215
Arg Asp Val Gly Ser Trp Asn Ser Val Leu Pro Pro His Thr Met Leu
            1220                1225                1230
Ser Ser Pro Ser Thr Ala Gly Ser Ile Ser Leu Leu Thr Leu Gly Ala
        1235                1240                1245
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Ser Pro Ser Gln Thr Pro Glu Gly Ser Gly Ile Ser Glu Glu Leu Glu
    1250                1255                1260
Glu Val Lys Thr Val Pro Phe Ser Ser Arg Ala Thr Asp Lys Thr Thr
1265                1270                1275                1280
Val Ile Ser Asp Leu Thr Thr Ser Ser Ile Ser Ala Val Asp Lys Ile
                1285                1290                1295
Gln Pro Thr Ser Ala Ser Lys Pro Phe Val Ser Ser Lys Ser Pro Arg
            1300                1305                1310
Ile Ile Pro Glu Glu Asp Glu Glu Val Thr Ser Ser Asp Ile Ile Val
        1315                1320                1325
Ile Asp Glu Ser Ile Ser Pro Ser Lys Ala Ser Ala Glu Asp Asp Leu
    1330                1335                1340
Thr Gly Lys Met Val Glu Pro Glu Ile Asp Lys Glu Tyr Phe Thr Ser
1345                1350                1355                1360
Ser Thr Ala Thr Ala Val Ala Arg Pro Thr Ala Pro Pro Thr Val Met
                1365                1370                1375
Glu Ala Thr Glu Ala Leu Gln Pro Gln Glu Val Ser Pro Thr Ser His
            1380                1385                1390
Pro Asp Ser Gly Thr Asp Ile Arg Leu Tyr Val Ile Gln Ile Thr Gly
        1395                1400                1405
Asn Asp Thr Asp His Pro Val Asn Glu Phe Leu Asp Leu Phe Ser Arg
    1410                1415                1420
His Ile Leu Pro His Ala Val Asp Glu Thr His Thr Asp Ala Glu Ser
1425                1430                1435                1440
Ala Gln Thr Glu Pro Cys Thr Ser Asp Ser Val Gln Asp Ser Ser Glu
                1445                1450                1455
Tyr Ile Ile Leu Asp Pro Phe Phe Pro Asn Phe Met Asp Phe Glu Glu
            1460                1465                1470
Glu Glu Glu Asp Cys Glu Asn Thr Thr Asp Val Thr Thr Pro Pro Ala
        1475                1480                1485
Leu Gln Phe Ile Asn Gly Lys Gln Gln Val Thr Ser Ala Pro Lys Ser
    1490                1495                1500
Thr Lys Ala Glu Glu Ala Arg Ser Asp Gln Ile Glu Ser Val Ala His
1505                1510                1515                1520
Ser Lys Asn Val Thr Phe Ser Gln Ile Asn Glu Thr Asn Thr Phe Ile
                1525                1530                1535
Ile Ser Glu Thr Glu Ala Ser Gly Thr Met Gln Pro Ser Lys Ala Gly
            1540                1545                1550
Glu Val Met Gly Ala Phe Glu Val Thr Gln Pro Thr Ala Asp Val Ala
        1555                1560                1565
Met Leu Glu Pro Val Tyr Ser Gly Glu Ser Glu Val Thr Thr Thr Asp
    1570                1575                1580
Lys Tyr Leu Glu Ile Thr Ser Val Tyr Glu Gln Ser Pro Lys Lys Asn
1585                1590                1595                1600
Lys Glu Thr Val Met Trp His Gly Thr Glu Glu Ser Ser Thr Lys Asp
                1605                1610                1615
Thr Lys Asn Leu Leu Leu Ile Thr Asn Glu Ser Ser Gly Asp Gly Ser
            1620                1625                1630
Thr Glu Ser Asp Leu Ser Arg Ser Val Phe Thr Glu Ile Leu Thr Met
        1635                1640                1645
Ser Ser His Glu Asp Ser Glu Lys Ile Ser His Thr Thr Ser Val Pro
    1650                1655                1660
Thr Ile Leu Ser Val Glu Arg Ser Ala Val Thr Ala Ala Pro Ser Ala
1665                1670                1675                1680
Asp Ser Asp Thr Ala Thr Val Gly Ile Asp Val Lys Asp Leu Ile Pro
                1685                1690                1695
Lys Gly Gly Thr Ala Thr Pro Gly Asn Tyr Tyr Lys Ser Thr Ile Lys
            1700                1705                1710
```

```
Leu Asp Ala Glu Phe Pro Phe Glu Ser Asn Pro Glu Ala Thr Ser His
        1715                1720                1725
Thr Thr Lys Pro Asp Met Thr Ala Ser Ser Phe Ile Val Leu Glu Gly
    1730                1735                1740
Ser Gly Asp Val Glu Glu Asn Ser Thr Leu Ala Ser Ala Met Thr Thr
1745                1750                1755                1760
Glu Thr Ala Val Ala Glu Thr Leu Ser Val Gln Asp Thr Ser Leu Gly
                1765                1770                1775
Ser Gly Thr Val Leu Pro Thr Glu Ile Ser Val Thr Ile Ser Glu Ile
            1780                1785                1790
Thr Pro Ala Leu Pro Gly Gly Thr Arg Ile Leu Tyr Ser Thr Phe Asp
        1795                1800                1805
Gln Ser Ser Glu Ala Thr Val Ser Thr Asn Phe Val Ser Glu Leu Ile
    1810                1815                1820
Met Glu Gln Val Val Gly Ser Ser Val Ala Thr Glu Lys Lys Val Glu
1825                1830                1835                1840
Asp Glu Lys Glu Val Gln Thr Thr Val Tyr Ser Ser Gln Glu Ile Ser
                1845                1850                1855
Thr Thr Asp Ala Lys Gly Lys Ser Glu Leu Asp Glu Phe Gly Ser Thr
            1860                1865                1870
Thr Asn Glu Val Arg Thr Val Ser Gln Glu Pro Thr Pro Leu Arg Glu
        1875                1880                1885
Ile Val Pro Ile Thr Gly Thr Met His Ser Glu Ile Lys Lys Val Thr
    1890                1895                1900
Ala Thr Pro Phe Leu Arg Glu Lys Leu Phe Ile Asn Glu Gly Ser Ala
1905                1910                1915                1920
Glu Glu Pro Ala Asp Leu Phe Ala Gly Ser Pro Thr Arg Lys Val Val
                1925                1930                1935
Ser Thr Asp Ser Pro Phe Thr Asp Ser Gly Ser Gly Asp Ile Asp Val
            1940                1945                1950
Ile Thr Glu Ser Ala Thr Leu Thr Ser Val Pro Ser Arg Ser Val Ile
        1955                1960                1965
Glu Thr Gln Thr Val Lys His Glu Gly Asn Ile Asn Val Ile Ser Val
    1970                1975                1980
Ser Leu Lys Asn Thr Thr Thr Glu Tyr Glu Glu His Ile Gly Thr Gly
1985                1990                1995                2000
Gly Pro Val Thr Ser Val Ser Ser Thr Gly Ser Asp Gly Leu Thr Glu
                2005                2010                2015
Glu Ser Glu Val Ala Ile Glu Met Ser Glu Asn Val Phe Ser Thr Glu
            2020                2025                2030
Asn Gln Gly Glu Pro Thr Gln Glu Ala Val Pro Thr Tyr Thr Ala Pro
        2035                2040                2045
Ser Asp Ile Lys Ser Arg Leu Gly Ser Arg Arg Glu Val Thr Ser His
    2050                2055                2060
Val Thr Pro Val Ile Arg Thr Lys Asp Leu Glu Thr Ala Glu Val Thr
2065                2070                2075                2080
Ser Ser Pro Glu Ser Val Val Asn Asn Ser Thr Leu Asp Thr Met Val
                2085                2090                2095
Thr His Gly Thr Ile Arg Ala Val Ala Glu Ser Thr Glu Ser Lys Lys
            2100                2105                2110
Gly Lys Gly Ser Phe Ser Ala Val Ser Leu Gly Lys Ile Leu Met Ile
        2115                2120                2125
Glu His Gly Ser Gly Glu Glu Leu Lys Val Asp Ser Ser Thr Thr Lys
    2130                2135                2140
Leu Met Ser Asn Gly Pro Thr Glu Lys Leu Leu Gly Ser His Phe Ser
2145                2150                2155                2160
Phe Phe Asp Gln Gly Ser Gly Glu Ala Glu Thr Leu Thr Glu Ser Phe
                2165                2170                2175
```

```
Thr Lys Ala Ser Val Ser Pro Thr Gly Lys Pro Glu Pro Gln Glu Gln
            2180                2185                2190
Tyr Gly Arg Lys Thr Val Ser Met Pro Ser Ala Val Val His Ala Tyr
        2195                2200                2205
Thr Ala Glu Pro Asn Glu Leu Val Thr Ser Thr Glu His Asp Ile Thr
    2210                2215                2220
Ser Leu Gln Thr Val Thr Asp Thr Glu Met Glu Glu Lys Ala Ala Asn
2225                2230                2235                2240
Glu Leu Thr Val Thr Ser Phe Ala Thr Asn Leu Pro Leu Ser Glu Asp
                2245                2250                2255
Val His Ser Trp Glu Asp Arg Pro Arg Glu Ile Leu Pro Lys Ala Ile
            2260                2265                2270
Glu Ser Ser Gly Glu Ala Thr Glu Asp Pro Phe Phe Ile Ser Thr Gln
        2275                2280                2285
Ala Asn His Glu His Val Glu Phe Leu Ser Val Pro Thr Ile Arg Pro
    2290                2295                2300
His Ser Glu Glu Asn Lys Val Glu Ala Glu Ser Asp Glu Lys Ile Leu
2305                2310                2315                2320
Leu Pro Phe Asn Asn Asp Arg Val Thr Glu Ser Ala Val Ile Glu Arg
                2325                2330                2335
Lys Tyr Leu Ser Ser Pro Phe Thr Asp Thr Glu Gln Glu Glu Glu Leu
            2340                2345                2350
Val Gln Asn Ile Phe Pro Thr Glu Asp Ile Pro Arg Leu Phe Leu Thr
        2355                2360                2365
Pro Lys Glu Glu Lys Pro Thr Asn Asn Glu Leu Ile Ser Asp Pro Leu
    2370                2375                2380
Phe Ser Gly Gln Gly Ser Gly Asp Glu Phe Thr Val Ile Pro Ser Val
2385                2390                2395                2400
Glu Ser Leu Ala Val Lys Glu Thr Thr Asn Thr Leu Ser Pro Trp Pro
                2405                2410                2415
Phe His Pro Ala Ser Val Gly Pro Lys Leu Ser Thr Asp Lys Thr Gln
            2420                2425                2430
Val Phe Glu Ser Gly Ser Thr Asp Ser Asn Ala Glu Ile Asn Glu Glu
        2435                2440                2445
Ile Thr Thr Thr Ala Ala Glu Leu Thr Glu Thr Ala Tyr Ser Met Ala
    2450                2455                2460
Thr Ser Ser Pro Ala Leu Glu Glu Glu Ser Ser Ser His Ser Asn Ser
2465                2470                2475                2480
Lys Asp Lys Asp Ile Thr His Tyr Phe Leu Val Ile Glu Asp Pro Tyr
                2485                2490                2495
Asn Lys Glu Met Asp His Arg Arg Gly Glu Asn Gly Thr Ser Arg Pro
            2500                2505                2510
Leu Pro Thr Pro Gly Asp Val Ser Leu Glu Glu Ser Ser His Met Leu
        2515                2520                2525
Thr Thr Asp Asp Val Thr Pro Val Ser Val Ile Leu Ser Glu Thr Pro
    2530                2535                2540
Tyr Leu Glu Met Gly Lys Ser Leu Ala Thr Ser Ala Thr Lys Met Pro
2545                2550                2555                2560
Ser Arg Val Leu Pro Glu Ser Ser Gly Glu Gly Ser Gly Trp Asp Gly
                2565                2570                2575
Val Ser Asp Ser Phe Ala Pro Asp Thr Leu Thr His Ser Thr Ala Pro
            2580                2585                2590
Ser Val Met Glu Val Glu Leu Thr Ala Ser Ser His Ile Pro Gly Val
        2595                2600                2605
Tyr Ser Glu Val Met Thr Thr His Val Pro Gly Asp Gly Ser Gln Thr
    2610                2615                2620
Val Ile Thr Gly Leu Ala Ser Leu Phe Thr Glu Glu Lys Glu Ile Val
2625                2630                2635                2640
```

```
Ala Asn Arg Thr Ala Ala Asp Pro Lys Thr Gly Thr Ser Glu Glu Leu
                2645                2650                2655
Thr Ser Asp Thr Gly Met Ser Leu Asp Ile Ile Pro Val Val Asp Asp
            2660                2665                2670
Arg Arg His Val Thr Leu Asn Val Ser Val Tyr Gly Asp Ile Thr Leu
        2675                2680                2685
Ile Glu Glu Arg Leu Gln Ile Pro Ser Glu Lys Thr Thr Ile Ile Asp
    2690                2695                2700
Met Asp His Ser Lys Ser Met Pro Glu Asp Ile Ile Ser Val Gln Thr
2705                2710                2715                2720
Met Pro Asn Leu Val Ile Arg Ser Thr Gln Val Ser Asp Asp Asn Met
                2725                2730                2735
Lys Ala Glu Glu Asp Lys Tyr Asp Ser Ile Leu Asn Phe Ser Thr Val
            2740                2745                2750
Glu Glu Asn Ser Phe Gly Ser Gly Asp Asn Leu Ser Leu Thr Thr Ser
        2755                2760                2765
Ile Gln Pro Ser Ser Glu Ser Val Thr Ala Gly His Gly Pro Lys Leu
    2770                2775                2780
Val Asp Lys Asp Leu Gly Ser Gly Tyr Ala Met Gln Phe Ala Thr Glu
2785                2790                2795                2800
Thr Leu Thr Thr Thr Val Leu Asn Glu Leu Gly Ile Phe Leu Pro Thr
                2805                2810                2815
Val Pro Ser Leu Val Ser Pro His Met Pro His Glu Ser Lys Glu Ser
            2820                2825                2830
Glu Phe Glu Ala Lys His Ile Gly Arg Thr Ser Thr Thr Asp Asp Val
        2835                2840                2845
Tyr Glu Pro Tyr Thr Ser Ala Asn Asn Gln Val Ile Thr Asp Gln Ser
    2850                2855                2860
Lys Thr Met Ser Ile Ser Gly Phe Ser Gly Met Gly Gln Glu Glu Ser
2865                2870                2875                2880
Gly Asp Lys Lys Pro Met Ile Pro Ser Leu Thr Pro Asp Leu Thr Met
                2885                2890                2895
Glu Thr Glu Lys Ala Leu Thr Thr Asp Thr Phe Asp Val Ser Met Val
            2900                2905                2910
Thr Thr Gln Ser Met Ser Gln His Ala Thr Val Ser Ser Ser Ser Ser
        2915                2920                2925
Glu Glu Lys His Ser Thr Val Tyr Met Gln Thr Lys Ser Ala Ser Thr
    2930                2935                2940
Glu Tyr Glu Glu Thr Asp Ser Val Ser Leu Asn Ser Val Ser Gln Asn
2945                2950                2955                2960
Pro Lys Ser Ser Val Thr Val Trp Leu Val Asn Gly Val Ser Lys Tyr
                2965                2970                2975
Pro Glu Val Ile Ile Pro Ser Thr Ser Ser Ala Lys Asp Ser Asp Gln
            2980                2985                2990
Ser Asp His Ser Ser Asp Gly Thr Phe Lys Glu Val Ser Ser Asp Met
        2995                3000                3005
Ala Ala Thr Tyr Lys Pro Pro Thr Thr Asp Leu Asp Thr Thr Val Ser
    3010                3015                3020
Ser Leu Leu Val Phe Ser Pro Glu Pro Glu Ser Glu Ser Ile Ser Thr
3025                3030                3035                3040
Glu Ser Thr Pro His Phe Asn Lys Phe Val Thr Glu Arg Ser Glu Glu
                3045                3050                3055
Thr Glu Ser Ser Val Asn Asp Leu Ile Ile Glu Glu Asn Ala Thr Val
            3060                3065                3070
Ser Gly Asp Ser Pro Ser Ile His Asp Tyr Pro Thr Ala Phe Trp Asn
        3075                3080                3085
Phe Gly Glu Arg Thr Ser Thr Asp Val Pro Lys Leu Ser Thr Ile Glu
    3090                3095                3100
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```
Val Glu Phe Ser Ser Glu Arg Val Lys Asn Pro Ser Gln Glu Ser Asp
3105                3110                3115                3120
Arg Ser Thr Glu Arg Glu Arg Pro Arg Leu Ser Ser Ala Pro Val Ser
                3125                3130                3135
Asp Ser Pro Asn Ser Ile Glu Val Gly Val Phe Lys Pro Asp Gln Glu
            3140                3145                3150
Ala Val Thr Met Leu Thr Ser Ser Leu Glu Pro Leu Asp Arg Ser Leu
        3155                3160                3165
Glu Thr Gln Ser Ala Leu Leu Gly Pro Leu Leu Gly Gln Gln Glu Ile
    3170                3175                3180
Thr Thr Ile Ser Ser Asn Ile Ala Thr Asn Asn Thr Ala Pro Gly Asn
3185                3190                3195                3200
Asn Pro Tyr Ser Asn Glu Gln Ser Thr Ile Ser Ser Glu Leu Leu Asn
                3205                3210                3215
Thr Ile Glu Leu Val Thr Ser Ser Phe Ser Leu Pro Glu Val Thr Asn
            3220                3225                3230
Gly Ser Asp Phe Leu Ile Gly Thr Ser Val Gly Ser Val Glu Gly Thr
        3235                3240                3245
Ala Val Gln Ile Pro Gly Gln Asp Pro Cys Lys Ser Asn Pro Cys Leu
    3250                3255                3260
Asn Gly Gly Thr Cys Tyr Pro Arg Gly Ser Phe Tyr Ile Cys Thr Cys
3265                3270                3275                3280
Leu Pro Gly Phe Asn Gly Glu Gln Cys Glu Leu Asp Ile Asp Glu Cys
                3285                3290                3295
Gln Ser Asn Pro Cys Arg Asn Gly Ala Thr Cys Ile Asp Gly Leu Asn
            3300                3305                3310
Thr Phe Thr Cys Leu Cys Leu Pro Ser Tyr Ile Gly Ala Leu Cys Glu
        3315                3320                3325
Gln Asp Thr Glu Thr Cys Asp Tyr Gly Trp His Lys Phe Gln Gly Gln
    3330                3335                3340
Cys Tyr Lys Tyr Phe Ala His Arg Arg Thr Trp Asp Thr Ala Glu Arg
3345                3350                3355                3360
Glu Cys Arg Leu Gln Gly Ala His Leu Thr Ser Ile Leu Ser His Glu
                3365                3370                3375
Glu Gln Val Phe Val Asn Arg Ile Gly His Asp Tyr Gln Trp Ile Gly
            3380                3385                3390
Leu Asn Asp Lys Met Phe Glu Arg Asp Phe Arg Trp Thr Asp Gly Ser
        3395                3400                3405
Pro Leu Gln Tyr Glu Asn Trp Arg Pro Asn Gln Pro Asp Ser Phe Phe
    3410                3415                3420
Ser Ala Gly Glu Asp Cys Val Val Ile Ile Trp His Glu Asn Gly Gln
3425                3430                3435                3440
Trp Asn Asp Val Pro Cys Asn Tyr His Leu Thr Tyr Thr Cys Lys Lys
                3445                3450                3455
Gly Thr Val Ala Cys Gly Gln Pro Pro Val Val Glu Asn Ala Lys Thr
            3460                3465                3470
Phe Gly Lys Met Lys Pro Arg Tyr Glu Ile Asn Ser Leu Ile Arg Tyr
        3475                3480                3485
His Cys Lys Asp Gly Phe Ile Gln Arg His Ile Pro Thr Ile Arg Cys
    3490                3495                3500
Gln Gly Asn Gly Arg Trp Asp Met Pro Lys Ile Thr Cys Met Asn Pro
3505                3510                3515                3520
Ser Thr Tyr Gln Arg Thr Tyr Ser Lys Lys Tyr Tyr Tyr Lys His Ser
                3525                3530                3535
Ser Ser Gly Lys Gly Thr Ser Leu Asn Ser Ser Lys His Tyr His Arg
            3540                3545                3550
Trp Ile Arg Thr Trp Gln Asp Ser Arg Arg
        3555                3560
```

<210> 301
<211> 1268
<212> PRT
<213> Mus musculus

<220>
<223> Mouse Neurocan P55066

<400> 301
Met Gly Ala Gly Ser Val Trp Ala Ser Gly Leu Leu Leu Leu Trp Leu
 1   5   10   15
Leu Leu Leu Val Ala Gly Asp Gln Asp Thr Gln Asp Thr Thr Ala Thr
            20   25   30
Glu Lys Gly Leu Arg Met Leu Lys Ser Gly Ser Gly Pro Val Arg Ala
        35   40   45
Ala Leu Ala Glu Leu Val Ala Leu Pro Cys Phe Phe Thr Leu Gln Pro
    50   55   60
Arg Leu Ser Ser Leu Arg Asp Ile Pro Arg Ile Lys Trp Thr Lys Val
65   70   75   80
Gln Thr Ala Ser Gly Gln Arg Gln Asp Leu Pro Ile Leu Val Ala Lys
                85   90   95
Asp Asn Val Val Arg Val Ala Lys Gly Trp Gln Gly Arg Val Ser Leu
            100   105   110
Pro Ala Tyr Pro Arg His Arg Ala Asn Ala Thr Leu Leu Leu Gly Pro
        115   120   125
Leu Arg Ala Ser Asp Ser Gly Leu Tyr Arg Cys Gln Val Val Lys Gly
    130   135   140
Ile Glu Asp Glu Gln Asp Leu Val Thr Leu Glu Val Thr Gly Val Val
145   150   155   160
Phe His Tyr Arg Ala Ala Arg Asp Arg Tyr Ala Leu Thr Phe Ala Glu
                165   170   175
Ala Gln Glu Ala Cys Arg Leu Ser Ser Ala Thr Ile Ala Ala Pro Arg
            180   185   190
His Leu Gln Ala Ala Phe Glu Asp Gly Phe Asp Asn Cys Asp Ala Gly
        195   200   205
Trp Leu Ser Asp Arg Thr Val Arg Tyr Pro Ile Thr Gln Ser Arg Pro
    210   215   220
Gly Cys Tyr Gly Asp Arg Ser Ser Leu Pro Gly Val Arg Ser Tyr Gly
225   230   235   240
Arg Arg Asp Pro Gln Glu Leu Tyr Asp Val Tyr Cys Phe Ala Arg Glu
                245   250   255
Leu Gly Gly Glu Val Phe Tyr Val Gly Pro Ala Arg Arg Leu Thr Leu
            260   265   270
Ala Gly Ala Arg Ala Gln Cys Gln Arg Gln Gly Ala Ala Leu Ala Ser
        275   280   285
Val Gly Gln Leu His Leu Ala Trp His Glu Gly Leu Asp Gln Cys Asp
    290   295   300
Pro Gly Trp Leu Ala Asp Gly Ser Val Arg Tyr Pro Ile Gln Thr Pro
305   310   315   320
Arg Arg Arg Cys Gly Gly Pro Ala Pro Gly Val Arg Thr Val Tyr Arg
                325   330   335
Phe Ala Asn Arg Thr Gly Phe Pro Ala Pro Gly Ala Arg Phe Asp Ala
            340   345   350
Tyr Cys Phe Arg Ala His His His Thr Ala Gln His Gly Asp Ser Glu
        355   360   365

```
Ile Pro Ser Ser Gly Asp Glu Gly Glu Ile Val Ser Ala Glu Gly Pro
    370                 375                 380
Pro Gly Arg Glu Leu Lys Pro Ser Leu Gly Glu Gln Glu Val Ile Ala
385                 390                 395                 400
Pro Asp Phe Gln Glu Pro Leu Met Ser Ser Gly Glu Gly Glu Pro Pro
                405                 410                 415
Asp Leu Thr Trp Thr Gln Ala Pro Glu Glu Thr Leu Gly Ser Thr Pro
            420                 425                 430
Gly Gly Pro Thr Leu Ala Ser Trp Pro Ser Ser Glu Lys Trp Leu Phe
        435                 440                 445
Thr Gly Ala Pro Ser Ser Met Gly Val Ser Ser Pro Ser Asp Met Gly
    450                 455                 460
Val Asp Met Glu Ala Thr Thr Pro Leu Gly Thr Gln Val Ala Pro Thr
465                 470                 475                 480
Pro Thr Met Arg Arg Gly Arg Phe Lys Gly Leu Asn Gly Arg His Phe
                485                 490                 495
Gln Gln Gln Gly Pro Glu Asp Gln Leu Pro Glu Val Ala Glu Pro Ser
            500                 505                 510
Ala Gln Pro Pro Thr Leu Gly Ala Thr Ala Asn His Met Arg Pro Ser
        515                 520                 525
Ala Ala Thr Glu Ala Ser Glu Ser Asp Gln Ser His Ser Pro Trp Ala
    530                 535                 540
Ile Leu Thr Asn Glu Val Asp Glu Pro Gly Ala Gly Ser Leu Gly Ser
545                 550                 555                 560
Arg Ser Leu Pro Glu Ser Leu Met Trp Ser Pro Ser Leu Ile Ser Pro
                565                 570                 575
Ser Val Pro Ser Thr Glu Ser Thr Pro Ser Pro Lys Pro Gly Ala Ala
            580                 585                 590
Glu Ala Pro Ser Val Lys Ser Ala Ile Pro His Leu Pro Arg Leu Pro
        595                 600                 605
Ser Glu Pro Pro Ala Pro Ser Pro Gly Pro Ser Glu Ala Leu Ser Ala
    610                 615                 620
Val Ser Leu Gln Ala Ser Ser Ala Asp Gly Ser Pro Asp Phe Pro Ile
625                 630                 635                 640
Val Ala Met Leu Arg Ala Pro Lys Leu Trp Leu Leu Pro Arg Ser Thr
                645                 650                 655
Leu Val Pro Asn Met Thr Pro Val Pro Leu Ser Pro Ala Ser Pro Leu
            660                 665                 670
Pro Ser Trp Val Pro Glu Glu Gln Ala Val Arg Pro Val Ser Leu Gly
        675                 680                 685
Ala Glu Asp Leu Glu Thr Pro Phe Gln Thr Thr Ile Ala Ala Pro Val
    690                 695                 700
Glu Ala Ser His Arg Ser Pro Asp Ala Asp Ser Ile Glu Ile Glu Gly
705                 710                 715                 720
Thr Ser Ser Met Arg Ala Thr Lys His Pro Ile Ser Gly Pro Trp Ala
                725                 730                 735
Ser Leu Asp Ser Ser Asn Val Thr Met Asn Pro Val Pro Ser Asp Ala
            740                 745                 750
Gly Ile Leu Gly Thr Glu Ser Gly Val Leu Asp Leu Pro Gly Ser Pro
        755                 760                 765
Thr Ser Gly Gly Gln Ala Thr Val Glu Lys Val Leu Ala Thr Trp Leu
    770                 775                 780
Pro Leu Pro Gly Gln Gly Leu Asp Pro Gly Ser Gln Ser Thr Pro Met
785                 790                 795                 800
Glu Ala His Gly Val Ala Val Ser Met Glu Pro Thr Val Ala Leu Glu
                805                 810                 815
Gly Gly Ala Thr Glu Gly Pro Met Glu Ala Thr Arg Glu Val Val Pro
            820                 825                 830
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Ser Thr Ala Asp Ala Thr Trp Glu Ser Glu Ser Arg Ser Ala Ile Ser
        835                 840                 845
Ser Thr His Ile Ala Val Thr Met Ala Arg Ala Gln Gly Met Pro Thr
    850                 855                 860
Leu Thr Ser Thr Ser Ser Glu Gly His Pro Glu Pro Lys Gly Gln Met
865                 870                 875                 880
Val Ala Gln Glu Ser Leu Glu Pro Leu Asn Thr Leu Pro Ser His Pro
                885                 890                 895
Trp Ser Ser Leu Val Val Pro Met Asp Glu Val Ala Ser Val Ser Ser
            900                 905                 910
Gly Glu Pro Thr Gly Leu Trp Asp Ile Pro Ser Thr Leu Ile Pro Val
        915                 920                 925
Ser Leu Gly Leu Asp Glu Ser Val Leu Asn Val Val Ala Glu Ser Pro
    930                 935                 940
Ser Val Glu Gly Phe Trp Glu Glu Val Ala Ser Gly Gln Glu Asp Pro
945                 950                 955                 960
Thr Asp Pro Cys Glu Asn Asn Pro Cys Leu His Gly Gly Thr Cys His
                965                 970                 975
Thr Asn Gly Thr Val Tyr Gly Cys Ser Cys Asp Gln Gly Tyr Ala Gly
            980                 985                 990
Glu Asn Cys Glu Ile Asp Ile Asp Asp Cys Leu Cys Ser Pro Cys Glu
        995                 1000                1005
Asn Gly Gly Thr Cys Ile Asp Glu Val Asn Gly Phe Ile Cys Leu Cys
    1010                1015                1020
Leu Pro Ser Tyr Gly Gly Ser Leu Cys Glu Lys Asp Thr Glu Gly Cys
1025                1030                1035                1040
Asp Arg Gly Trp His Lys Phe Gln Gly His Cys Tyr Arg Tyr Phe Ala
                1045                1050                1055
His Arg Arg Ala Trp Glu Asp Ala Glu Arg Asp Cys Arg Arg Arg Ala
            1060                1065                1070
Gly His Leu Thr Ser Val His Ser Pro Glu Glu His Lys Phe Ile Asn
        1075                1080                1085
Ser Phe Gly His Glu Asn Ser Trp Ile Gly Leu Asn Asp Arg Thr Val
    1090                1095                1100
Glu Arg Asp Phe Gln Trp Thr Asp Asn Thr Gly Leu Gln Tyr Glu Asn
1105                1110                1115                1120
Trp Arg Glu Lys Gln Pro Asp Asn Phe Phe Ala Gly Gly Glu Asp Cys
                1125                1130                1135
Val Val Met Val Ala His Glu Ser Gly Arg Trp Asn Asp Val Pro Cys
            1140                1145                1150
Asn Tyr Asn Leu Pro Tyr Val Cys Lys Lys Gly Thr Val Leu Cys Gly
        1155                1160                1165
Pro Pro Pro Ala Val Glu Asn Ala Ser Leu Val Gly Val Arg Lys Ile
    1170                1175                1180
Lys Tyr Asn Val His Ala Thr Val Arg Tyr Gln Cys Asp Glu Gly Phe
1185                1190                1195                1200
Ser Gln His Arg Val Ala Thr Ile Arg Cys Arg Asn Asn Gly Lys Trp
                1205                1210                1215
Asp Arg Pro Gln Ile Met Cys Ile Lys Pro Arg Arg Ser His Arg Met
            1220                1225                1230
Arg Arg His His His His Pro His Arg His His Lys Pro Arg Lys Glu
        1235                1240                1245
His Arg Lys His Lys Arg His Pro Ala Glu Asp Trp Glu Lys Asp Glu
    1250                1255                1260
Gly Asp Phe Cys
1265
```

<210> 302
<211> 1257
<212> PRT
<213> Rattus norvegicus

<220>
<223> Rat Neurocan P55067

<400> 302
Met Gly Ala Glu Ser Val Trp Ala Ser Gly Leu Leu Val Leu Trp Leu
 1   5   10   15
Leu Leu Leu Val Ser Gly Asp Gln Asp Thr Gln Asp Thr Thr Thr Thr
            20   25   30
Glu Lys Gly Leu His Met Leu Lys Ser Gly Ser Gly Pro Ile Gln Ala
        35   40   45
Ala Leu Ala Glu Leu Val Ala Leu Pro Cys Phe Phe Thr Leu Gln Pro
    50   55   60
Arg Gln Ser Pro Leu Gly Asp Ile Pro Arg Ile Lys Trp Thr Lys Val
65   70   75   80
Gln Thr Ala Ser Gly Gln Arg Gln Asp Leu Pro Ile Leu Val Ala Lys
                85   90   95
Asp Asn Val Val Arg Val Ala Lys Gly Trp Gln Gly Arg Val Ser Leu
            100   105   110
Pro Ala Tyr Pro Arg His Arg Ala Asn Ala Thr Leu Leu Leu Gly Pro
        115   120   125
Leu Arg Ala Ser Asp Ser Gly Leu Tyr Arg Cys Gln Val Val Lys Gly
    130   135   140
Ile Glu Asp Glu Gln Asp Leu Val Thr Leu Glu Val Thr Gly Val Val
145   150   155   160
Phe His Tyr Arg Ala Ala Arg Asp Arg Tyr Ala Leu Thr Phe Ala Glu
                165   170   175
Ala Gln Glu Ala Cys His Leu Ser Ser Ala Thr Ile Ala Ala Pro Arg
            180   185   190
His Leu Gln Ala Ala Phe Glu Asp Gly Phe Asp Asn Cys Asp Ala Gly
        195   200   205
Trp Leu Ser Asp Arg Thr Val Arg Tyr Pro Ile Thr Gln Ser Arg Pro
    210   215   220
Gly Cys Tyr Gly Asp Arg Ser Ser Leu Pro Gly Val Arg Ser Tyr Gly
225   230   235   240
Arg Arg Asp Pro Gln Glu Leu Tyr Asp Val Tyr Cys Phe Ala Arg Glu
                245   250   255
Leu Gly Gly Glu Val Phe Tyr Val Gly Pro Ala Arg Arg Leu Thr Leu
            260   265   270
Ala Gly Ala Arg Ala Leu Cys Gln Arg Gln Gly Ala Ala Leu Ala Ser
        275   280   285
Val Gly Gln Leu His Leu Ala Trp His Glu Gly Leu Asp Gln Cys Asp
    290   295   300
Pro Gly Trp Leu Ala Asp Gly Ser Val Arg Tyr Pro Ile Gln Thr Pro
305   310   315   320
Arg Arg Arg Cys Gly Gly Ser Ala Pro Gly Val Arg Thr Val Tyr Arg
                325   330   335
Phe Ala Asn Arg Thr Gly Phe Pro Ala Pro Gly Ala Arg Phe Asp Ala
            340   345   350
Tyr Cys Phe Arg Ala His His His Thr Pro Gln Arg Gly Asp Ser Glu
        355   360   365
Ile Pro Ser Ser Gly Asp Glu Gly Glu Ile Val Ser Ala Glu Gly Pro
    370   375   380

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Pro Ala Pro Glu Leu Lys Pro Arg Leu Gly Glu Gln Glu Val Ile Thr
385                 390                 395                 400
Pro Asp Phe Gln Glu Pro Leu Val Ser Ser Gly Glu Asp Glu Pro Leu
                405                 410                 415
Asp Leu Thr Arg Thr Gln Ala Ser Gln Glu Thr Leu Ala Ser Thr Pro
            420                 425                 430
Gly Gly Pro Thr Leu Ala Ser Trp Leu Leu Thr Gly Val Thr Ser Ser
        435                 440                 445
Thr Gly Val Pro Ser Pro Ser Ser Leu Gly Val Asp Met Glu Glu Thr
    450                 455                 460
Thr Pro Ser Gly Thr Gln Val Ala Pro Thr Pro Thr Met Arg Arg Gly
465                 470                 475                 480
Arg Phe Lys Gly Leu Asn Gly Arg His Phe Gln Gln Gln Gly Pro Glu
                485                 490                 495
Asp Gln Leu Leu Glu Ala Ala Glu Ala Ser Ala Gln Pro Pro Thr Leu
            500                 505                 510
Glu Val Thr Ala Asp His Met Gly Pro Ser Ala Ala Thr Glu Ala Leu
        515                 520                 525
Glu Ser Asp Gln Ser His Ser Pro Trp Ala Ile Leu Thr Asn Glu Val
    530                 535                 540
Asp Val Pro Gly Ala Gly Ser Leu Gly Ser Arg Ser Leu Pro Glu Ser
545                 550                 555                 560
Arg Lys Trp Ser Pro Ser Leu Ile Ser Pro Ser Thr Val Pro Ser Thr
                565                 570                 575
Asp Ser Thr Pro Gly Leu Lys Pro Gly Ala Asp Glu Ala Pro Gly Val
            580                 585                 590
Lys Ser Ala Ile His His Pro Pro Trp Leu Pro Ser Glu Pro Ala Val
        595                 600                 605
Pro Ser Ser Ile Pro Ser Glu Ala Leu Ser Ala Val Ser Leu Gln Ala
    610                 615                 620
Ser Pro Gly Asp Gly Ser Pro Asp Phe Pro Ile Val Ala Met Leu Arg
625                 630                 635                 640
Ala Pro Lys Leu Trp Leu Leu Pro His Ser Thr Leu Val Pro Asn Val
                645                 650                 655
Ser Pro Ile Pro Leu Ser Pro Ala Ser Pro Leu Pro Ser Ser Val Pro
            660                 665                 670
Glu Glu Gln Ala Val Arg Pro Val Ser Phe Gly Ala Glu Asp Pro Glu
        675                 680                 685
Thr Pro Phe Gln Thr Thr Met Ala Ala Pro Gly Glu Ala Ser His Gly
    690                 695                 700
Ser Pro Glu Ala Asp Ser Ile Glu Ile Glu Gly Ile Ser Ser Met Gln
705                 710                 715                 720
Ala Thr Lys His Pro Ile Ser Gly Pro Trp Ala Ser Leu Asp Ser Ser
                725                 730                 735
Asn Val Thr Val Asn Pro Val Pro Ser Asp Ala Gly Ile Leu Gly Thr
            740                 745                 750
Glu Ser Gly Val Leu Asp Leu Pro Gly Ser Pro Thr Ser Asp Gly Gln
        755                 760                 765
Ala Thr Val Asp Met Val Leu Ala Thr Trp Leu Pro Leu Pro Gly His
    770                 775                 780
Gly Leu Asp Thr Gly Ser Gln Ser Thr Pro Met Glu Ala His Gly Val
785                 790                 795                 800
Thr Met Ser Val Glu Pro Thr Val Ala Leu Glu Gly Gly Ala Thr Lys
                805                 810                 815
Asp Pro Met Glu Ala Thr Met Asp Val Val Pro Ser Thr Val Asp Ala
            820                 825                 830
Thr Ser Gly Ser Glu Pro Lys Ser Ser Ile Ser Ser Thr His Val Val
        835                 840                 845
```

```
Val Thr Ala Ala Gly Asp Gln Gly Thr Pro Thr Leu Thr Pro Thr Ser
    850                 855                 860
Ser Glu Gly Gln Val Val Ala Gln Glu Ser Leu Gly Thr Leu Thr Ser
865                 870                 875                 880
Leu Pro Ser His Pro Trp Ser Ser Leu Ala Ser Ser Met Asp Glu Val
                885                 890                 895
Ala Ser Val Ser Ser Gly Glu Pro Thr Arg Leu Trp Asp Ile Pro Ser
            900                 905                 910
Thr Leu Ile Pro Val Ser Leu Gly Leu Asp Glu Ser Asp Leu Lys Val
        915                 920                 925
Val Ala Glu Ser Pro Gly Leu Glu Gly Phe Trp Glu Glu Val Ala Ser
    930                 935                 940
Gly Gln Glu Asp Pro Thr Asp Pro Cys Glu Asn Asn Pro Cys Leu His
945                 950                 955                 960
Gly Gly Thr Cys Arg Thr Asn Gly Thr Met Tyr Gly Cys Ser Cys Asp
                965                 970                 975
Gln Gly Tyr Ala Gly Glu Asn Cys Glu Ile Asp Ile Asp Asp Cys Leu
            980                 985                 990
Cys Ser Pro Cys Glu Asn Gly Gly Thr Cys Ile Asp Glu Val Asn Gly
        995                 1000                1005
Phe Ile Cys Leu Cys Leu Pro Ser Tyr Gly Gly Asn Leu Cys Glu Lys
    1010                1015                1020
Asp Thr Glu Gly Cys Asp Arg Gly Trp His Lys Phe Gln Gly His Cys
1025                1030                1035                1040
Tyr Arg Tyr Phe Ala His Arg Arg Ala Trp Glu Asp Ala Glu Arg Asp
                1045                1050                1055
Cys Arg Arg Arg Ala Gly His Leu Thr Ser Val His Ser Pro Glu Glu
            1060                1065                1070
His Lys Phe Ile Asn Ser Phe Gly His Glu Asn Ser Trp Ile Gly Leu
        1075                1080                1085
Asn Asp Arg Thr Val Glu Arg Asp Phe Gln Trp Thr Asp Asn Thr Gly
    1090                1095                1100
Leu Gln Tyr Glu Asn Trp Arg Glu Lys Gln Pro Asp Asn Phe Phe Ala
1105                1110                1115                1120
Gly Gly Glu Asp Cys Val Val Met Val Ala His Glu Asn Gly Arg Trp
                1125                1130                1135
Asn Asp Val Pro Cys Asn Tyr Asn Leu Pro Tyr Val Cys Lys Lys Gly
            1140                1145                1150
Thr Val Leu Cys Gly Pro Pro Pro Ala Val Glu Asn Ala Ser Leu Val
        1155                1160                1165
Gly Val Arg Lys Val Lys Tyr Asn Val His Ala Thr Val Arg Tyr Gln
    1170                1175                1180
Cys Asp Glu Gly Phe Ser Gln His His Val Ala Thr Ile Arg Cys Arg
1185                1190                1195                1200
Ser Asn Gly Lys Trp Asp Arg Pro Gln Ile Val Cys Thr Lys Pro Arg
                1205                1210                1215
Arg Ser His Arg Met Arg Arg His His His His Pro His Arg His His
            1220                1225                1230
Lys Pro Arg Lys Glu His Arg Lys His Lys Arg His Pro Ala Glu Asp
        1235                1240                1245
Trp Glu Lys Asp Glu Gly Asp Phe Cys
    1250                1255
```

<210> 303
<211> 1321
<212> PRT
<213> Pan troglodytes

<220>
<223> Chimpanzee Neurocan Q51S41

<400> 303
Met Gly Thr Pro Phe Val Trp Ala Leu Gly Leu Leu Met Leu Gln Met
 1   5   10   15
Leu Leu Phe Val Ala Gly Glu Gln Gly Thr Gln Asp Ile Ala Asp Ala
            20   25   30
Ser Glu Arg Gly Leu His Met Gln Lys Leu Gly Ser Gly Ser Val Gln
        35   40   45
Ala Ala Leu Ala Glu Leu Val Ala Leu Pro Cys Leu Phe Thr Leu Gln
    50   55   60
Pro Gln Pro Ser Ala Ala Arg Asp Ala Pro Arg Ile Lys Trp Thr Lys
65   70   75   80
Val Arg Thr Ala Ser Gly Gln Arg Gln Asp Leu Pro Ile Leu Val Ala
                85   90   95
Lys Asp Asn Val Val Lys Val Ala Lys Ser Trp Gln Gly Arg Val Ser
            100   105   110
Leu Pro Ser Tyr Pro Arg Arg Arg Ala Asn Ala Thr Leu Leu Leu Gly
        115   120   125
Pro Leu Arg Ala Ser Asp Ser Gly Leu Tyr Arg Cys Gln Val Val Arg
    130   135   140
Gly Ile Glu Asp Glu Gln Asp Leu Val Pro Leu Glu Val Thr Gly Val
145   150   155   160
Val Phe His Tyr Arg Ser Ala Arg Asp Arg Tyr Ala Leu Thr Phe Ala
                165   170   175
Glu Ala Gln Glu Ala Cys Arg Leu Ser Ser Ala Ile Ile Ala Ala Pro
            180   185   190
Arg His Leu Gln Ala Ala Phe Glu Asp Gly Phe Asp Asn Cys Asp Ala
        195   200   205
Gly Trp Leu Ser Asp Arg Thr Val Arg Tyr Pro Ile Thr Gln Ser Arg
    210   215   220
Pro Gly Cys Tyr Gly Asp Arg Ser Ser Leu Pro Gly Val Arg Ser Tyr
225   230   235   240
Gly Arg Arg Asn Pro Gln Glu Leu Tyr Asp Val Tyr Cys Phe Ala Arg
                245   250   255
Glu Leu Gly Gly Glu Val Phe Tyr Val Gly Pro Ala Arg Arg Leu Thr
            260   265   270
Leu Ala Gly Ala Arg Ala Gln Cys Arg Arg Gln Gly Ala Ala Leu Ala
        275   280   285
Ser Val Gly Gln Leu His Leu Ala Trp His Glu Gly Leu Asp Gln Cys
    290   295   300
Asp Pro Gly Trp Leu Ala Asp Gly Ser Val Arg Tyr Pro Ile Gln Thr
305   310   315   320
Pro Arg Arg Arg Cys Gly Gly Pro Ala Pro Gly Val Arg Thr Val Tyr
                325   330   335
Arg Phe Ala Asn Arg Thr Gly Phe Pro Ser Pro Ala Glu Arg Phe Asp
            340   345   350
Ala Tyr Cys Phe Arg Ala His His Pro Thr Ser Gln His Gly Asp Leu
        355   360   365
Glu Thr Pro Ser Ser Gly Asp Glu Gly Glu Ile Leu Ser Ala Glu Gly
    370   375   380
Pro Pro Val Arg Glu Leu Glu Pro Thr Leu Glu Glu Glu Glu Val Val
385   390   395   400
Thr Pro Asp Phe Gln Glu Pro Leu Val Ser Ser Gly Glu Glu Glu Pro
                405   410   415

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Leu Ile Leu Glu Glu Lys Gln Glu Ser Gln Gln Thr Leu Ser Pro Thr
            420                 425                 430
Pro Gly Asp Pro Met Leu Ala Ser Trp Pro Thr Gly Glu Val Trp Leu
        435                 440                 445
Ser Thr Val Ala Pro Ser Pro Ser Asp Met Gly Ala Gly Thr Ala Ala
    450                 455                 460
Ser Ser His Thr Glu Val Ala Pro Thr Asp Pro Met Pro Arg Arg Arg
465                 470                 475                 480
Gly Arg Phe Lys Gly Leu Asn Gly Arg Tyr Phe Gln Gln Gln Glu Pro
                485                 490                 495
Glu Pro Gly Leu Gln Gly Gly Met Glu Ala Ser Ala Gln Pro Pro Thr
            500                 505                 510
Ser Glu Ala Ala Gly Asn Gln Met Glu Pro Pro Leu Ala Met Ala Val
        515                 520                 525
Thr Glu Met Leu Gly Ser Gly Gln Ser Arg Ser Pro Trp Ala Asp Leu
    530                 535                 540
Thr Asn Glu Val Asp Met Pro Gly Ala Gly Ser Ala Gly Gly Lys Ser
545                 550                 555                 560
Ser Pro Glu Pro Trp Leu Trp Pro Pro Thr Met Val Pro Pro Ser Ile
                565                 570                 575
Ser Gly His Ser Arg Ala Pro Val Leu Glu Leu Glu Lys Ala Glu Gly
            580                 585                 590
Pro Ser Ala Arg Pro Ala Thr Pro Asp Leu Phe Trp Ser Pro Leu Glu
        595                 600                 605
Ala Thr Val Ser Ala Pro Ser Pro Ala Pro Trp Glu Ala Phe Pro Val
    610                 615                 620
Ala Thr Ser Pro Asp Leu Pro Met Met Ala Met Leu Arg Gly Pro Lys
625                 630                 635                 640
Glu Trp Met Leu Pro His Pro Thr Pro Ile Ser Thr Glu Ala Asn Arg
                645                 650                 655
Val Glu Ala His Gly Glu Ala Thr Thr Thr Pro Pro Pro Ser Pro Ala
            660                 665                 670
Ala Glu Thr Lys Val Tyr Ser Leu Pro Leu Ser Leu Thr Pro Thr Gly
        675                 680                 685
Gln Gly Gly Glu Ala Met Pro Thr Thr Pro Glu Ser Pro Gly Ala Asp
    690                 695                 700
Phe Arg Glu Thr Gly Glu Thr Ser Pro Ala Gln Val Asn Lys Ala Glu
705                 710                 715                 720
His Ser Ser Ser Ser Pro Trp Pro Ser Val Asn Arg Asn Val Ala Val
                725                 730                 735
Gly Phe Val Pro Thr Glu Thr Ala Thr Glu Pro Thr Gly Leu Arg Gly
            740                 745                 750
Ile Ser Gly Ser Glu Ser Gly Val Leu Asp Thr Ala Glu Ser Pro Thr
        755                 760                 765
Ser Gly Leu Gln Ala Thr Val Asp Glu Val Gln Asp Pro Trp Pro Ser
    770                 775                 780
Val Tyr Ser Lys Gly Leu Gly Ala Ser Ser Pro Ser Ala Pro Leu Gly
785                 790                 795                 800
Ser Pro Gly Val Phe Leu Val Pro Lys Val Thr Pro Ser Leu Glu Pro
                805                 810                 815
Trp Val Ala Thr Asp Glu Gly Pro Thr Val Asn Pro Met Asp Ser Thr
            820                 825                 830
Val Thr Leu Ala Pro Ser Asp Ala Ser Gly Ile Trp Glu Pro Gly Ser
        835                 840                 845
Gln Val Phe Glu Glu Ala Glu Ser Thr Thr Leu Ser Pro Gln Val Ala
    850                 855                 860
Leu Asp Thr Ser Ile Val Thr Pro Leu Thr Thr Leu Glu Gln Gly Asp
865                 870                 875                 880
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Lys Val Gly Val Pro Ala Met Ser Thr Leu Gly Ser Ser Ser Ser Gln
                885                 890                 895
Pro His Pro Glu Pro Glu Asp Gln Val Glu Thr Gln Gly Thr Ser Gly
            900                 905                 910
Ala Ser Val Pro Pro His Gln Ser Ser Pro Leu Gly Lys Pro Ala Val
        915                 920                 925
Pro Pro Gly Thr Pro Thr Ala Ala Ser Val Gly Glu Ser Ala Ser Val
    930                 935                 940
Ser Ser Gly Glu Pro Thr Val Pro Trp Asp Pro Ser Ser Thr Leu Leu
945                 950                 955                 960
Pro Val Thr Leu Gly Ile Glu Asp Phe Glu Leu Glu Val Leu Ala Gly
                965                 970                 975
Ser Pro Gly Val Glu Ser Phe Trp Glu Glu Val Ala Ser Gly Glu Glu
            980                 985                 990
Pro Ala Leu Pro Gly Thr Pro Met Lys Ala Gly Ala Glu Glu Val His
        995                 1000                1005
Ser Asp Pro Cys Glu Asn Asn Pro Cys Leu His Gly Gly Thr Cys Asn
    1010                1015                1020
Ala Asn Gly Thr Met Tyr Gly Cys Ser Cys Asp Gln Gly Phe Ala Gly
1025                1030                1035                1040
Glu Asn Cys Glu Ile Asp Ile Asp Asp Cys Leu Cys Ser Pro Cys Glu
                1045                1050                1055
Asn Gly Gly Thr Cys Ile Asp Glu Val Asn Gly Phe Val Cys Leu Cys
            1060                1065                1070
Leu Pro Ser Tyr Gly Gly Ser Phe Cys Glu Lys Asp Thr Glu Gly Cys
        1075                1080                1085
Asp Arg Gly Trp His Lys Phe Gln Gly His Cys Tyr Arg Tyr Phe Ala
    1090                1095                1100
His Arg Arg Ala Trp Glu Asp Ala Glu Arg Asp Cys Arg Arg Arg Ser
1105                1110                1115                1120
Gly His Leu Thr Ser Val His Ser Ser Glu Glu His Ser Phe Ile Asn
                1125                1130                1135
Ser Phe Gly His Glu Asn Thr Trp Ile Gly Leu Asn Asp Arg Ile Val
            1140                1145                1150
Glu Arg Asp Phe Gln Trp Thr Asp Asn Thr Gly Leu Gln Phe Glu Asn
        1155                1160                1165
Trp Arg Glu Asn Gln Pro Asp Asn Phe Phe Ala Gly Gly Glu Asp Cys
    1170                1175                1180
Val Val Met Val Ala His Glu Ser Gly Arg Trp Asn Asp Val Pro Cys
1185                1190                1195                1200
Asn Tyr Asn Leu Pro Tyr Val Cys Lys Lys Gly Thr Val Leu Cys Gly
                1205                1210                1215
Pro Pro Pro Ala Val Glu Asn Ala Ser Leu Ile Gly Ala Arg Lys Ala
            1220                1225                1230
Lys Tyr Asn Val His Ala Thr Val Arg Tyr Gln Cys Asn Glu Gly Phe
        1235                1240                1245
Ala Gln His His Val Ala Thr Ile Arg Cys Arg Ser Asn Gly Lys Trp
    1250                1255                1260
Asp Arg Pro Gln Ile Val Cys Thr Lys Pro Arg Arg Ser His Arg Met
1265                1270                1275                1280
Arg Arg His His His His His Gln His His His Gln His His His His
                1285                1290                1295
Lys Ser Arg Lys Glu Arg Arg Lys His Lys Lys His Pro Thr Glu Asp
            1300                1305                1310
Trp Glu Lys Asp Glu Gly Asn Phe Cys
        1315                1320
```

<210> 304
<211> 381
<212> PRT
<213> Mus musculus

<220>
<223> Mouse Layilin Q8C351

<400> 304
Met Gln Pro Gly Ala Ala Leu Gln Ala Met Leu Leu Ala Val Leu Leu
 1   5   10   15
Ala Lys Pro Arg Asp Ser Lys Gly Arg Leu Leu Ser Ala Ser Asp Leu
            20   25   30
Asp Pro Arg Gly Gly Gln Leu Val Cys Arg Gly Gly Thr Arg Arg Pro
        35   40   45
Cys Tyr Lys Val Ile Tyr Phe His Asp Ala Phe Gln Arg Leu Asn Phe
    50   55   60
Glu Glu Ala Lys Glu Thr Cys Met Glu Asp Gly Gly Gln Leu Val Ser
65   70   75   80
Ile Glu Thr Glu Asp Glu Gln Arg Leu Ile Glu Lys Phe Ile Glu Asn
                85   90   95
Leu Leu Ala Ser Asp Gly Asp Phe Trp Ile Gly Leu Lys Arg Leu Glu
            100   105   110
Glu Lys Gln Ser Asn Asn Thr Ala Cys Gln Asp Leu Tyr Ala Trp Thr
        115   120   125
Asp Gly Ser Thr Ser Gln Phe Arg Asn Trp Tyr Val Asp Glu Pro Ser
    130   135   140
Cys Gly Ser Glu Val Cys Val Val Met Tyr His Gln Pro Ser Ala Pro
145   150   155   160
Pro Gly Ile Gly Gly Ser Tyr Met Phe Gln Trp Asn Asp Asp Arg Cys
                165   170   175
Asn Met Lys Asn Asn Phe Ile Cys Lys Tyr His Asp Asp Lys Pro Ser
            180   185   190
Thr Thr Pro Ser Ile Trp Pro Gly Gly Glu Ala Thr Glu Pro Ala Thr
        195   200   205
Pro Leu Leu Pro Glu Glu Thr Gln Lys Glu Asp Thr Lys Glu Thr Phe
    210   215   220
Lys Glu Arg Arg Glu Ala Ala Leu Asn Leu Ala Tyr Ile Leu Ile Pro
225   230   235   240
Ser Ile Pro Leu Phe Leu Leu Leu Val Val Thr Ser Ala Val Cys Trp
                245   250   255
Val Trp Ile Cys Arg Arg Lys Arg Glu Gln Thr Asp Pro Ser Thr Lys
            260   265   270
Glu Gln His Thr Ile Trp Pro Thr Pro Arg Gln Glu Asn Ser Pro Asn
        275   280   285
Leu Asp Val Tyr Asn Val Ile Arg Lys Gln Ser Glu Ala Asp Leu Ala
    290   295   300
Glu Pro Arg Pro Asp Leu Lys Asn Ile Ser Phe Arg Val Cys Ser Gly
305   310   315   320
Glu Ala Met Pro Asp Asp Met Ser Cys Asp Tyr Glu Asn Ile Ala Val
                325   330   335
Asn Pro Ser Glu Ser Gly Phe Val Thr Leu Ala Ser Met Glu Ser Gly
            340   345   350
Phe Val Thr Asn Asp Ile Tyr Glu Phe Ser Pro Asp Arg Met Gly Arg
        355   360   365
Ser Lys Glu Ser Gly Trp Val Glu Asn Glu Ile Tyr Tyr
    370   375   380

<210> 305
<211> 374
<212> PRT
<213> Cricetulus griseus

<220>
<223> Chinese Hamster Layilin Q9Z209

<400> 305
Met Gln Pro Gly Pro Ala Leu Gln Ala Val Leu Leu Ala Val Leu Leu
 1   5   10   15
Ser Glu Pro Arg Ser Ser Lys Gly Arg Leu Leu Ser Gly Gln Leu Val
            20   25   30
Cys Arg Gly Gly Thr Arg Arg Pro Cys Tyr Lys Val Ile Tyr Phe His
        35   40   45
Asp Ala Phe Gln Arg Leu Asn Phe Glu Glu Ala Lys Glu Ala Cys Arg
    50   55   60
Arg Asp Gly Gly Gln Leu Val Ser Ile Glu Thr Glu Asp Glu Gln Arg
65   70   75   80
Leu Ile Glu Lys Phe Ile Glu Asn Leu Leu Ala Ser Asp Gly Asp Phe
                85   90   95
Trp Ile Gly Leu Arg Arg Leu Glu Val Lys Gln Val Asn Asn Thr Ala
            100   105   110
Cys Gln Asp Leu Tyr Ala Trp Thr Asp Gly Ser Thr Ser Gln Phe Arg
        115   120   125
Asn Trp Tyr Val Asp Glu Pro Ser Cys Gly Ser Glu Val Cys Val Val
    130   135   140
Met Tyr His Gln Pro Ser Ala Pro Pro Gly Ile Gly Gly Ser Tyr Met
145   150   155   160
Phe Gln Trp Asn Asp Asp Arg Cys Asn Met Lys Asn Asn Phe Ile Cys
                165   170   175
Lys Tyr Ala Asp Glu Lys Pro Ser Thr Thr Pro Ser Ile Arg Pro Gly
            180   185   190
Gly Glu Ala Thr Glu Pro Pro Thr Pro Val Leu Pro Glu Glu Thr Gln
        195   200   205
Lys Glu Asp Thr Lys Glu Thr Phe Lys Glu Ser Arg Glu Ala Ala Leu
    210   215   220
Asn Leu Ala Tyr Ile Leu Ile Pro Ser Ile Pro Leu Phe Leu Leu Leu
225   230   235   240
Val Val Thr Ser Ala Ala Cys Trp Val Trp Ile Cys Arg Arg Arg Lys
                245   250   255
Gln Glu Gln Pro Asp Pro Thr Thr Lys Glu Gln His Thr Ile Trp Pro
            260   265   270
Thr Pro His Gln Glu Asn Ser Pro Asn Leu Asp Val Tyr Asn Val Ile
        275   280   285
Arg Lys Gln Ser Glu Ala Asp Leu Thr Glu Pro Arg Pro Asp Leu Lys
    290   295   300
Asn Ile Ser Phe Arg Val Cys Ser Ser Glu Ala Pro Pro Asp Asp Ile
305   310   315   320
Ser Cys Asp Tyr Asp Asn Met Ala Val Asn Pro Ser Glu Ser Gly Phe
                325   330   335
Val Thr Leu Ala Ser Met Glu Ser Gly Phe Val Thr Asn Asp Ile Tyr
            340   345   350
Glu Phe Ser Pro Asp Arg Met Gly Arg Ser Lys Glu Ser Gly Trp Val
        355   360   365

Glu Asn Glu Ile Tyr Tyr
370

<210> 306
<211> 376
<212> PRT
<213> Rattus norvegicus

<220>
<223> Rat Layilin NP_001178926

<400> 306
Met Gln Pro Gly Ala Ala Leu Gln Ala Met Leu Leu Ala Val Leu Leu
1 5 10 15
Ala Lys Pro Arg Asp Ser Lys Gly His Leu Leu Ser Gly Asp Leu Asp
20 25 30
Pro Arg Gly Gly Gln Arg Phe Cys Trp Glu Gly Thr Arg Arg Pro Cys
35 40 45
Tyr Arg Val Ile Tyr Phe His Asp Thr Ser Gln Arg Arg Asn Phe Glu
50 55 60
Glu Ala Lys Glu Ala Cys Met Lys Asp Gly Gly Gln Leu Ala Ser Ile
65 70 75 80
Glu Thr Ala Asp Glu Gln Arg Leu Ile Glu Asn Phe Ile Glu Ser Leu
85 90 95
Gln Ala Ser Asp Gly Asp Phe Trp Ile Gly Leu Lys Arg Leu Glu Glu
100 105 110
Lys Gln His Asn Ser Thr Ala Cys Gln Asp Leu Tyr Ala Trp Thr Asp
115 120 125
Gly Ser Leu Ser Gln Phe Arg Asn Trp Tyr Met Asp Glu Pro Ser Cys
130 135 140
Glu Ser Glu Val Cys Val Val Met Tyr His Gln Pro Ser Ala Pro Pro
145 150 155 160
Gly Ile Gly Gly Pro Tyr Met Phe Gln Trp Asn Asp Asp Arg Cys Asn
165 170 175
Thr Lys Lys Asn Phe Ile Cys Lys Tyr Ser Asp Asp Lys Pro Ser Thr
180 185 190
Thr Pro Ser Leu Ser Pro Gly Gly Glu Ala Thr Glu Pro Ala Ala Pro
195 200 205
Ile Leu Pro Glu Glu Thr Leu Glu Ile Asp Thr Lys Glu Arg Arg Glu
210 215 220
Ala Ala Leu Asn Leu Ala Tyr Ile Leu Ile Pro Ser Ile Pro Leu Phe
225 230 235 240
Leu Leu Leu Val Val Thr Ser Ala Val Cys Trp Val Trp Ile Cys Arg
245 250 255
Arg Lys Arg Glu Gln Thr Asp Pro Pro Thr Lys Glu Gln His Thr Ile
260 265 270
Trp Pro Thr Pro His Gln Glu Asn Ser Pro Asp Leu Glu Val Tyr Asn
275 280 285
Val Ile Arg Lys Gln Ser Glu Ala Asp Leu Ala Glu Pro Arg Pro Asp
290 295 300
Leu Lys Asn Ile Ser Phe Arg Val Cys Ser Gly Glu Ala Met Pro Asp
305 310 315 320
Asp Thr Ser Cys Asp Tyr Asp Asn Met Val Ile Asn Pro Ser Glu Ser
325 330 335
Gly Leu Val Thr Leu Ala Ser Met Glu Gly Arg Phe Val Thr Asn Asp
340 345 350

```
Ile Tyr Glu Phe Ser Pro Asp Arg Met Gly Arg Ser Lys Glu Ser Gly
        355                 360                 365
Trp Val Glu Asn Glu Ile Tyr Tyr
    370                 375
```

<210> 307
<211> 794
<212> PRT
<213> Mus musculus

<220>
<223> Mouse RHAMM Q00547

<400> 307

```
Met Ser Phe Pro Lys Ala Pro Leu Lys Arg Phe Asn Asp Pro Ser Gly
 1               5                  10                  15
Cys Ala Pro Ser Pro Gly Ala Tyr Asp Val Lys Thr Ser Glu Ala Thr
            20                  25                  30
Lys Gly Pro Val Ser Phe Gln Lys Ser Gln Arg Phe Lys Asn Gln Arg
        35                  40                  45
Glu Ser Gln Gln Asn Leu Asn Ile Asp Lys Asp Thr Thr Leu Leu Ala
    50                  55                  60
Ser Ala Lys Lys Ala Lys Lys Ser Val Ser Lys Lys Asp Ser Gln Lys
65                  70                  75                  80
Asn Asp Lys Asp Val Lys Arg Leu Glu Lys Glu Ile Arg Ala Leu Leu
                85                  90                  95
Gln Glu Arg Gly Thr Gln Asp Lys Arg Ile Gln Asp Met Glu Ser Glu
            100                 105                 110
Leu Glu Lys Thr Glu Ala Lys Leu Asn Ala Ala Val Arg Glu Lys Thr
        115                 120                 125
Ser Leu Ser Ala Ser Asn Ala Ser Leu Glu Lys Arg Leu Thr Glu Leu
    130                 135                 140
Thr Arg Ala Asn Glu Leu Leu Lys Ala Lys Phe Ser Glu Asp Gly His
145                 150                 155                 160
Gln Lys Asn Met Arg Ala Leu Ser Leu Glu Leu Met Lys Leu Arg Asn
                165                 170                 175
Lys Arg Glu Thr Lys Met Arg Ser Met Met Val Lys Gln Glu Gly Met
            180                 185                 190
Glu Leu Lys Leu Gln Ala Thr Gln Lys Asp Leu Thr Glu Ser Lys Gly
        195                 200                 205
Lys Ile Val Gln Leu Glu Gly Lys Leu Val Ser Ile Glu Lys Glu Lys
    210                 215                 220
Ile Asp Glu Lys Cys Glu Thr Glu Lys Leu Leu Glu Tyr Ile Gln Glu
225                 230                 235                 240
Ile Ser Cys Ala Ser Asp Gln Val Glu Lys Cys Lys Val Asp Ile Ala
                245                 250                 255
Gln Leu Glu Glu Asp Leu Lys Glu Lys Asp Arg Glu Ile Leu Ser Leu
            260                 265                 270
Lys Gln Ser Leu Glu Glu Asn Ile Thr Phe Ser Lys Gln Ile Glu Asp
        275                 280                 285
Leu Thr Val Lys Cys Gln Leu Leu Glu Thr Glu Arg Asp Asn Leu Val
    290                 295                 300
Ser Lys Asp Arg Glu Arg Ala Glu Thr Leu Ser Ala Glu Met Gln Ile
305                 310                 315                 320
Leu Thr Glu Arg Leu Ala Leu Glu Arg Gln Glu Tyr Glu Lys Leu Gln
                325                 330                 335
```

```
Gln Lys Glu Leu Gln Ser Gln Ser Leu Leu Gln Gln Glu Lys Glu Leu
            340                 345                 350
Ser Ala Arg Leu Gln Gln Gln Leu Cys Ser Phe Gln Glu Glu Met Thr
        355                 360                 365
Ser Glu Lys Asn Val Phe Lys Glu Glu Leu Lys Leu Ala Leu Ala Glu
    370                 375                 380
Leu Asp Ala Val Gln Gln Lys Glu Glu Gln Ser Glu Arg Leu Val Lys
385                 390                 395                 400
Gln Leu Glu Glu Glu Thr Lys Ser Thr Ala Glu Gln Leu Thr Arg Leu
                405                 410                 415
Asp Asn Leu Leu Arg Glu Lys Glu Val Glu Leu Glu Lys His Ile Ala
            420                 425                 430
Ala His Ala Gln Ala Ile Leu Ile Ala Gln Glu Lys Tyr Asn Asp Thr
        435                 440                 445
Ala Gln Ser Leu Arg Asp Val Thr Ala Gln Leu Glu Ser Val Gln Glu
    450                 455                 460
Lys Tyr Asn Asp Thr Ala Gln Ser Leu Arg Asp Val Thr Ala Gln Leu
465                 470                 475                 480
Glu Ser Glu Gln Glu Lys Tyr Asn Asp Thr Ala Gln Ser Leu Arg Asp
                485                 490                 495
Val Thr Ala Gln Leu Glu Ser Glu Gln Glu Lys Tyr Asn Asp Thr Ala
            500                 505                 510
Gln Ser Leu Arg Asp Val Thr Ala Gln Leu Glu Ser Val Gln Glu Lys
        515                 520                 525
Tyr Asn Asp Thr Ala Gln Ser Leu Arg Asp Val Thr Ala Gln Leu Glu
    530                 535                 540
Ser Tyr Lys Ser Ser Thr Leu Lys Glu Ile Glu Asp Leu Lys Leu Glu
545                 550                 555                 560
Asn Leu Thr Leu Gln Glu Lys Val Ala Met Ala Glu Lys Ser Val Glu
                565                 570                 575
Asp Val Gln Gln Gln Ile Leu Thr Ala Glu Ser Thr Asn Gln Glu Tyr
            580                 585                 590
Ala Arg Met Val Gln Asp Leu Gln Asn Arg Ser Thr Leu Lys Glu Glu
        595                 600                 605
Glu Ile Lys Glu Ile Thr Ser Ser Phe Leu Glu Lys Ile Thr Asp Leu
    610                 615                 620
Lys Asn Gln Leu Arg Gln Gln Asp Glu Asp Phe Arg Lys Gln Leu Glu
625                 630                 635                 640
Glu Lys Gly Lys Arg Thr Ala Glu Lys Glu Asn Val Met Thr Glu Leu
                645                 650                 655
Thr Met Glu Ile Asn Lys Trp Arg Leu Leu Tyr Glu Glu Leu Tyr Glu
            660                 665                 670
Lys Thr Lys Pro Phe Gln Gln Gln Leu Asp Ala Phe Glu Ala Glu Lys
        675                 680                 685
Gln Ala Leu Leu Asn Glu His Gly Ala Thr Gln Glu Gln Leu Asn Lys
    690                 695                 700
Ile Arg Asp Ser Tyr Ala Gln Leu Leu Gly His Gln Asn Leu Lys Gln
705                 710                 715                 720
Lys Ile Lys His Val Val Lys Leu Lys Asp Glu Asn Ser Gln Leu Lys
                725                 730                 735
Ser Glu Val Ser Lys Leu Arg Ser Gln Leu Val Lys Arg Lys Gln Asn
            740                 745                 750
Glu Leu Arg Leu Gln Gly Glu Leu Asp Lys Ala Leu Gly Ile Arg His
        755                 760                 765
Phe Asp Pro Ser Lys Ala Phe Cys His Ala Ser Lys Glu Asn Phe Thr
    770                 775                 780
Pro Leu Lys Glu Gly Asn Pro Asn Cys Cys
785                 790
```

<210> 308
<211> 498
<212> PRT
<213> Rattus norvegicus

<220>
<223> Rat RHAMM Q9WUF7

<400> 308
Met Gly Gly Gly Val Ser Tyr Val Gly Trp Leu Glu Lys Ser Glu Thr
 1   5   10   15
Glu Lys Leu Leu Glu Tyr Ile Glu Glu Ile Ser Cys Ala Ser Asp Gln
            20   25   30
Val Glu Lys Tyr Lys Leu Asp Ile Ala Gln Leu Glu Glu Asp Leu Lys
        35   40   45
Glu Lys Asp Arg Glu Ile Leu Cys Leu Lys Gln Ser Leu Glu Glu Lys
    50   55   60
Val Ser Phe Ser Lys Gln Ile Glu Asp Leu Thr Val Lys Cys Gln Leu
65   70   75   80
Leu Glu Ala Glu Arg Asp Asp Leu Val Ser Lys Asp Arg Glu Arg Ala
                85   90   95
Glu Ser Leu Ser Ala Glu Met Gln Val Leu Thr Glu Lys Leu Leu Leu
            100   105   110
Glu Arg Gln Glu Tyr Glu Lys Leu Gln Gln Asn Glu Leu Gln Ser Gln
        115   120   125
Ser Leu Leu Gln Gln Glu Lys Glu Leu Ser Ala His Leu Gln Gln Gln
    130   135   140
Leu Cys Ser Phe Gln Glu Glu Met Thr Ser Glu Arg Asn Val Phe Lys
145   150   155   160
Glu Gln Leu Lys Leu Ala Leu Asp Glu Leu Asp Ala Val Gln Gln Lys
                165   170   175
Glu Glu Gln Ser Glu Lys Leu Val Lys Gln Leu Glu Glu Glu Thr Lys
            180   185   190
Ser Thr Ala Glu Gln Leu Arg Arg Leu Asp Asp Leu Leu Arg Glu Lys
        195   200   205
Glu Ile Glu Leu Glu Lys Arg Thr Ala Ala His Ala Gln Ala Thr Val
    210   215   220
Ile Ala Gln Glu Lys Tyr Ser Asp Thr Ala Gln Thr Leu Arg Asp Val
225   230   235   240
Thr Ala Gln Leu Glu Ser Tyr Lys Ser Ser Thr Leu Lys Glu Ile Glu
                245   250   255
Asp Leu Lys Leu Glu Asn Leu Thr Leu Gln Glu Lys Val Ala Met Ala
            260   265   270
Glu Lys Arg Val Glu Asp Val Gln Gln Gln Ile Leu Thr Ala Glu Ser
        275   280   285
Thr Asn Gln Glu Tyr Ala Lys Val Val Gln Asp Leu Gln Asn Ser Ser
    290   295   300
Thr Leu Lys Glu Ala Glu Ile Lys Glu Ile Thr Ser Ser Tyr Leu Glu
305   310   315   320
Lys Ile Thr Asp Leu Gln Asn Gln Leu Arg Gln Gln Asn Glu Asp Phe
                325   330   335
Arg Lys Gln Leu Glu Glu Glu Gly Ala Lys Met Thr Glu Lys Glu Thr
            340   345   350
Ala Val Thr Glu Leu Thr Met Glu Ile Asn Lys Trp Arg Leu Leu Tyr
        355   360   365

```
Glu Glu Leu Tyr Asp Lys Thr Lys Pro Phe Gln Gln Leu Asp Ala
    370                 375                 380
Phe Glu Ala Glu Lys Gln Ala Leu Leu Asn Glu His Gly Ala Thr Gln
385                 390                 395                 400
Glu Gln Leu Ser Lys Ile Arg Asp Ser Tyr Ala Gln Leu Leu Gly His
                405                 410                 415
Gln Asn Leu Lys Gln Lys Ile Lys His Val Val Lys Leu Lys Asp Glu
            420                 425                 430
Asn Ser Gln Leu Lys Ser Glu Val Ser Lys Leu Arg Ser Gln Leu Ala
        435                 440                 445
Lys Arg Lys Gln Asn Glu Leu Arg Leu Gln Gly Glu Leu Asp Lys Ala
    450                 455                 460
Leu Gly Ile Arg His Phe Asp Pro Pro Lys Ala Phe Cys His Glu Ser
465                 470                 475                 480
Lys Glu Asn Val Thr Leu Lys Thr Pro Leu Lys Glu Gly Asn Pro Asn
                485                 490                 495
Cys Cys
```

<210> 309
<211> 907
<212> PRT
<213> Mus musculus

<220>
<223> Mouse Inter-alpha-trypsin inhibitor heavy chain H1
Q61702

<400> 309

```
Met Glu Gly Ala Thr Gly Leu Arg Val Leu Leu Cys Leu Leu Pro Leu
 1               5                  10                  15
Leu Thr Leu Gln Ala Arg Pro Ala Leu Gly Leu Ala Thr Gly Arg Pro
            20                  25                  30
Arg Gly Ser Glu Lys Arg His Ala Val Asp Thr Ser Val Asn Gly Val
        35                  40                  45
Ser Ile Lys Ser Leu Lys Val Asn Cys Lys Val Thr Ser Arg Phe Ala
    50                  55                  60
His Tyr Val Ile Thr Ser Gln Val Val Asn Asn Ala Asp Lys Ala Arg
65                  70                  75                  80
Glu Val Ala Phe Asp Val Glu Ile Pro Lys Thr Ala Phe Ile Ser Asp
                85                  90                  95
Phe Ala Ile Thr Ser Asp Gly Lys Ala Phe Ile Gly Asp Ile Lys Asp
            100                 105                 110
Lys Val Thr Ala Trp Lys Gln Tyr Arg Lys Ala Ala Val Leu Gly Glu
        115                 120                 125
Ser Ala Gly Leu Val Arg Ala Ser Gly Arg Asn Met Glu Gln Phe Thr
    130                 135                 140
Ile His Ile Thr Val Gly Ala Gln Ser Lys Ala Thr Phe Arg Leu Thr
145                 150                 155                 160
Tyr Glu Glu Val Leu Lys Arg Arg Leu Met Gln Tyr Asp Ile Thr Ile
                165                 170                 175
Lys Val Arg Pro Lys Gln Leu Val Gln His Phe Glu Ile Asp Val Asp
            180                 185                 190
Ile Phe Glu Pro Gln Gly Ile Ser Lys Leu Asp Ala Gln Ala Ser Phe
        195                 200                 205
Leu Ser Glu Glu Leu Ala Ala Gln Thr Ile Lys Lys Ser Phe Ser Gly
    210                 215                 220
```

```
Lys Lys Gly His Val Leu Phe Arg Pro Thr Val Ser Gln Gln Gln Ser
225                 230                 235                 240
Cys Pro Thr Cys Ser Thr Ser Leu Leu Asn Gly Glu Phe Lys Val Thr
                245                 250                 255
Tyr Asp Val Asn Arg Asp Lys Leu Cys Asp Leu Leu Val Ala Asn Asn
            260                 265                 270
Tyr Phe Thr His Phe Phe Ala Pro Lys Asn Leu Thr Asn Met Ser Lys
        275                 280                 285
Asn Leu Val Phe Val Ile Asp Ile Ser Gly Ser Met Glu Gly Gln Lys
    290                 295                 300
Val Arg Gln Thr Lys Glu Ala Leu Leu Lys Ile Leu Glu Asp Met Arg
305                 310                 315                 320
Pro Val Asp Asn Phe Asp Leu Val Leu Phe Gly Ser Lys Val Gln Ser
                325                 330                 335
Trp Lys Gly Ser Leu Val Pro Ala Ser Asn Ala Asn Leu Gln Ala Ala
            340                 345                 350
Gln Asp Phe Val Arg Arg Phe Ser Leu Ala Gly Ala Thr Asn Leu Asn
        355                 360                 365
Gly Gly Leu Leu Arg Gly Ile Glu Ile Leu Asn Lys Ala Gln Gly Ser
    370                 375                 380
His Pro Glu Leu Ser Ser Pro Ala Ser Ile Leu Ile Met Leu Thr Asp
385                 390                 395                 400
Gly Glu Pro Thr Glu Gly Glu Thr Asp Arg Ser Gln Ile Leu Lys Asn
                405                 410                 415
Val Arg Asn Ala Ile Arg Gly Arg Phe Pro Leu Tyr Asn Leu Gly Phe
            420                 425                 430
Gly His Asp Leu Asp Phe Ser Phe Leu Glu Val Met Ser Thr Glu Asn
        435                 440                 445
Asn Gly Trp Ala Gln Arg Ile Tyr Glu Asp His Asp Ala Thr Gln Gln
    450                 455                 460
Leu Gln Gly Phe Tyr Asn Gln Val Ala Asn Pro Leu Leu Thr Asp Val
465                 470                 475                 480
Glu Leu Gln Tyr Pro Gln Asp Ala Val Leu Ala Leu Thr Gln His Arg
                485                 490                 495
His Lys Gln Tyr Tyr Asp Gly Ser Glu Ile Val Val Ala Gly Arg Ile
            500                 505                 510
Ala Asn His Lys Leu Asn Thr Phe Lys Ala Asp Val Arg Ala Arg Gly
        515                 520                 525
Glu Lys Gln Glu Phe Arg Ala Thr Cys Leu Val Asp Glu Glu Glu Met
    530                 535                 540
Lys Lys Leu Leu Arg Glu Arg Gly His Val Leu Glu Asn His Val Glu
545                 550                 555                 560
Arg Leu Trp Ala Tyr Leu Thr Ile Gln Glu Leu Leu Ala Lys Arg Met
                565                 570                 575
Lys Thr Glu Gly Glu Glu Arg Ala Asn Leu Ser Ser Gln Val Leu Lys
            580                 585                 590
Met Ser Leu Asp Tyr His Phe Val Thr Pro Leu Thr Ser Leu Thr Ile
        595                 600                 605
Arg Gly Leu Thr Asp Glu Asp Gly Leu Glu Pro Thr Ile Asp Lys Pro
    610                 615                 620
Leu Glu Asp Ser Gln Pro Leu Glu Met Val Gly Pro Arg Arg Thr Phe
625                 630                 635                 640
Val Leu Ser Ala Ile Gln Pro Ser Pro Thr Ala His Pro Ile Asp Ser
                645                 650                 655
Lys Leu Pro Leu Arg Val Thr Gly Val Asp Thr Asp Pro His Phe Ile
            660                 665                 670
Ile Tyr Val Pro Ser Lys Glu Asp Ser Leu Cys Phe Asn Ile Asn Glu
        675                 680                 685
```

```
Glu Pro Gly Val Ile Leu Asn Leu Val Gln Asp Pro Asp Thr Gly Phe
    690                 695                 700
Thr Val Asn Gly Gln Leu Ile Gly Asn Lys Ala Ser Ser Pro Gly Gln
705                 710                 715                 720
His Glu Ser Thr Tyr Phe Gly Arg Leu Gly Ile Ser Ser Pro Thr Ser
                725                 730                 735
Asp Phe Gln Leu Glu Val Thr Pro Gln Asn Ile Thr Leu Asn Pro Ser
            740                 745                 750
Ser Ser Gly Ser Met Phe Ser Trp Arg Asp Gln Ala Val Leu Gln Lys
        755                 760                 765
Asp Gly Val Val Val Thr Ile Asn Lys Lys Arg Asn Leu Val Val Ser
    770                 775                 780
Val Asp Asp Gly Ala Thr Phe Glu Ile Val Leu His Arg Thr Trp Lys
785                 790                 795                 800
Gly Ser Ala Val His Gln Asp Phe Leu Gly Phe Tyr Val Leu Asp Ser
                805                 810                 815
Phe Arg Met Ser Ala Arg Thr Lys Gly Leu Leu Gly Gln Phe Phe Ser
            820                 825                 830
Pro Leu Asp Phe Glu Val Phe Asp Leu His Pro Gly Ser Asp Pro Thr
        835                 840                 845
Lys Thr Asp Ala Thr Met Val Val Lys Asn Arg Gln Leu Thr Val Thr
    850                 855                 860
Arg Gly Leu Gln Lys Asp Tyr Ser Lys Asp Pro Arg His Gly Ala Glu
865                 870                 875                 880
Val Pro Cys Trp Phe Val His Asp Asn Gly Ala Gly Leu Ile Asp Gly
                885                 890                 895
Val His Thr Asp Tyr Val Val Ser Asp Ile Phe
            900                 905
```

<210> 310
<211> 946
<212> PRT
<213> Mus musculus

<220>
<223> Mouse Inter-alpha-trypsin inhibitor heavy chain H2
Q61703

<400> 310

```
Met Gln Arg Pro Val Cys Leu Leu Ile Trp Leu Phe Leu Leu Glu Ala
 1               5                  10                  15
Gln Ala Phe Glu Ile Pro Ile Asn Gly Asn Ser Glu Phe Ala Glu Tyr
            20                  25                  30
Ser Asp Leu Val Glu Leu Ala Pro Asp Lys Leu Pro Phe Val Gln Glu
        35                  40                  45
Asn Gly Arg His Gln Arg Ser Leu Pro Glu Glu Ser Gly Glu Glu Thr
    50                  55                  60
Asp Thr Val Asp Pro Val Thr Leu Tyr Ser Tyr Lys Val Gln Ser Thr
65                  70                  75                  80
Ile Thr Ser Arg Val Ala Thr Thr Thr Ile Gln Ser Lys Leu Val Asn
                85                  90                  95
Asn Ser Pro Leu Pro Gln Ser Val Val Phe Asp Val Gln Ile Pro Lys
            100                 105                 110
Gly Ala Phe Ile Ser Asn Phe Thr Met Thr Val Asn Gly Met Thr Phe
        115                 120                 125
Thr Ser Ser Ile Lys Glu Lys Thr Val Gly Arg Ala Leu Tyr Ser Gln
```

```
    130                 135                 140
Ala Arg Ala Lys Gly Lys Thr Ala Gly Trp Val Arg Ser Arg Thr Leu
145                 150                 155                 160
Asp Met Glu Asn Phe Asn Thr Glu Val Asn Ile Pro Pro Gly Ala Lys
                165                 170                 175
Val Gln Phe Glu Leu His Tyr Gln Glu Val Lys Trp Arg Lys Leu Gly
            180                 185                 190
Ser Tyr Glu His Lys Ile His Leu Gln Pro Gly Lys Leu Ala Lys His
        195                 200                 205
Leu Glu Val Asn Val Trp Ile Ile Glu Pro Gln Gly Met Arg Phe Leu
    210                 215                 220
His Val Pro Asp Thr Phe Glu Gly His Phe Gln Gly Val Pro Val Ile
225                 230                 235                 240
Ser Lys Gly Gln Gln Lys Ala His Val Ser Phe Lys Pro Thr Val Ala
                245                 250                 255
Gln Gln Arg Lys Cys Pro Asn Cys Thr Glu Thr Ala Val Asn Gly Glu
            260                 265                 270
Leu Val Val Met Tyr Asp Val Asn Arg Glu Glu Lys Ala Gly Glu Leu
        275                 280                 285
Glu Val Phe Asn Gly Tyr Phe Val His Phe Phe Ala Pro Glu Asn Leu
    290                 295                 300
Asp Pro Ile Pro Lys Asn Ile Leu Phe Val Ile Asp Val Ser Gly Ser
305                 310                 315                 320
Met Trp Gly Ile Lys Met Lys Gln Thr Val Glu Ala Met Lys Thr Ile
                325                 330                 335
Leu Asp Asp Leu Arg Thr Asp Asp Gln Phe Ser Val Val Asp Phe Asn
            340                 345                 350
His Asn Val Arg Thr Trp Arg Asn Asp Leu Val Ser Ala Thr Lys Thr
        355                 360                 365
Gln Ile Ala Asp Ala Lys Arg Tyr Ile Glu Lys Ile Gln Pro Ser Gly
    370                 375                 380
Gly Thr Asn Ile Asn Glu Ala Leu Leu Arg Ala Ile Phe Ile Leu Asn
385                 390                 395                 400
Glu Ala Ser Asn Met Gly Leu Leu Asn Pro Asp Ser Val Ser Leu Ile
                405                 410                 415
Ile Leu Val Ser Asp Gly Asp Pro Thr Val Gly Glu Leu Lys Leu Ser
            420                 425                 430
Lys Ile Gln Lys Asn Val Lys Gln Ser Ile Gln Asp Asn Ile Ser Leu
        435                 440                 445
Phe Ser Leu Gly Ile Gly Phe Asp Val Asp Tyr Asp Phe Leu Lys Arg
    450                 455                 460
Leu Ser Asn Glu Asn Arg Gly Ile Ala Gln Arg Ile Tyr Gly Asn Gln
465                 470                 475                 480
Asp Thr Ser Ser Gln Leu Lys Lys Phe Tyr Asn Gln Val Ser Thr Pro
                485                 490                 495
Leu Leu Arg Asn Val Gln Phe Asn Tyr Pro Gln Ala Ser Val Thr Asp
            500                 505                 510
Val Thr Gln Asn Asn Phe His Asn Tyr Phe Gly Gly Ser Glu Ile Val
        515                 520                 525
Val Ala Gly Lys Phe Asp Pro Ser Lys Leu Thr Glu Val Gln Ser Ile
    530                 535                 540
Ile Thr Ala Thr Ser Ala Asn Thr Glu Leu Val Leu Glu Thr Leu Ser
545                 550                 555                 560
Gln Met Asp Asp Leu Glu Glu Phe Leu Ser Lys Asp Lys His Ala Asp
                565                 570                 575
Pro Asp Phe Thr Lys Lys Leu Trp Ala Tyr Leu Thr Ile Asn Gln Leu
            580                 585                 590
Leu Ala Glu Arg Ser Leu Ala Pro Thr Ala Ala Ile Lys Arg Lys Ile
```

```
        595                 600                 605
Thr Lys Thr Ile Leu Gln Met Ser Leu Asp His His Ile Val Thr Pro
    610                 615                 620
Leu Thr Ala Met Val Ile Glu Asn Asp Ala Gly Asp Glu Arg Met Leu
625                 630                 635                 640
Ala Asp Ser Pro Pro Gln Asp His Ser Cys Cys Ser Gly Ala Leu Tyr
                645                 650                 655
Tyr Gly Thr Lys Val Ala Ser Gly Pro Ile Pro Ser Trp Ala Asn Pro
            660                 665                 670
Ser Pro Thr Pro Met Ser Ala Met Leu Ala Val Gly Ala Lys Pro Leu
        675                 680                 685
Glu Ser Thr Pro Pro Thr His Leu Asn Gln Val Glu Asn Asp Pro His
    690                 695                 700
Phe Ile Ile Tyr Leu Pro Lys Ser Lys Arg Asn Ile Cys Phe Asn Ile
705                 710                 715                 720
Asp Ser Glu Pro Gly Lys Ile Leu Ser Leu Val Ser Asp Pro Glu Ser
                725                 730                 735
Gly Ile Val Val Asn Gly Gln Leu Ile Gly Ala Lys Arg Ala Glu Asn
            740                 745                 750
Gly Lys Leu Ser Thr Tyr Phe Gly Lys Leu Gly Phe Tyr Phe Gln Lys
        755                 760                 765
Glu Gly Met Lys Ile Glu Ile Ser Thr Glu Thr Ile Thr Leu Ser Ser
    770                 775                 780
Gly Ser Ser Thr Ser Arg Leu Ser Trp Ser Asp Thr Ala His Leu Gly
785                 790                 795                 800
Asn Ser Arg Val Leu Ile Ser Val Lys Lys Glu Lys Ser Val Thr Leu
                805                 810                 815
Thr Leu Asn Lys Glu Leu Phe Phe Ser Val Leu Leu His Arg Val Trp
            820                 825                 830
Arg Lys His Pro Val Asn Val Asp Phe Leu Gly Ile Tyr Ala Pro Pro
        835                 840                 845
Ile Asp Lys Phe Ser Pro Arg Val His Gly Leu Leu Gly Gln Phe Met
    850                 855                 860
Gln Glu Pro Ala Ile His Ile Phe Asn Glu Arg Pro Gly Lys Glu Pro
865                 870                 875                 880
Gly Lys Pro Glu Ala Ser Met Glu Val Lys Gly His Lys Leu Thr Val
                885                 890                 895
Thr Arg Gly Leu Gln Lys Asp Tyr Arg Thr Asp Ile Val Phe Gly Thr
            900                 905                 910
Asp Val Pro Cys Trp Phe Val His Asn Ser Gly Lys Gly Phe Ile Asp
        915                 920                 925
Gly His Tyr Lys Asp Tyr Phe Val Pro Gln Leu Tyr Ser Phe Leu Lys
    930                 935                 940
Arg Pro
945
```

<210> 311
<211> 889
<212> PRT
<213> Mus musculus

<220>
<223> Mouse Inter-alpha-trypsin inhibitor heavy chain H3
Q61704

<400> 311

```
Met Arg Thr Met Trp Trp Pro Cys Leu Val Leu Ala Leu Leu Ser Gly
 1               5                  10                  15
Leu Glu Thr Ser Gly Phe Pro Arg Ser Pro Leu Gln Leu Leu Gly Lys
            20                  25                  30
Arg Ser Leu Pro Glu Gly Val Val Asp Gly Ile Glu Val Tyr Ser Thr
        35                  40                  45
Lys Ile Ser Cys Lys Val Thr Ser Arg Phe Ala His Asn Val Val Thr
    50                  55                  60
Thr Arg Ala Val Asn Arg Ala Asp Thr Ala Lys Glu Val Ser Phe Asp
65                  70                  75                  80
Val Glu Leu Pro Lys Thr Ala Phe Ile Thr Asn Phe Thr Leu Thr Ile
                85                  90                  95
Asp Gly Val Thr Tyr Pro Gly Asn Val Lys Glu Lys Glu Val Ala Gln
            100                 105                 110
Lys Gln Tyr Glu Lys Ala Val Ser Gln Gly Lys Thr Ala Gly Leu Val
        115                 120                 125
Lys Ala Ser Gly Arg Lys Leu Glu Lys Phe Thr Val Ser Val Asn Val
    130                 135                 140
Ala Ala Gly Ser Lys Val Thr Phe Glu Leu Thr Tyr Glu Glu Leu Leu
145                 150                 155                 160
Lys Arg Asn Lys Gly Lys Tyr Glu Met Tyr Leu Lys Val Gln Pro Lys
                165                 170                 175
Gln Leu Val Arg His Phe Glu Ile Asp Ala His Ile Phe Glu Pro Gln
            180                 185                 190
Gly Ile Ser Met Leu Asp Ala Glu Ala Ser Phe Ile Thr Asn Asp Leu
        195                 200                 205
Leu Gly Ser Ala Leu Thr Lys Ser Phe Ser Gly Lys Lys Gly His Val
    210                 215                 220
Ser Phe Lys Pro Ser Leu Asp Gln Gln Arg Ser Cys Pro Thr Cys Thr
225                 230                 235                 240
Asp Ser Leu Leu Asn Gly Asp Phe Thr Ile Val Tyr Asp Val Asn Arg
                245                 250                 255
Glu Ser Pro Gly Asn Val Gln Ile Val Asn Gly Tyr Phe Val His Phe
            260                 265                 270
Phe Ala Pro Gln Gly Leu Pro Val Val Pro Lys Asn Ile Val Phe Val
        275                 280                 285
Ile Asp Val Ser Gly Ser Met Ser Gly Arg Lys Ile Gln Gln Thr Arg
    290                 295                 300
Glu Ala Leu Leu Lys Ile Leu Asp Asp Val Lys Glu Asp Asp Tyr Leu
305                 310                 315                 320
Asn Phe Ile Leu Phe Ser Thr Asp Val Thr Thr Trp Lys Asp His Leu
                325                 330                 335
Val Gln Ala Thr Pro Ala Asn Leu Lys Glu Ala Lys Thr Phe Val Lys
            340                 345                 350
Asn Ile His Asp Gln Ser Met Thr Asn Ile Asn Asp Gly Leu Leu Lys
        355                 360                 365
Gly Ile Glu Met Leu Asn Lys Ala Arg Glu Asp His Thr Val Pro Glu
    370                 375                 380
Arg Ser Thr Ser Ile Ile Ile Met Leu Thr Asp Gly Asp Ala Asn Thr
385                 390                 395                 400
Gly Glu Ser Arg Pro Glu Lys Ile Gln Glu Asn Val Arg Asn Ala Ile
                405                 410                 415
Gly Gly Lys Phe Pro Leu Tyr Asn Leu Gly Phe Gly Asn Asn Leu Asn
            420                 425                 430
Tyr Asn Phe Leu Glu Thr Leu Ala Leu Glu Asn His Gly Leu Ala Arg
        435                 440                 445
Arg Ile Tyr Glu Asp Ser Asp Ala Asn Leu Gln Leu Gln Gly Phe Tyr
    450                 455                 460
```

```
Glu Glu Val Ala Asn Pro Leu Leu Thr Asn Val Glu Val Glu Tyr Pro
465                 470                 475                 480
Glu Asn Ala Ile Leu Asp Leu Thr Arg Asn Ser Tyr Pro His Phe Tyr
                485                 490                 495
Asp Gly Ser Glu Ile Val Val Ala Gly Arg Leu Val Asp Arg Asn Met
            500                 505                 510
Asp Asn Phe Lys Ala Asp Val Lys Gly His Gly Ala Leu Asn Asp Leu
        515                 520                 525
Thr Phe Thr Glu Glu Val Asp Met Glu Glu Met Asp Ala Ala Leu Lys
    530                 535                 540
Glu Gln Gly Tyr Ile Phe Gly Asp Tyr Ile Glu Arg Leu Trp Ala Tyr
545                 550                 555                 560
Leu Thr Ile Glu Gln Leu Leu Glu Lys Arg Lys Asn Ala Lys Gly Asp
                565                 570                 575
Glu Lys Glu Asn Ile Thr Ala Glu Ala Leu Asp Leu Ser Leu Lys Tyr
            580                 585                 590
His Phe Val Thr Pro Leu Thr Ser Met Val Val Thr Lys Pro Glu Asp
        595                 600                 605
Asn Glu Asp Gln Thr Ser Ile Ala Asp Lys Pro Gly Glu Glu Ala Ile
    610                 615                 620
Ala Glu Thr Thr Thr Met Ser Phe Leu Thr Thr Gln Gln Ser Ser Gln
625                 630                 635                 640
Ser Pro Tyr Tyr Tyr Val Asp Gly Asp Pro His Phe Ile Ile Gln Ile
                645                 650                 655
Pro Gly Lys Asn Asp Ser Ile Cys Phe Asn Ile Asp Glu Lys Pro Gly
            660                 665                 670
Thr Val Leu Arg Leu Ile Gln Asp Pro Val Thr Gly Ile Thr Val Thr
        675                 680                 685
Gly Gln Ile Ile Gly Asp Lys Arg Ser Asn Ala Ser Ser Arg Thr Gly
    690                 695                 700
Lys Thr Tyr Phe Gly Lys Leu Gly Ile Thr Asn Ala Trp Met Asp Phe
705                 710                 715                 720
Arg Val Glu Val Thr Thr Glu Lys Ile Ile Leu Gly Thr Gly Ala Glu
                725                 730                 735
Leu Ser Thr Phe Ser Trp Leu Asp Thr Ile Thr Val Thr Gln Thr Gly
            740                 745                 750
Leu Ser Val Thr Ile Asn Arg Lys Lys Asn Met Val Val Ser Phe Gly
        755                 760                 765
Asp Gly Ile Ser Phe Val Ile Ile Leu His Gln Val Trp Lys Lys His
    770                 775                 780
Pro Val His Gln Asp Phe Leu Gly Phe Tyr Val Val Asp Ser His Arg
785                 790                 795                 800
Met Ser Ala Gln Thr His Gly Leu Leu Gly Gln Phe Phe Gln Pro Phe
                805                 810                 815
Asp Phe Lys Val Phe Gly Ile Arg Pro Gly Ser Asp Pro Thr Lys Pro
            820                 825                 830
Asp Ala Thr Met Val Val Lys Asn His Arg Leu Thr Val Thr Arg Gly
        835                 840                 845
Ser Gln Lys Asp Tyr Arg Lys Asp Ala Ser Val Gly Thr Lys Val Ile
    850                 855                 860
Cys Trp Phe Val His Asn Asn Gly Glu Gly Leu Ile Asp Gly Val His
865                 870                 875                 880
Thr Asp Tyr Ile Val Pro Ser Leu Phe
                885
```

<210> 312
<211> 906

<212> PRT
<213> Bos taurus

<220>
<223> Cow Inter-alpha-trypsin inhibitor heavy chain H1
Q0VCM5

<400> 312
Met Gly Leu Arg Gly Leu Leu Cys Val Cys Leu Val Ser Leu Leu Ala
1 5 10 15
Leu Gln Ala Val Ala Ala Gln Gly Ser Pro Thr Arg Asn Pro Lys Gly
20 25 30
Gly Lys Lys Arg Met Ala Val Asp Ala Ala Val Asp Gly Val Val Ile
35 40 45
Arg Ser Leu Lys Val Asn Cys Lys Val Thr Ser Arg Phe Ala His Tyr
50 55 60
Ile Ile Thr Ser Gln Val Val Asn Ser Ala Asp Thr Ala Lys Glu Val
65 70 75 80
Ser Phe Asn Val Glu Ile Pro Lys Thr Ala Phe Ile Ser Asp Phe Ala
85 90 95
Ile Thr Ala Asp Glu Asn Ala Phe Thr Gly Asp Ile Lys Asp Lys Val
100 105 110
Thr Ala Trp Lys Gln Tyr Arg Lys Ala Ala Ile Ser Gly Glu Asn Ala
115 120 125
Gly Leu Val Arg Ala Ser Gly Arg Thr Met Glu Gln Phe Ser Ile His
130 135 140
Ile Ile Val Gly Pro Arg Ser Lys Ala Thr Phe Arg Leu Thr Tyr Glu
145 150 155 160
Glu Val Leu Arg Arg Lys Leu Met Gln Tyr Asp Ile Val Ile Lys Val
165 170 175
Lys Pro Gln Gln Leu Val Gln His Phe Glu Ile Asp Val Asp Ile Phe
180 185 190
Glu Pro Gln Gly Ile Arg Lys Leu Asp Val Glu Ala Ser Phe Leu Pro
195 200 205
Lys Glu Leu Ala Ala Gln Leu Ile Lys Lys Ser Phe Ser Gly Lys Lys
210 215 220
Gly His Val Leu Phe Arg Pro Thr Val Ser Gln Gln Gln Thr Cys Pro
225 230 235 240
Thr Cys Ser Thr Thr Leu Leu Asn Gly Asp Phe Lys Val Thr Tyr Asp
245 250 255
Val Asn Arg Asp Asp Ala Cys Asp Leu Leu Val Ala Asn Asn Tyr Phe
260 265 270
Ala His Phe Phe Ala Pro Gln Asn Leu Lys Lys Leu Asn Lys Asn Val
275 280 285
Val Phe Val Ile Asp Ile Ser Ser Ser Met Glu Gly Gln Lys Leu Lys
290 295 300
Gln Thr Lys Glu Ala Leu His Lys Ile Leu Gly Asp Met Arg Pro Gly
305 310 315 320
Asp Tyr Phe Asp Leu Val Leu Phe Gly Ser Ala Val Gln Ser Trp Lys
325 330 335
Gly Ser Leu Val Gln Ala Ser Pro Ala Asn Leu Glu Ala Ala Arg Asn
340 345 350
Phe Val Gln Gln Phe Ser Leu Ala Gly Ala Thr Asn Leu Asn Gly Gly
355 360 365
Leu Leu Arg Gly Ile Glu Ile Leu Asn Lys Ala Gln Gln Ser Leu Pro
370 375 380
Glu Leu Ser Asn His Ala Ser Ile Leu Ile Met Leu Thr Asp Gly Glu

```
385                 390                 395                 400
Pro Thr Glu Gly Val Met Asp Arg Thr Gln Ile Leu Lys Asn Val Arg
                405                 410                 415
Asp Gly Ile Lys Gly Arg Phe Pro Leu Tyr Asn Leu Gly Phe Gly His
            420                 425                 430
Asp Val Asp Leu Asn Phe Leu Glu Val Met Ser Leu Glu Asn Asn Gly
        435                 440                 445
Arg Val Gln Arg Ile Tyr Glu Asp His Asp Ala Thr Gln Gln Leu Gln
    450                 455                 460
Gly Phe Tyr Glu Gln Val Ala Asn Pro Leu Leu Arg Asp Val Glu Leu
465                 470                 475                 480
Leu Tyr Pro Arg Glu Ala Val Ser Asp Leu Thr Gln His Arg His Lys
                485                 490                 495
Gln Tyr Tyr Glu Gly Ser Glu Ile Met Val Ala Gly Arg Ile Ala Asp
            500                 505                 510
His Lys Leu Ser Ser Phe Lys Ala Asp Val Arg Ala His Gly Glu Gly
        515                 520                 525
Gln Glu Phe Met Thr Thr Cys Leu Val Asp Lys Glu Glu Met Lys Lys
    530                 535                 540
Leu Leu Arg Glu Arg Gly His Met Leu Glu Asn His Val Glu Arg Leu
545                 550                 555                 560
Trp Ala Tyr Leu Thr Ile Gln Glu Leu Leu Ala Lys Arg Met Lys Leu
                565                 570                 575
Glu Gly Gln Glu Lys Ala Asn Val Ser Ala Lys Ala Leu Gln Met Ser
            580                 585                 590
Leu Ala Tyr Gln Phe Val Thr Pro Leu Thr Ser Met Thr Val Arg Gly
        595                 600                 605
Met Thr Asp Gln Asp Gly Leu Glu Pro Ile Ile Asp Lys Pro Leu Asp
    610                 615                 620
Asp Tyr Leu Pro Leu Glu Met Val Gly Pro Arg Lys Thr Phe Met Leu
625                 630                 635                 640
Gln Ala Ser Gln Pro Ala Pro Thr His Ser Ser Leu Asp Ile Lys Lys
                645                 650                 655
Leu Pro Asp Gln Val Thr Gly Val Asp Thr Asp Pro His Phe Leu Ile
            660                 665                 670
His Val Pro Gln Lys Glu Asp Thr Leu Cys Phe Asn Ile Asn Glu Glu
        675                 680                 685
Pro Gly Val Val Leu Ser Leu Val Gln Asp Pro Asp Thr Gly Phe Ser
    690                 695                 700
Val Asn Gly Gln Leu Ile Gly Asn Glu Ala Gly Ser Pro Gly Lys His
705                 710                 715                 720
Glu Gly Thr Tyr Phe Gly Arg Leu Gly Ile Ala Asn Pro Ala Thr Asp
                725                 730                 735
Phe Gln Leu Glu Val Thr Pro Gln Asn Ile Thr Leu Asn Pro Gly Ser
            740                 745                 750
Gly Gly Pro Val Phe Ser Trp Arg Asp Gln Ala Phe Leu Arg Gln Asn
        755                 760                 765
Glu Val Leu Val Thr Ile Asn Arg Lys Arg Asn Leu Val Val Ser Val
    770                 775                 780
Glu Asp Gly Gly Thr Phe Glu Val Val Leu His Arg Val Trp Arg Gly
785                 790                 795                 800
Ser Ala Val Arg Gln Asp Phe Leu Gly Phe Tyr Val Leu Asp Ser His
                805                 810                 815
Arg Met Ser Ala Arg Thr His Gly Leu Leu Gly Gln Phe Phe His Pro
            820                 825                 830
Phe Asp Tyr Lys Val Ser Asn Leu His Pro Gly Ser Asp Pro Thr Lys
        835                 840                 845
Thr Asp Ala Thr Met Val Val Lys Asn Arg Arg Leu Thr Val Thr Arg
```

```
    850                 855                 860
Gly Leu Gln Lys Asp Tyr Arg Lys Asp Pro Arg His Gly Ala Glu Val
865                 870                 875                 880
Thr Cys Trp Phe Ile His Asn Asn Gly Asp Gly Leu Ile Asp Gly Ile
                885                 890                 895
His Thr Asp Tyr Ile Val Pro Asp Ile Phe
            900                 905
```

<210> 313
<211> 946
<212> PRT
<213> Bos taurus

<220>
<223> Cow Inter-alpha-trypsin inhibitor heavy chain H2
NP_001091485

<400> 313

```
Met Lys Gly Leu Thr Cys Phe Phe Leu Cys Phe Phe Leu Ser Glu Ser
 1               5                  10                  15
Arg Gly Phe Glu Ile Pro Thr Asn Gly Leu Ser Glu Phe Ala Asp Tyr
            20                  25                  30
Gly Asp His Val Glu Leu Ala Pro Gly Lys Phe Gln Phe Val Pro Glu
        35                  40                  45
Asn Arg Arg Tyr Gln Arg Ser Ile Ser Gly Glu Ser Gly Glu Arg Thr
    50                  55                  60
Glu Asp Val Asp Gln Val Thr Val Tyr Ser Tyr Lys Val Gln Ser Thr
65                  70                  75                  80
Ile Thr Ser Arg Val Ala Asn Thr Val Ile Gln Thr Lys Val Val Asn
                85                  90                  95
His Ser Pro Gln Pro Gln Asn Val Val Phe Asp Val Gln Ile Pro Lys
            100                 105                 110
Gly Ala Phe Ile Ser Asn Phe Ser Met Thr Val Asp Gly Thr Thr Phe
        115                 120                 125
Thr Ser Ser Ile Lys Glu Lys Thr Val Gly Arg Ala Leu Tyr Ala Gln
    130                 135                 140
Ala Arg Ala Lys Gly Lys Thr Ala Gly Leu Val Arg Ser Arg Ala Leu
145                 150                 155                 160
Asp Met Glu Asp Phe Lys Thr Glu Val Ser Ile Ala Pro Gly Ala Lys
                165                 170                 175
Val Gln Phe Glu Leu His Tyr Gln Glu Val Lys Trp Arg Lys Leu Gly
            180                 185                 190
Ser Tyr Glu His Arg Leu His Leu Lys Pro Gly Arg Leu Ala Lys His
        195                 200                 205
Leu Glu Val Asp Val Arg Ile Ile Glu Pro Gln Gly Leu Arg Ser Leu
    210                 215                 220
His Val Leu Asp Thr Phe Asp Gly His Phe Asp Gly Val Pro Val Val
225                 230                 235                 240
Ser Lys Gly Pro Gln Lys Ala His Ile Ala Phe Lys Pro Thr Val Ala
                245                 250                 255
Gln Gln Arg Lys Cys Leu Asn Cys Ser Glu Thr Met Val Asp Gly Glu
            260                 265                 270
Leu Val Val Met Tyr Asp Val Asn Arg Glu Glu Lys Val Gly Glu Leu
        275                 280                 285
Glu Val Phe Asn Gly Tyr Phe Val His Phe Phe Ala Pro Glu Asn Met
    290                 295                 300
```

```
Asp Pro Ile Pro Lys Asn Ile Leu Phe Val Ile Asp Val Ser Gly Ser
305                 310                 315                 320
Met Trp Gly Ile Lys Met Lys Gln Thr Val Glu Ala Met Lys Thr Ile
                325                 330                 335
Leu Asp Asp Leu Arg Thr Glu Asp His Phe Ser Val Val Asp Phe Asn
            340                 345                 350
His Asn Val Arg Thr Trp Arg Asn Asp Leu Val Ser Ala Thr Lys Thr
        355                 360                 365
Gln Val Ala Asp Ala Lys Asn Tyr Ile Glu Lys Ile Gln Pro Ser Gly
    370                 375                 380
Gly Thr Asn Ile Asn Glu Ala Leu Leu Arg Ala Ile Phe Ile Leu Asn
385                 390                 395                 400
Glu Ala Asn Asn Leu Gly Met Leu Asp Pro Asn Ser Val Ser Leu Ile
                405                 410                 415
Ile Leu Val Ser Asp Gly Asp Pro Thr Val Gly Glu Leu Lys Leu Ser
            420                 425                 430
Lys Ile Gln Lys Asn Val Lys Gln Asn Ile Arg Asp Asn Ile Ser Leu
        435                 440                 445
Phe Ser Leu Gly Ile Gly Phe Asp Val Asp Tyr Asp Phe Leu Lys Arg
    450                 455                 460
Leu Ser Asn Asp Asn Arg Gly Ile Ala Gln Arg Ile Tyr Gly Asn Gln
465                 470                 475                 480
Asp Thr Ser Val Gln Leu Lys Lys Phe Tyr Asn Gln Val Ser Thr Pro
                485                 490                 495
Leu Leu Arg Asn Val Gln Phe Asn Tyr Pro Gln Pro Ser Val Thr Asp
            500                 505                 510
Val Thr Gln Asn Ser Phe His Asn Tyr Phe Gly Gly Ser Glu Ile Val
        515                 520                 525
Val Ala Gly Lys Val Asp Pro Glu Lys Leu Gly Gln Leu Gln Ser Ile
    530                 535                 540
Ile Thr Ala Thr Ser Ala Asn Ala Glu Leu Val Leu Glu Thr Leu Ala
545                 550                 555                 560
Glu Met Asp Gly Leu Glu Asp Phe Leu Ser Lys Asp Lys His Ala Asp
                565                 570                 575
Pro Asp Phe Thr Lys Lys Leu Trp Ala Tyr Leu Thr Ile Asn Gln Leu
            580                 585                 590
Leu Ala Glu Arg Ser Leu Ala Pro Thr Ala Ala Met Lys Arg Lys Ile
        595                 600                 605
Thr Lys Thr Ile Leu Gln Met Ser Leu Asp His His Ile Val Thr Pro
    610                 615                 620
Leu Thr Ala Met Val Ile Glu Asn Glu Ala Gly Asp Glu Arg Met Leu
625                 630                 635                 640
Ala Asp Ser Pro Pro Gln Asp His Ser Cys Cys Ser Gly Ala Leu Tyr
                645                 650                 655
His Gly Ser Lys Val Ser Pro Asn Ser Val Pro Ser Trp Val Asn Pro
            660                 665                 670
Ser Pro Ala Pro Val Leu Pro Met Pro Ala Val Gly Ala Gln Val Leu
        675                 680                 685
Glu Ser Thr Pro Pro Pro His Val Met Arg Val Glu Asn Asp Pro His
    690                 695                 700
Phe Ile Ile Tyr Leu Pro Lys Ser Gln Lys Asn Ile Cys Phe Asn Ile
705                 710                 715                 720
Asp Ser Glu Pro Gly Lys Ile Leu Asn Leu Val Ser Asp Pro Glu Leu
                725                 730                 735
Gly Ile Leu Val Asn Gly Gln Leu Val Gly Ala Lys Lys Pro Lys Asn
            740                 745                 750
Lys Lys Leu Ser Thr Tyr Phe Gly Lys Leu Gly Phe Tyr Phe Gln Arg
        755                 760                 765
```

Glu Asp Val Lys Val Glu Ile Ser Thr Glu Thr Ile Ser Leu Ser Arg
    770   775   780
Gly Ser Arg Thr Ser Val Leu Ser Trp Ser Asp Thr Ala His Val Leu
785   790   795   800
Asn Gln Arg Val Leu Val Ser Val Lys Lys Glu Lys Thr Val Thr Val
                805   810   815
Thr Leu Asp Lys Glu Met Phe Phe Ser Val Leu Leu His Arg Val Trp
            820   825   830
Lys Lys His Pro Ile Asn Val Asp Phe Leu Gly Ile Tyr Ile Pro Pro
        835   840   845
Thr Asn Lys Phe Ser Pro Asn Val His Gly Leu Ile Gly Gln Phe Met
    850   855   860
Asn Glu Pro Lys Ile His Val Phe Asn Glu Arg Pro Gly Lys Asp Pro
865   870   875   880
Glu Lys Pro Glu Ala Ser Met Glu Val Lys Gly Gln Lys Leu Val Val
                885   890   895
Thr Arg Gly Leu Gln Lys Asp Tyr Arg Thr Asp Arg Val Phe Gly Thr
            900   905   910
Asp Val Pro Cys Trp Phe Val His Asn Ser Gly Lys Gly Phe Ile Asp
        915   920   925
Gly His Tyr Lys Asp Tyr Phe Val Pro Gln Leu Tyr Ser Phe Leu Arg
    930   935   940
Arg Pro
945

<210> 314
<211> 891
<212> PRT
<213> Bos taurus

<220>
<223> Cow Inter-alpha-trypsin inhibitor heavy chain H3
      P56652

<400> 314
Met Ala Leu Ala Gln Trp Pro Tyr Leu Ile Leu Ala Leu Leu Ser Gly
 1   5   10   15
Leu Ala Val Ser Gly Phe Pro Arg Asn Pro Ser Leu Leu Leu Gly Lys
            20   25   30
Arg Ser Leu Pro Gly Arg Ala Val Asp Gly Ile Glu Val Tyr Ser Thr
        35   40   45
Lys Val Asn Cys Lys Val Thr Ser Arg Phe Ala His Asn Val Val Thr
    50   55   60
Thr Arg Ala Val Asn His Ala Asn Thr Ala Lys Glu Val Ser Phe Asp
65   70   75   80
Val Glu Leu Pro Lys Thr Ala Phe Ile Thr Asn Phe Thr Leu Thr Ile
                85   90   95
Asp Gly Val Thr Tyr Pro Gly Lys Val Lys Glu Lys Glu Val Ala Lys
            100   105   110
Lys Gln Tyr Glu Lys Ala Val Ser Gln Gly Lys Thr Ala Gly Leu Val
        115   120   125
Lys Ala Ser Gly Arg Lys Leu Glu Lys Phe Thr Val Ser Val Asn Val
    130   135   140
Ala Ala Gly Ser Lys Val Thr Phe Glu Leu Thr Tyr Glu Glu Leu Leu
145   150   155   160
Lys Arg His Lys Gly Lys Tyr Glu Met Tyr Leu Lys Val Gln Pro Lys

```
                165                 170                 175
Gln Leu Val Lys His Phe Glu Ile Thr Val Asp Ile Phe Glu Pro Gln
            180                 185                 190
Gly Ile Ser Thr Leu Asp Ala Glu Ala Ser Phe Ile Thr Asn Asp Leu
        195                 200                 205
Leu Gly Ser Ala Leu Thr Lys Ser Phe Ser Gly Lys Lys Gly His Val
    210                 215                 220
Ser Phe Lys Pro Ser Leu Asp Gln Gln Arg Ser Cys Pro Thr Cys Thr
225                 230                 235                 240
Asp Ser Leu Leu Lys Gly Asp Phe Ile Ile Thr Tyr Asp Val Asn Arg
                245                 250                 255
Glu Ser Pro Ala Asn Val Gln Ile Val Asn Gly Tyr Phe Val His Phe
            260                 265                 270
Phe Ala Pro Gln Gly Leu Pro Val Val Pro Lys Ser Val Val Phe Val
        275                 280                 285
Ile Asp Val Ser Gly Ser Met His Gly Arg Lys Met Glu Gln Thr Lys
    290                 295                 300
Asp Ala Leu Leu Lys Ile Leu Glu Asp Val Lys Gln Asp Asp Tyr Leu
305                 310                 315                 320
Asn Phe Ile Leu Phe Ser Gly Asp Val Thr Thr Trp Lys Asp Ser Leu
                325                 330                 335
Val Pro Ala Thr Pro Glu Asn Ile Gln Glu Ala Ser Lys Phe Val Met
            340                 345                 350
Asp Ile Gln Asp Arg Gly Met Thr Asn Ile Asn Asp Ala Leu Leu Arg
        355                 360                 365
Gly Ile Ser Met Leu Asn Lys Ala Arg Glu Glu His Thr Val Pro Glu
    370                 375                 380
Arg Ser Thr Ser Ile Ile Ile Met Leu Thr Asp Gly Asp Ala Asn Val
385                 390                 395                 400
Gly Glu Ser Arg Pro Glu Lys Ile Gln Glu Asn Val Arg Asn Ala Ile
                405                 410                 415
Gly Gly Lys Phe Pro Leu Tyr Asn Leu Gly Phe Gly Asn Asn Leu Asn
            420                 425                 430
Tyr Asn Phe Leu Glu Asn Met Ala Leu Glu Asn His Gly Leu Ala Arg
        435                 440                 445
Arg Ile Tyr Glu Asp Ser Asp Ala Asn Leu Gln Leu Gln Gly Phe Tyr
    450                 455                 460
Glu Glu Val Ala Asn Pro Leu Leu Thr Gly Val Glu Val Glu Tyr Pro
465                 470                 475                 480
Gln Asn Ala Ile Leu Asp Leu Thr Gln Asn Ser Tyr Gln His Phe Tyr
                485                 490                 495
Asp Gly Ser Glu Ile Val Val Ala Gly Arg Leu Ala Asp Glu Asp Met
            500                 505                 510
Asn Ser Phe Lys Ala Ala Val Lys Gly His Gly Ala Ile Asn Asp Leu
        515                 520                 525
Thr Phe Thr Glu Glu Val Asp Met Lys Glu Met Glu Lys Ala Leu Gln
    530                 535                 540
Glu Arg Asp Tyr Ile Phe Gly Asp Tyr Ile Glu Arg Leu Trp Ala Tyr
545                 550                 555                 560
Leu Thr Ile Glu Gln Leu Leu Asp Lys Arg Lys Asn Ala Gln Gly Glu
                565                 570                 575
Glu Lys Glu Ile Leu Thr Ala Gln Ala Leu Glu Leu Ser Leu Lys Tyr
            580                 585                 590
His Phe Val Thr Pro Leu Thr Ser Met Val Val Thr Lys Pro Glu Asp
        595                 600                 605
Asn Glu Asn Gln Thr Ala Ile Ala Asn Lys Pro Gly Glu Gly Pro Leu
    610                 615                 620
Asp Ala Glu Glu Val Pro Ser Met Ala Tyr Leu Thr Ser Tyr Gln Ala
```

625 630 635 640
Pro Gln Thr Pro Tyr Tyr Tyr Val Asp Gly Asp Pro His Phe Ile Ile
645 650 655
Gln Ile Pro Glu Lys Asp Asp Ala Ile Cys Phe Asn Ile Asp Glu Asp
660 665 670
Pro Gly Thr Val Leu Arg Leu Ile Gln Asp Pro Val Thr Gly Leu Thr
675 680 685
Val Asn Gly Gln Ile Ile Gly Glu Lys Thr Gly Arg Ser Asp Ser Gln
690 695 700
Thr Arg Arg Thr Tyr Phe Gly Lys Leu Gly Ile Ala Ser Ala Gln Met
705 710 715 720
Asp Phe Arg Ile Glu Val Thr Arg Glu Asn Ile Thr Leu Trp Asn Gly
725 730 735
Asp Ser Leu Ser Thr Phe Ser Trp Leu Asp Thr Val Met Val Thr Gln
740 745 750
Asp Gly Leu Ser Val Met Ile Asn Arg Lys Lys Asn Met Val Val Ser
755 760 765
Phe Gly Asp Gly Val Thr Phe Val Val Val Leu His Gln Val Trp Lys
770 775 780
Lys Glu Pro Ala His His Asp Phe Leu Gly Phe Tyr Val Val Asn Ser
785 790 795 800
Arg Gly Met Ser Ala Gln Thr His Gly Leu Leu Gly Gln Phe Phe His
805 810 815
Pro Phe Asp Phe Gln Val Ser Asp Val His Pro Gly Ser Asp Pro Thr
820 825 830
Lys Pro Asp Ala Thr Met Val Val Lys Asn His Gln Leu Thr Val Thr
835 840 845
Arg Gly Ser Gln Lys Asp Tyr Arg Lys Asp Ile Ser Val Gly Arg Asn
850 855 860
Val Ala Cys Trp Phe Val His Asn Asn Gly Gln Gly Leu Ile Asp Gly
865 870 875 880
Ile His Arg Asp Tyr Ile Val Pro Asn Leu Phe
885 890

<210> 315
<211> 928
<212> PRT
<213> Gallus gallus

<220>
<223> Chicken Interphotoreceptor matrix proteoglycan 1
SPACR Q8JIR8

<400> 315
Met His Leu Lys Thr Gly Leu Ile Phe Leu Ala Ile Cys Leu Ala Leu
1 5 10 15
Gln Val Gln Gly Ser Arg Glu Ile Pro Ser Lys Thr Asn His Gly Glu
20 25 30
Ala Lys Gln Leu Ala Asp Ala Ser Gly Ser Asp Lys Thr Glu Arg Thr
35 40 45
Thr Lys Arg Ser Arg Val Ser Thr Ile Arg Arg Ile Phe Asp Met Ala
50 55 60
Lys His Arg Thr Lys Arg Ser Pro Phe Phe Ser Thr Gly Val Lys Ile
65 70 75 80
Cys Pro Gln Glu Ser Val Lys Gln Ile Leu Ala Ser His Gln Ala Tyr
85 90 95

```
Tyr Arg Leu Arg Val Cys Gln Glu Ala Val Trp Glu Ala Phe Arg Ile
            100                 105                 110
Phe Leu Asp Arg Ile Pro Asp Thr Ser Glu Tyr Gln Asn Trp Val Thr
        115                 120                 125
Ala Cys Gln Arg Glu Thr Phe Cys Ile Phe Asp Ile Gly Lys Asn Phe
    130                 135                 140
Ser Asn Ser Gln Glu His Leu Glu Ile Ile Gln Arg Arg Val Lys His
145                 150                 155                 160
Arg Thr Phe Gln Glu Arg Lys Asp Glu Ile Ser Thr Asp Lys Thr Gly
                165                 170                 175
Gly Lys Lys Leu Glu Asp Ile Pro Ser Val Ser Thr Gly Pro Pro Ser
            180                 185                 190
Ala Ser Leu Ser Thr Tyr Thr Leu Val Pro Asn Gly Thr Leu Leu Asn
        195                 200                 205
Glu Ile Val Asn Glu Thr Lys Thr Pro Val Lys Glu Leu Gly Thr Asn
    210                 215                 220
Thr Val Pro Glu Leu Pro Ala Glu Gln Met Val Glu Phe Ser Val Thr
225                 230                 235                 240
Leu Thr Asp Gln Glu Tyr Thr Ala Glu Leu Ser Asp Pro Asn Ser Pro
                245                 250                 255
Gln Tyr Arg Gln Leu Ala Ala Lys Phe Gln Leu Gln Met Gln Lys Ile
            260                 265                 270
Phe Glu Lys Leu Pro Gly Phe Lys Glu Ile His Val Leu Gly Phe Lys
        275                 280                 285
Gln Lys Lys Glu Lys Asp Gly Ser Ser Ser Thr Ile Ala Arg Tyr Met
    290                 295                 300
Val Asn Phe Glu Arg Asp Gly Ser Glu Ile Lys Ser Thr Ala Asp Asp
305                 310                 315                 320
Ile Ser Thr Ile Gly Ser Asn Lys Val Glu Asn Glu Lys Val Pro Leu
                325                 330                 335
Ser Ala Lys Glu Glu Arg Glu Ile Ser Ala Thr Lys Leu Thr Val Thr
            340                 345                 350
Asp Leu Gln Gln Leu Val Ala Thr Ala Leu His Glu Asp Arg Ser Leu
        355                 360                 365
Pro Val Asp Leu Gly Thr Leu Arg Phe Thr Asp Glu Pro Ile Lys Pro
    370                 375                 380
Ser Ser Asp Phe Asp Asn Asp Ile Gln Gly Met Val Thr Ile Pro Leu
385                 390                 395                 400
Ala Gly Pro Asp Leu Asp Asp Thr Ile Ser Ala Glu Leu Pro Leu Val
                405                 410                 415
Tyr Pro Ser Pro Ile Thr Val Asp Gln Thr Arg Asp Ile Phe Val Asp
            420                 425                 430
Glu Phe Thr Thr Gly Ile Thr Asp Leu Ser Arg Glu Ile Gly Gly Pro
        435                 440                 445
Glu Asp Phe Asp Ser Asn Phe Ile Thr Ser Glu Pro Ala Phe Pro Thr
    450                 455                 460
Lys Pro Ser Arg Glu Pro Pro His Asp Arg Ser Pro Asp Thr Glu Asp
465                 470                 475                 480
Ile Thr Thr Asp Tyr Gln Arg Phe Thr Val Pro Phe Ser Ala Leu Val
                485                 490                 495
Ser Thr Asp Ser Pro Ala Lys Pro Glu Asp Ser Tyr Leu Pro Pro Pro
            500                 505                 510
Ala Asp Glu Ser Asp Ser Asn Asp Leu Ile Thr Asp Glu Ser Pro Thr
        515                 520                 525
Glu Gln Val Ile Thr Pro Ala Val Tyr Thr Thr Gly Ser Phe Thr Leu
    530                 535                 540
Pro Thr Phe Leu Gln Ala Thr Asp Lys Asp Thr Glu Ala Glu Met Lys
545                 550                 555                 560
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Lys Glu Leu Val Gly Val Thr Glu Pro Leu Phe Lys Glu Ala Asp Arg
                565                 570                 575
Asp Ser Leu Ser Gly Gln Ala Val Lys Met Met Asp Glu Leu Glu Ser
            580                 585                 590
Ser Gly Asp Asp Ile Leu Val Thr Thr Ser Thr Tyr Lys Thr Leu Pro
        595                 600                 605
Phe Leu Ile Gly Ser Ser Asp Leu Phe Ala Thr Gln Pro Glu Val Thr
    610                 615                 620
Phe Ala Ala Ala Leu Pro Pro Asp Gln Thr Leu Leu Pro Thr Val Thr
625                 630                 635                 640
Ser Pro Phe Tyr Ser His Ser Val Val Ile Asp Gln Ser Pro Glu Val
                645                 650                 655
Pro Asp Thr Leu Met Pro Ala Ala Ala Ser Ala Leu Pro Asp Arg Ala
            660                 665                 670
Ser Thr Gly Val Gln Asp Ile Ala Ala Glu Leu Asp Gly Ala Gly Val
        675                 680                 685
Lys Ser Thr Ala Val Leu Asp Glu Ala Glu His Gly Ser Gly Tyr Ile
    690                 695                 700
Ser Val Gln Thr Thr Glu Pro Ala Glu Val Thr Gln Ala Pro Thr Leu
705                 710                 715                 720
Lys Tyr Val Thr Thr Ser Ser Met Thr Thr Ala Ala Lys Gly Lys Glu
                725                 730                 735
Leu Val Val Phe Phe Ser Leu Arg Val Thr Asn Met His Phe Ser Asp
            740                 745                 750
Asp Leu Phe Asn Arg Ser Ser Gln Glu Tyr Lys Ala Leu Glu Gln Gln
        755                 760                 765
Phe Met Gln Leu Leu Leu Pro Tyr Leu Gln Ser Asn Leu Thr Gly Phe
    770                 775                 780
Lys Gln Leu Glu Ile Leu Asn Phe Arg Asn Gly Ser Val Ile Val Asn
785                 790                 795                 800
Ser Lys Met Lys Phe Ala Arg Thr Val Pro Tyr Asn Ile Thr Glu Ala
                805                 810                 815
Val His Cys Val Leu Glu Asp Phe Cys Asp Ala Ala Ala Gln His Leu
            820                 825                 830
Asn Leu Glu Ile Asp Ser Tyr Ser Leu Asp Ile Glu Pro Ala Asp Gln
        835                 840                 845
Ala Asp Pro Cys Lys Phe Met Ala Cys Asp Glu Phe Ser Lys Cys Ile
    850                 855                 860
Met Asn Glu Trp Thr Lys Glu Ala Asp Cys Leu Cys Lys Pro Gly Tyr
865                 870                 875                 880
Ala Ser Gln Asp Gly Leu Pro Cys Arg Ser Leu Cys Glu Met Glu Pro
                885                 890                 895
His Leu Cys Asp Asn Gly Gly Lys Cys Glu Leu Val Pro Gly Arg Gly
            900                 905                 910
Ala Val Cys Arg Ser Pro Asp Gln Phe Thr Glu Pro Gly Leu Thr Ser
        915                 920                 925
```

<210> 316
<211> 798
<212> PRT
<213> Mus musculus

<220>
<223> Mouse Interphotoreceptor matrix proteoglycan 1
SPACR Q8RIW8

<400> 316
Met Asn Leu Gln Ile Lys His Ala Ile Phe Val Leu Gly Ile Phe Leu
 1   5   10   15
Gln Val Gln Gly Ile Lys Asp Thr Ser Ile Lys Ile Phe Ser Ser Glu
            20   25   30
Ile Lys Asn Ile Asp Lys Thr Pro Arg Ile Glu Thr Ile Glu Ser Thr
        35   40   45
Ser Thr Val His Lys Val Ser Thr Met Lys Arg Ile Phe Asp Leu Pro
    50   55   60
Lys Leu Arg Thr Lys Arg Ser Ala Leu Phe Pro Ala Ala Asn Ile Cys
65   70   75   80
Pro Gln Glu Ser Leu Arg Gln Ile Leu Ala Ser Leu Gln Glu Tyr Tyr
                85   90   95
Arg Leu Arg Val Cys Gln Glu Val Val Trp Glu Ala Tyr Arg Ile Phe
            100   105   110
Leu Asp Arg Ile Pro Asp Thr Glu Glu Tyr Gln Asp Trp Val Ser Leu
        115   120   125
Cys Gln Lys Glu Thr Phe Cys Leu Phe Asp Ile Gly Lys Asn Phe Ser
    130   135   140
Asn Ser Gln Glu His Leu Asp Leu Leu Gln Gln Arg Ile Lys Gln Arg
145   150   155   160
Ser Phe Pro Gly Arg Lys Asp Glu Thr Ala Ser Met Glu Thr Leu Glu
                165   170   175
Ala Pro Thr Glu Ala Pro Val Val Pro Thr Asp Val Ser Arg Met Ser
            180   185   190
Leu Gly Pro Phe Pro Leu Pro Ser Asp Asp Thr Asp Leu Lys Glu Ile
        195   200   205
Leu Ser Val Thr Leu Lys Asp Ile Gln Lys Pro Thr Thr Glu Ser Lys
    210   215   220
Thr Glu Pro Ile His Val Ser Glu Phe Ser Ser Glu Glu Lys Val Glu
225   230   235   240
Phe Ser Ile Ser Leu Pro Asn His Arg Phe Lys Ala Glu Leu Thr Asn
                245   250   255
Ser Gly Ser Pro Tyr Tyr Gln Glu Leu Val Gly Gln Ser Gln Leu Gln
            260   265   270
Leu Gln Lys Ile Phe Lys Lys Leu Pro Gly Phe Gly Glu Ile Arg Val
        275   280   285
Leu Gly Phe Arg Pro Lys Lys Glu Glu Asp Gly Ser Ser Ser Thr Glu
    290   295   300
Ile Gln Leu Met Ala Ile Phe Lys Arg Asp His Ala Glu Ala Lys Ser
305   310   315   320
Pro Asp Ser His Leu Leu Ser Leu Asp Ser Asn Lys Ile Glu Ser Glu
                325   330   335
Arg Ile His His Gly Val Ile Glu Asp Lys Gln Pro Glu Thr Tyr Leu
            340   345   350
Thr Ala Thr Asp Leu Lys Lys Leu Ile Ile Gln Leu Leu Asp Gly Asp
        355   360   365
Leu Ser Leu Val Glu Gly Lys Ile Pro Phe Gly Asp Glu Val Thr Gly
    370   375   380
Thr Leu Phe Arg Pro Val Thr Glu Pro Asp Leu Pro Lys Pro Leu Ala
385   390   395   400
Asp Val Thr Glu Asp Ala Thr Leu Ser Pro Glu Leu Pro Phe Val Glu
                405   410   415
Pro Arg Leu Glu Ala Val Asp Arg Glu Gly Ser Glu Leu Pro Gly Met
            420   425   430
Ser Ser Lys Asp Ser Ser Trp Ser Pro Pro Val Ser Ala Ser Ile Ser
        435   440   445
Arg Ser Glu Asn Leu Pro Ser Phe Thr Pro Ser Ile Phe Ser Leu Asp

```
    450                 455                 460
Ala Gln Ser Pro Pro Pro Leu Met Thr Thr Gly Pro Thr Ala Leu Ile
465                 470                 475                 480
Pro Lys Pro Thr Leu Pro Thr Ile Asp Tyr Ser Thr Ile Arg Gln Leu
                485                 490                 495
Pro Leu Glu Ser Ser His Trp Pro Ala Ser Ser Ser Asp Arg Glu Leu
            500                 505                 510
Ile Thr Ser Ser His Asp Thr Ile Arg Asp Leu Asp Gly Met Asp Val
        515                 520                 525
Ser Asp Thr Pro Ala Leu Ser Glu Ile Ser Glu Leu Ser Gly Tyr Asp
    530                 535                 540
Ser Ala Ser Gly Gln Phe Leu Glu Met Thr Thr Pro Ile Pro Thr Val
545                 550                 555                 560
Arg Phe Ile Thr Thr Ser Ser Glu Thr Ile Ala Thr Lys Gly Gln Glu
                565                 570                 575
Leu Val Val Phe Phe Ser Leu Arg Val Ala Asn Met Pro Phe Ser Tyr
            580                 585                 590
Asp Leu Phe Asn Lys Ser Ser Leu Glu Tyr Gln Ala Leu Glu Gln Arg
        595                 600                 605
Phe Thr Asp Leu Leu Val Pro Tyr Leu Arg Ser Asn Leu Thr Gly Phe
    610                 615                 620
Lys Gln Leu Glu Ile Leu Ser Phe Arg Asn Gly Ser Val Ile Val Asn
625                 630                 635                 640
Ser Lys Val Arg Phe Ala Lys Ala Val Pro Tyr Asn Leu Thr Gln Ala
                645                 650                 655
Val Arg Gly Val Leu Glu Asp Leu Arg Ser Thr Ala Ala Gln Gly Leu
            660                 665                 670
Asn Leu Glu Ile Glu Ser Tyr Ser Leu Asp Ile Glu Pro Ala Asp Gln
        675                 680                 685
Ala Asp Pro Cys Lys Leu Leu Asp Cys Gly Lys Phe Ala Gln Cys Val
    690                 695                 700
Lys Asn Glu Trp Thr Glu Glu Ala Glu Cys Arg Cys Arg Gln Gly His
705                 710                 715                 720
Glu Ser His Gly Thr Leu Asp Tyr Gln Thr Leu Asn Leu Cys Pro Pro
                725                 730                 735
Gly Lys Thr Cys Val Ala Gly Arg Glu Gln Ala Thr Pro Cys Arg Pro
            740                 745                 750
Pro Asp His Ser Thr Asn Gln Ala Gln Glu Pro Gly Val Lys Lys Leu
        755                 760                 765
Arg Gln Gln Asn Lys Val Val Lys Lys Arg Asn Ser Lys Leu Ser Ala
    770                 775                 780
Ile Gly Phe Glu Glu Phe Glu Asp Gln Asp Trp Glu Gly Asn
785                 790                 795


<210> 317
<211> 1243
<212> PRT
<213> Mus musculus

<220>
<223> Mouse Interphotoreceptor matrix proteoglycan 2
      SPACRCAN Q80XH2


<400> 317
Met Ile Met Phe Leu Pro Val Gly Arg Met Ser Leu Gly Ile Leu Ile
 1               5                  10                  15
```

```
Leu Phe Leu Thr Gly Gly Asn Leu Val Ser Ala Ser Glu Glu Arg Gln
            20                  25                  30
Glu Pro Met His Ala Val Ser Val Leu Ser Pro Glu Lys Ser Thr Asp
        35                  40                  45
Leu Ser Leu Pro Thr Arg Lys Arg Gln Leu Leu Asp Ala Thr Glu Thr
    50                  55                  60
Gly Arg Arg Trp Leu Leu Arg Arg Arg Arg Ser Ile Leu Phe Pro Asn
65                  70                  75                  80
Gly Val Lys Ile Cys Ser Ser Glu Thr Val Ala Glu Ala Val Ala Asn
                85                  90                  95
His Val Lys Tyr Phe Lys Ala Arg Val Cys Gln Glu Ala Ile Trp Glu
            100                 105                 110
Ala Phe Arg Thr Phe Trp Asp Arg Leu Pro Gly Arg Asp Glu Tyr Arg
        115                 120                 125
His Trp Met Asn Leu Cys Glu Asp Gly Val Thr Ser Val Phe Glu Met
    130                 135                 140
Gly Ala His Phe Ser Gln Ser Val Glu His Arg Asn Leu Ile Met Lys
145                 150                 155                 160
Lys Leu Ala Tyr Thr Arg Glu Ala Glu Ser Ser Ser Cys Lys Asp Gln
                165                 170                 175
Ser Cys Gly Pro Glu Leu Ser Phe Pro Val Pro Ile Gly Glu Thr Ser
            180                 185                 190
Thr Leu Thr Gly Ala Val Ser Ser Ala Ser Tyr Pro Gly Leu Ala Ser
        195                 200                 205
Glu Ser Ser Ala Ala Ser Pro Gln Glu Ser Ile Ser Asn Glu Ile Glu
    210                 215                 220
Asn Val Thr Glu Glu Pro Thr Gln Pro Ala Ala Glu Gln Ile Ala Glu
225                 230                 235                 240
Phe Ser Ile Gln Leu Leu Gly Lys Arg Tyr Ser Glu Glu Leu Arg Asp
                245                 250                 255
Pro Ser Ser Ala Leu Tyr Arg Leu Leu Val Glu Glu Phe Ile Ser Glu
            260                 265                 270
Val Glu Lys Ala Phe Thr Gly Leu Pro Gly Tyr Lys Gly Ile Arg Val
        275                 280                 285
Leu Glu Phe Arg Ala Pro Glu Glu Asn Asp Ser Gly Ile Asp Val His
    290                 295                 300
Tyr Ala Val Thr Phe Asn Gly Glu Ala Ile Ser Asn Thr Thr Trp Asp
305                 310                 315                 320
Leu Ile Ser Leu His Ser Asn Lys Val Glu Asn His Gly Leu Val Glu
                325                 330                 335
Met Asp Asp Lys Pro Thr Ala Val Tyr Thr Ile Ser Asn Phe Arg Asp
            340                 345                 350
Tyr Ile Ala Glu Thr Leu His Gln Asn Phe Leu Met Gly Asn Ser Ser
        355                 360                 365
Leu Asn Pro Asp Pro Lys Ser Leu Gln Leu Ile Asn Val Arg Gly Val
    370                 375                 380
Leu Leu Pro Gln Thr Glu Asp Ile Val Trp Asn Thr Gln Ser Ser Ser
385                 390                 395                 400
Leu Gln Val Thr Thr Ser Ser Ile Leu Asp Asn Thr Leu Gln Ala Glu
                405                 410                 415
Trp Leu Ser Ala Asp Thr Thr Thr Thr Thr Thr Thr Thr Ile Ser Pro
            420                 425                 430
Phe Gly Phe Ser Ser Ser Ser Pro Ser Ala Thr Gly Arg Glu Leu Gln
        435                 440                 445
Ser Gln Ser Ala Leu Arg Asp Val Val Ser Thr Ser Lys Leu Ala Ser
    450                 455                 460
Pro Thr Lys Val Val Leu Ser Ser Leu Pro Glu Ile Leu Gly Gly Ser
465                 470                 475                 480
```

```
Ser Leu Thr Leu His Ser Val Thr Pro Ala Val Leu Gln Pro Asp Leu
                485                 490                 495
Pro Val Ala Pro Glu Gly Arg Thr Ser Gly Ser Phe Ile Leu Glu Asp
            500                 505                 510
Gly Leu Ala Ser Thr Glu Glu Leu Glu Asp Thr Ser Ile Asp Gly Leu
        515                 520                 525
Pro Ser Ser Pro Leu Ile Gln Pro Val Pro Lys Glu Thr Val Pro Pro
    530                 535                 540
Met Glu Asp Ser Asp Thr Ala Leu Leu Ser Thr Pro His Leu Thr Ser
545                 550                 555                 560
Ser Ala Ile Glu Asp Leu Thr Lys Asp Ile Gly Thr Pro Ser Gly Leu
                565                 570                 575
Glu Ser Leu Ala Ser Asn Ile Ser Asp Gln Leu Glu Val Ile Pro Trp
            580                 585                 590
Phe Pro Asp Thr Ser Val Glu Lys Asp Phe Ile Phe Glu Ser Gly Leu
        595                 600                 605
Gly Ser Gly Ser Gly Lys Asp Val Asp Val Ile Asp Trp Pro Trp Ser
    610                 615                 620
Glu Thr Ser Leu Glu Lys Thr Thr Lys Pro Leu Ser Lys Ser Trp Ser
625                 630                 635                 640
Glu Glu Gln Asp Ala Leu Leu Pro Thr Glu Gly Arg Glu Lys Leu His
                645                 650                 655
Ile Asp Gly Arg Val Asp Ser Thr Glu Gln Ile Ile Glu Ser Ser Glu
            660                 665                 670
His Arg Tyr Gly Asp Arg Pro Ile His Phe Ile Glu Glu Glu Ser His
        675                 680                 685
Val Arg Ser Thr Ile Pro Ile Phe Val Glu Ser Ala Thr Pro Pro Thr
    690                 695                 700
Ser Pro Ile Phe Ser Lys His Thr Ser Asp Val Pro Asp Ile Asp Ser
705                 710                 715                 720
Tyr Ser Leu Thr Lys Pro Pro Phe Leu Pro Val Thr Ile Ala Ile Pro
                725                 730                 735
Ala Ser Thr Lys Lys Thr Asp Glu Val Leu Lys Glu Asp Met Val His
            740                 745                 750
Thr Glu Ser Ser Ser His Lys Glu Leu Asp Ser Glu Val Pro Val Ser
        755                 760                 765
Arg Pro Asp Met Gln Pro Val Trp Thr Met Leu Pro Glu Ser Asp Thr
    770                 775                 780
Val Trp Thr Arg Thr Ser Ser Leu Gly Lys Leu Ser Arg Asp Thr Leu
785                 790                 795                 800
Ala Ser Thr Pro Glu Ser Thr Asp Arg Leu Trp Leu Lys Ala Ser Met
                805                 810                 815
Thr Gln Ser Thr Glu Leu Pro Ser Thr Thr His Ser Thr Gln Leu Glu
            820                 825                 830
Glu Glu Val Ile Met Ala Val Gln Asp Ile Ser Leu Glu Leu Asp Gln
        835                 840                 845
Val Gly Thr Asp Tyr Tyr Gln Ser Glu Leu Thr Glu Glu Gln His Gly
    850                 855                 860
Lys Ala Asp Ser Tyr Val Glu Met Ser Thr Ser Val His Tyr Thr Glu
865                 870                 875                 880
Met Pro Ile Val Ala Leu Pro Thr Lys Gly Gly Val Leu Ser His Thr
                885                 890                 895
Gln Thr Ala Gly Ala Leu Val Val Phe Phe Ser Leu Arg Val Thr Asn
            900                 905                 910
Met Leu Phe Ser Glu Asp Leu Phe Asn Lys Asn Ser Leu Glu Tyr Lys
        915                 920                 925
Ala Leu Glu Gln Arg Phe Leu Glu Leu Leu Val Pro Tyr Leu Gln Ser
    930                 935                 940
```

```
Asn Leu Ser Gly Phe Gln Asn Leu Glu Ile Leu Ser Phe Arg Asn Gly
945                 950                 955                 960
Ser Ile Val Val Asn Ser Arg Val Arg Phe Ala Glu Ser Ala Pro Pro
                965                 970                 975
Asn Val Asn Lys Ala Met Tyr Arg Ile Leu Glu Asp Phe Cys Thr Thr
            980                 985                 990
Ala Tyr Gln Thr Met Asn Leu Asp Ile Asp Lys Tyr Ser Leu Asp Val
        995                 1000                1005
Glu Ser Gly Asp Glu Ala Asn Pro Cys Lys Phe Gln Ala Cys Asn Glu
    1010                1015                1020
Phe Ser Glu Cys Leu Val Asn Pro Trp Ser Gly Glu Ala Lys Cys Lys
1025                1030                1035                1040
Cys Tyr Pro Gly Tyr Leu Ser Val Asp Glu Leu Pro Cys Gln Ser Leu
                1045                1050                1055
Cys Asp Leu Gln Pro Asp Phe Cys Leu Asn Asp Gly Lys Cys Asp Ile
            1060                1065                1070
Met Pro Gly His Gly Ala Ile Cys Arg Cys Arg Val Gly Ser Asn Trp
        1075                1080                1085
Trp Tyr Arg Gly Gln His Cys Glu Glu Phe Val Ser Glu Pro Phe Val
    1090                1095                1100
Ile Gly Ile Thr Ile Ala Ser Val Val Ser Phe Leu Leu Val Ala Ser
1105                1110                1115                1120
Ala Val Val Phe Phe Leu Val Lys Met Leu Gln Ala Gln Asn Val Arg
                1125                1130                1135
Arg Glu Arg Gln Arg Pro Thr Ser Ser Ser Arg His Pro Asp Ser Leu
            1140                1145                1150
Ser Ser Val Glu Asn Ala Met Lys Tyr Asn Pro Ala Tyr Glu Ser His
        1155                1160                1165
Leu Ala Gly Cys Glu Leu Tyr Glu Lys Ser Tyr Ser Gln His Pro Phe
    1170                1175                1180
Tyr Ser Ser Ala Ser Glu Glu Val Ile Gly Gly Leu Ser Arg Glu Glu
1185                1190                1195                1200
Ile Arg Gln Met Tyr Glu Ser Ser Asp Leu Ser Lys Glu Glu Ile Gln
                1205                1210                1215
Glu Arg Met Arg Ile Leu Glu Leu Tyr Ala Asn Asp Pro Glu Phe Ala
            1220                1225                1230
Ala Phe Val Arg Glu His Gln Met Glu Glu Leu
        1235                1240
```

<210> 318
<211> 1241
<212> PRT
<213> Rattus norvegicus

<220>
<223> Rat Interphotoreceptor matrix proteoglycan 2
SPACRCAN P70628

<400> 318

```
Met Ile Met Phe Leu Pro Leu Gly Arg Ile Ser Leu Gly Ile Leu Ile
 1               5                  10                  15
Leu Phe Leu Thr Gly Gly Asn Leu Val Ser Val Ser Glu Glu Ile Gln
            20                  25                  30
Asp Arg Met His Ala Val Ala Val Leu Ser Pro Lys Glu Ser Thr Asp
        35                  40                  45
Leu Ser Leu Pro Thr Arg Lys Arg Gln Leu Leu Asp Ala Thr Glu Thr
```

```
    50                  55                  60
Gly Arg Arg Trp Pro Leu Arg Arg Arg Arg Ser Ile Leu Phe Pro Asn
65                  70                  75                  80
Gly Val Arg Ile Cys Pro Ser Asp Thr Val Ala Glu Ala Val Ala Asn
                85                  90                  95
His Val Lys Tyr Phe Lys Ala Arg Val Cys Gln Glu Ala Ile Trp Glu
            100                 105                 110
Ala Phe Arg Thr Phe Trp Asp Arg Leu Pro Gly Arg Glu Glu Tyr Gln
        115                 120                 125
Tyr Trp Met Asn Leu Cys Glu Asp Gly Val Thr Ser Val Phe Glu Met
    130                 135                 140
Gly Thr Gln Phe Ser Gln Ser Val Glu His Arg His Leu Ile Met Glu
145                 150                 155                 160
Lys Leu Thr Tyr Thr Lys Glu Ala Glu Ser Ser Ser Cys Lys Asp Gln
                165                 170                 175
Ala Cys Gly Pro Glu Leu Ser Ser Pro Val Pro Ile Gly Glu Thr Ser
            180                 185                 190
Thr Leu Ala Gly Ala Val Ser Ser Ala Ser Tyr Pro Gly Ala Ala Ser
        195                 200                 205
Glu Arg Ser Ala Ala Ser Pro Gln Glu Ser Ile Ser Asn Glu Ile Glu
    210                 215                 220
Asn Val Thr Glu Gln Pro Thr Pro Pro Ala Ala Glu Gln Ile Ala Glu
225                 230                 235                 240
Phe Ser Ile Gln Leu Leu Gly Lys Gln Tyr Ser Glu Glu Leu Arg Asp
                245                 250                 255
Pro Ser Ser Ala Leu Tyr Arg Leu Leu Val Glu Glu Phe Ile Ser Glu
            260                 265                 270
Val Glu Lys Ala Phe Thr Gly Leu Pro Gly Tyr Lys Gly Ile His Val
        275                 280                 285
Leu Asp Phe Arg Ser Pro Lys Glu Asn Gly Ser Gly Ile Asp Val His
    290                 295                 300
Tyr Ala Val Thr Phe Asn Gly Glu Ala Ile Ser Asn Thr Thr Trp Asp
305                 310                 315                 320
Leu Ile Ser Leu His Ser Asn Lys Val Glu Asn His Gly Leu Val Glu
                325                 330                 335
Leu Asp Asp Lys Pro Thr Ala Val Tyr Thr Ile Ser Asn Phe Arg Asp
            340                 345                 350
Tyr Ile Ala Glu Thr Leu His Gln Asn Phe Leu Met Gly Asn Ser Ser
        355                 360                 365
Leu Asn Pro Asp Pro Lys Ser Leu Gln Leu Ile Asn Val Arg Gly Val
    370                 375                 380
Leu Leu Pro Gln Thr Glu Glu Ile Val Trp Asn Thr Gln Ser Ser Ser
385                 390                 395                 400
Leu Gln Val Thr Thr Ser Ser Ile Leu Asp Asn Thr Leu Gln Ala Glu
                405                 410                 415
Trp Leu Ser Ala Asp Glu Ser Ile Thr Thr Thr Thr Thr Thr Thr Ile
            420                 425                 430
Ser Pro Phe Gly Phe Ser Ser Gly Pro Pro Ser Ala Thr Gly Arg Glu
        435                 440                 445
Leu His Ser Glu Ser Thr Leu Gly Asp Ile Val Ser Thr Pro Lys Leu
    450                 455                 460
Ala Ser Pro Ser Lys Val Val Leu Ser Ser Ser Pro Glu Val Leu Gly
465                 470                 475                 480
Gly Ser Ser Leu Thr Leu His Ser Val Thr Pro Ala Val Leu Gln Ile
                485                 490                 495
Asp Leu Pro Val Ala Pro Glu Gly Arg Thr Ser Gly Ser Ser Ile Leu
            500                 505                 510
Glu Asp Asp Asn Thr Glu Glu Ser Glu Asp Val Ser Ile Asp Val Leu
```

```
        515                 520                 525
Pro Ser Ser Ser Leu Ile Gln Pro Val Pro Lys Glu Thr Val Pro Pro
    530                 535                 540
Met Glu Asp Ser Asp Met Ile Leu Leu Thr Ser Ser Pro His Leu Thr
545                 550                 555                 560
Ser Ser Val Ile Glu Asp Leu Ala Lys Asp Ile Thr Thr Pro Ser Gly
                565                 570                 575
Leu Asp Ser Leu Ala Ser Arg Val Ser Asp Lys Leu Asp Val Ser Pro
            580                 585                 590
Trp Phe Pro Asp Thr Ser Val Glu Lys Glu Phe Ile Phe Glu Ser Gly
        595                 600                 605
Leu Gly Ser Gly Ser Gly Lys Asn Val Asp Val Ile Asp Trp Pro Trp
    610                 615                 620
Ser Glu Thr Ser Leu Glu Lys Thr Thr Glu Pro Leu Ser Lys Ser Trp
625                 630                 635                 640
Ser Glu Glu Gln Asp Thr Leu Leu Pro Thr Glu Ser Ile Glu Lys Leu
                645                 650                 655
His Met Tyr Phe Thr Glu Gln Met Ile Glu Pro Ser Ala His Arg Tyr
            660                 665                 670
Gly Asp Gly Pro Ile Tyr Phe Thr Glu Glu Glu Ser His Val Arg Ser
        675                 680                 685
Thr Ile Pro Ile Phe Ala Glu Ser Ala Thr Gln Pro Thr Ser Leu Ile
    690                 695                 700
Ser Ser Lys His Thr Ser Asp Val Pro Asp Ile Asp Ser Tyr Ser Val
705                 710                 715                 720
Thr Lys Ala Pro Phe Leu Leu Ala Thr Ile Ala Asn Thr Ala Ser Thr
                725                 730                 735
Lys Glu Thr Asp Glu Val Asn Thr Leu Leu Lys Lys Gly Met Val Gln
            740                 745                 750
Thr Glu Pro Ser Ser Pro Lys Gly Leu Asp Ser Lys Ile Ser Val Ala
        755                 760                 765
Arg Pro Asp Met Gln Pro Val Trp Thr Ile Leu Pro Glu Ser Asp Thr
    770                 775                 780
Val Trp Ala Arg Thr Ser Ser Leu Gly Lys Leu Ser Arg Asp Thr Leu
785                 790                 795                 800
Val Ser Thr Pro Glu Ser Ala Asp Arg Leu Trp Leu Lys Ala Ser Met
                805                 810                 815
Thr Gln Pro Ala Glu Leu Pro Pro Ser Thr His Ser Ile Gln Leu Glu
            820                 825                 830
Asp Glu Val Ile Met Ala Val Gln Asn Ile Ser Leu Glu Leu Asp Gln
        835                 840                 845
Val Gly Thr Asp Tyr Tyr Gln Pro Glu Leu Thr Gln Glu Gln Asn Gly
    850                 855                 860
Lys Val Asp Ser Tyr Val Glu Met Pro Thr His Val His Tyr Thr Glu
865                 870                 875                 880
Met Pro Leu Val Ala Gln Pro Thr Lys Gly Gly Val Leu Ser Arg Thr
                885                 890                 895
Gln Thr Ala Gly Ala Leu Val Val Phe Phe Ser Leu Arg Val Thr Asn
            900                 905                 910
Met Leu Phe Ser Glu Asp Leu Phe Asn Lys Asn Ser Leu Glu Tyr Lys
        915                 920                 925
Ala Leu Glu Gln Arg Phe Leu Glu Leu Leu Val Pro Tyr Leu Gln Ser
    930                 935                 940
Asn Leu Ser Gly Phe Gln Asn Leu Glu Ile Leu Asn Phe Arg Asn Gly
945                 950                 955                 960
Ser Ile Val Val Asn Ser Arg Val Lys Phe Ala Glu Ser Val Pro Pro
                965                 970                 975
Asn Val Asn Asn Ala Ile Tyr Met Ile Leu Glu Asp Phe Cys Thr Thr
```

```
            980                 985                 990
Ala Tyr Gln Thr Met Asn Leu Asp Ile Asp Lys Tyr Ser Leu Asp Val
        995                 1000                1005
Glu Ser Gly Asp Asp Ala Asn Pro Cys Lys Phe Gln Ala Cys Asn Glu
    1010                1015                1020
Phe Ser Glu Cys Leu Val Asn Pro Trp Ser Gly Glu Ala Lys Cys Lys
1025                1030                1035                1040
Cys His Pro Gly Tyr Leu Ser Val Asp Glu Leu Pro Cys Gln Ser Val
                1045                1050                1055
Cys Asp Leu Gln Pro Asp Phe Cys Leu Asn Asp Gly Lys Cys Asp Val
            1060                1065                1070
Met Pro Gly His Gly Ala Ile Cys Arg Cys Arg Val Gly Ser Asn Trp
        1075                1080                1085
Trp Tyr Arg Gly Gln His Cys Glu Glu Phe Val Ser Glu Pro Phe Val
    1090                1095                1100
Ile Gly Ile Thr Ile Ala Ser Val Val Ser Leu Leu Leu Val Ala Ser
1105                1110                1115                1120
Ala Val Val Phe Phe Leu Ala Lys Met Leu Gln Ala Gln Asn Val Arg
                1125                1130                1135
Arg Glu Arg Gln Arg Pro Thr Asn Arg Gln Pro Asp Ser Leu Ser Ser
            1140                1145                1150
Val Glu Asn Ala Met Lys Tyr Asn Pro Ala Tyr Glu Ser Arg Leu Ala
        1155                1160                1165
Gly Cys Glu Gln Tyr Glu Lys Pro Tyr Ser Gln His Pro Phe Tyr Ser
    1170                1175                1180
Ser Ala Ser Glu Glu Val Ile Gly Gly Leu Ser Arg Glu Glu Ile Arg
1185                1190                1195                1200
Gln Met Tyr Glu Ser Ser Asp Leu Ser Lys Glu Glu Ile Gln Glu Arg
                1205                1210                1215
Met Arg Ile Leu Glu Leu Tyr Ala Asn Asp Pro Glu Phe Ala Ala Phe
            1220                1225                1230
Val Arg Glu His Glu Met Glu Glu Leu
        1235                1240


<210> 319
<211> 1423
<212> PRT
<213> Gallus gallus

<220>
<223> Chicken Interphotoreceptor matrix proteoglycan 2
      SPACRCAN Q1XI86


<220>
<221> VARIANT
<222> 491, 606, 623, 812, 842
<223> Xaa = any amino acid

<400> 319
Met Phe Ala Phe Leu Trp Lys Ile Ser Leu Cys Leu Leu Val Leu Gly
 1               5                  10                  15
Val Ile Thr Gly Asp Pro Gln Ala Val Ala Ala Glu Glu Lys Gln Ala
            20                  25                  30
Lys Asp Ala Ser Pro Thr Pro Gln Leu Gly Val Trp Gln Phe Ala Ser
        35                  40                  45
Pro Ser Leu Pro Pro Glu Leu Arg Lys Leu His Gly Ile Val Glu Ala
```

```
    50                  55                  60
Glu Gln Val Asn Arg His Leu Leu Arg Arg Arg Lys Arg Ser Ile Leu
65                  70                  75                  80
Phe Pro Ser Gly Val Lys Ile Cys Pro Asp Glu Ser Val Glu Gln Ala
                85                  90                  95
Ile Ala Asn His Leu Lys Tyr Phe Arg Leu Arg Val Cys Gln Glu Thr
            100                 105                 110
Val Trp Glu Val Phe Lys Thr Phe Trp Asp Arg Leu Pro Glu Arg Glu
        115                 120                 125
Glu Tyr His Thr Trp Met Ser Leu Cys Glu Glu Gly Thr Met Ser Ile
    130                 135                 140
Phe Glu Met Gly Met Asn Phe Ser Gln Ser Glu Glu His Arg Ser Leu
145                 150                 155                 160
Ile Val Lys Lys Leu Ser Tyr Thr Lys Glu Ala Met Ala Gly Ser Cys
                165                 170                 175
Thr Asp Trp Ser Cys Gly Gly Thr Pro Thr Pro Ala Ser Asp Ala Asp
            180                 185                 190
Ala Thr Thr Leu Arg Asp Ala Ala Ala Asn Val Pro Pro Pro His Glu
        195                 200                 205
Val Ser Ile Glu Ser Pro Pro Gly Gly Thr Ser His Glu Ile Glu Asp
    210                 215                 220
Ala Asp Thr Thr Ile Asn Asn Glu Ile Lys Lys Glu Asp Glu Ile Pro
225                 230                 235                 240
Val Arg Pro Val Thr Glu Gln Met Ile Glu Phe Ser Ile Val Ile Ala
                245                 250                 255
Gly Glu Lys Tyr Ser Glu Glu Leu Ser Asp Pro Asp Thr Ala Lys Tyr
            260                 265                 270
Gln Leu Leu Ser Glu Gln Phe Val Ser Gln Ile Gln Asn Val Phe Glu
        275                 280                 285
Gly Leu Pro Gly Tyr Lys Asn Ile His Val Leu Glu Phe Ser Ser Pro
    290                 295                 300
Glu Glu Asp Ser Gly Val Glu Val His Tyr Ala Val Thr Phe Asp Gly
305                 310                 315                 320
Glu Ala Ile Ser Asn Ala Thr Trp Asp Leu Ile Asn Leu His Ser Asn
                325                 330                 335
Lys Val Glu Asp Asn Ser Phe Met Gly Ile Glu Asp Asn Pro Thr Val
            340                 345                 350
Val Tyr Thr Ile Ser Asp Phe Gln Asp Tyr Ile Ala Glu Ile Leu Gln
        355                 360                 365
Lys Asn Ala Leu Leu Glu Asn Thr Ser Leu Thr Leu Asp Pro Asn Ser
    370                 375                 380
Leu Gln Leu Ile Asn Val Lys Glu Ile Leu His Pro Thr Gln Glu Asp
385                 390                 395                 400
Pro Ser Trp Ile Thr Glu His Pro Thr Val Leu Glu His Val Glu Phe
                405                 410                 415
Asp Asp Asn Thr Phe Ser Ala Glu Arg Pro Ser Ala Asp Glu Ser Thr
            420                 425                 430
Val Ser Asn Thr Leu Pro Phe Asp Phe Thr Lys Pro Asp Ser Thr Leu
        435                 440                 445
Asp Ser Glu Glu Ser Asp Asp Asn Glu Ile Arg Pro Arg Pro Glu Ser
    450                 455                 460
Leu Asp Ser Glu Val Ser Leu Ile Pro Glu Ala Pro Leu Ser Ser Glu
465                 470                 475                 480
Ala Asp Val Thr Ser Leu Pro Asp Gly Leu Xaa Leu Ala Asp Trp Asn
                485                 490                 495
Gln Thr Pro Ala Leu Val Thr Ala Pro Val Ile Glu His Asp Ser Leu
            500                 505                 510
Asp Ser Leu Glu Trp Leu Ser Ala Pro Asp Ser Ser Asp Glu Phe Glu
```

```
        515                 520                 525
Asp Thr Gly Leu Ser Asp Asp Phe Leu Leu Pro Ser Ser Pro Ser Ser
    530                 535                 540
His Leu Val Pro Glu Glu Pro Pro Ser Thr Asp Asp Tyr Thr Ala Pro
545                 550                 555                 560
Leu Leu Ser Ala Pro Thr Val Ala Ser Ser Ser Val Ile Glu Thr Asp
                565                 570                 575
Thr Lys Arg Thr Val Thr Ala Glu Lys Glu Val Val Thr Gln Gly Ser
            580                 585                 590
Pro Ala Asp Ser Ser Ser Ala Asp Ser Leu Leu His Glu Xaa Val Glu
        595                 600                 605
Glu Ser Pro Phe Pro Leu Glu Val His Pro Val Glu Gly Glu Xaa Asp
    610                 615                 620
Ile Tyr Leu Gly Asp Arg Met Ile Phe Asp Asp Gly Ser Gly Ser Ala
625                 630                 635                 640
Phe Asp Gly Ser Gly Lys Gly Met Glu Pro Ser Ile Trp Pro Trp Asp
                645                 650                 655
Val Ala Thr Leu Glu Pro Val Phe Tyr Pro Gly Pro Asp Ser Trp Leu
            660                 665                 670
Asp Asp Asp Asn Asp Ser Leu Pro Phe Arg Thr Glu Asp Ile Pro Glu
        675                 680                 685
Gly Leu Ile Leu Asp Tyr Ile Leu Asn Ser Gly Asn Lys Leu Asp Asp
    690                 695                 700
Asp Pro Ser Lys Asp Glu Asn Glu Gly Val Ala Ser Ile Lys Glu Asn
705                 710                 715                 720
Phe Leu Asp Glu Ser Glu Ile Phe Val Phe Pro Glu Thr Thr Thr Gln
                725                 730                 735
Gln Val Pro Leu Leu Gln Thr Gly Glu Pro Ser Ser Val Glu Thr Ser
            740                 745                 750
Thr Gln Met Glu Thr Leu Ser Met Asp Asp Asp Ser Phe Val Lys Pro
        755                 760                 765
Ser Phe Val Leu Glu Pro Pro Glu Asp Tyr Ser Phe Ala Asp Leu Pro
    770                 775                 780
Thr Gly Glu Asp Leu Phe Leu Pro His Ser Thr Gly Val Ser Val Glu
785                 790                 795                 800
Asp Thr Leu Leu Thr Ser Thr Val Thr Leu Gly Xaa Glu Asp Ser Leu
                805                 810                 815
Leu Thr Ser Thr Val Ala Phe Ser Val Glu Gln Pro Glu Glu Ser Ser
            820                 825                 830
Val Gly Gln Glu Ile Ile Ser Glu Ala Xaa Glu His Gln Asn Glu Asp
        835                 840                 845
Arg Pro Thr Val Glu Glu Leu Phe Thr Ala Gly Gln Ser Asn Val Gly
    850                 855                 860
Glu Ala Ala Thr Val Gly Tyr Leu Asp Lys Ser Ser Leu Glu Thr Val
865                 870                 875                 880
Leu Thr Ala Glu Pro Phe Glu Val Ser Thr Asp Thr Ser Thr Glu Glu
                885                 890                 895
Gln Gln Ser Leu Asp Ser Ser Leu Ala Asp Arg Asp Thr Gly Leu Ala
            900                 905                 910
Ile Arg Lys Pro Ala Asp Val Trp Pro Thr Asp Arg Val Leu Glu Lys
        915                 920                 925
Thr Leu Asp Gln Thr Val Gln Ser Ala Val Pro Thr Ala Ala Gln Val
    930                 935                 940
Ser Thr Ala Val Pro Ser Leu Ile His Gln Ala Thr Ala Leu Glu Gly
945                 950                 955                 960
Phe Ala Gly Gln Asp Gly Thr Glu His Asp Thr His Val Ser Met Ser
                965                 970                 975
Ile Ser Thr Ile Leu Asn Ser Tyr Val Thr Ile Thr Ala Asp Thr Val
```

```
            980                 985                 990
Glu Leu Pro Ser His Leu Pro Pro Met Thr Thr Thr Val Ser Ser Ser
        995                 1000                1005
Val Val Thr Leu Ala Lys Val Gly Asp Glu Thr Thr Arg Val Leu Asp
    1010                1015                1020
Val Ser Val Asp Leu Asp His Val Ser Met Val Ser Phe Ser Pro Glu
1025                1030                1035                1040
Pro Ser Glu Glu Ala Lys Ser Met Thr Asp Ser His Met Glu Leu Thr
                1045                1050                1055
Thr His Ala His Ser Thr Glu Met Ala Gly Val Ala Trp Pro Thr His
            1060                1065                1070
Glu Ile His Asn Ser Thr Pro Val Pro Ser Arg Ala Leu Val Val Phe
        1075                1080                1085
Phe Ser Leu Arg Val Thr Asn Met Met Phe Ser Glu Asp Leu Phe Asn
    1090                1095                1100
Lys Asn Ser Pro Glu Tyr Lys Ala Leu Glu Gln Arg Phe Leu Glu Leu
1105                1110                1115                1120
Leu Val Pro Tyr Leu Gln Ser Asn Leu Thr Gly Phe Gln Asn Leu Glu
                1125                1130                1135
Ile Leu Asn Phe Arg Asn Gly Ser Ile Val Val Asn Ser Arg Met Lys
            1140                1145                1150
Phe Ala Lys Pro Val Pro Arg Asn Val Thr Asn Ala Val Tyr Met Ile
        1155                1160                1165
Leu Glu Asp Phe Cys Asn Thr Ala Tyr His Thr Met Asn Leu Ala Ile
    1170                1175                1180
Asp Lys Tyr Ser Leu Asp Val Glu Ser Gly Glu Gln Ala Asp Pro Cys
1185                1190                1195                1200
Lys Phe Gln Ala Cys Asn Glu Phe Ser Glu Cys Leu Val Asn Arg Trp
                1205                1210                1215
Ser Gly Glu Ala Glu Cys Val Cys Asn Pro Gly Tyr Leu Ser Ile Asp
            1220                1225                1230
Gly Leu Pro Cys Asn Ser Ile Cys Asp Leu Gln Pro Asn Phe Cys Leu
        1235                1240                1245
Asn Asp Gly Lys Cys Asp Ile Ser Pro Gly Gln Gly Ala Ile Cys Arg
    1250                1255                1260
Cys Arg Val Gly Glu Asn Trp Trp Tyr Arg Gly Glu His Cys Glu Glu
1265                1270                1275                1280
Tyr Val Ser Glu Pro Leu Val Val Gly Ile Ala Ile Ala Ser Val Ala
                1285                1290                1295
Gly Phe Leu Leu Val Ala Ser Ala Val Ile Phe Phe Leu Ala Arg Thr
            1300                1305                1310
Leu Arg Asp Gln Tyr Thr Lys Ser Asp Thr Glu Asp Ser Gln Gly Gln
        1315                1320                1325
Gly Asp Ser Leu Ser Ser Ile Glu Asn Ala Val Lys Tyr Asn Pro Met
    1330                1335                1340
Tyr Glu Ser Asp Thr Thr Gly Tyr Ser His Tyr Tyr Arg Arg Tyr Pro
1345                1350                1355                1360
Gln Leu Thr Ser Tyr Ser Ser Thr Ser Ala Glu Thr Ser Thr Asp Tyr
                1365                1370                1375
Ser Ser Glu Glu Ile Arg His Ile Tyr Glu Asn Ser Glu Leu Thr Lys
            1380                1385                1390
Glu Glu Ile Gln Asp Arg Ile Arg Ile Ile Glu Leu Tyr Ala Lys Asp
        1395                1400                1405
Arg Gln Phe Ala Glu Phe Val Arg Gln His Gln Met Lys Leu Leu
    1410                1415                1420
```

<210> 320

<211> 304
<212> PRT
<213> Mus musculus

<220>
<223> Mouse CD38 P56528

<400> 320
Met Ala Asn Tyr Glu Phe Ser Gln Val Ser Gly Asp Arg Pro Gly Cys
 1   5   10   15
Arg Leu Ser Arg Lys Ala Gln Ile Gly Leu Gly Val Gly Leu Leu Val
            20   25   30
Leu Ile Ala Leu Val Val Gly Ile Val Val Ile Leu Leu Arg Pro Arg
        35   40   45
Ser Leu Leu Val Trp Thr Gly Glu Pro Thr Thr Lys His Phe Ser Asp
    50   55   60
Ile Phe Leu Gly Arg Cys Leu Ile Tyr Thr Gln Ile Leu Arg Pro Glu
65   70   75   80
Met Arg Asp Gln Asn Cys Gln Glu Ile Leu Ser Thr Phe Lys Gly Ala
                85   90   95
Phe Val Ser Lys Asn Pro Cys Asn Ile Thr Arg Glu Asp Tyr Ala Pro
            100   105   110
Leu Val Lys Leu Val Thr Gln Thr Ile Pro Cys Asn Lys Thr Leu Phe
        115   120   125
Trp Ser Lys Ser Lys His Leu Ala His Gln Tyr Thr Trp Ile Gln Gly
    130   135   140
Lys Met Phe Thr Leu Glu Asp Thr Leu Leu Gly Tyr Ile Ala Asp Asp
145   150   155   160
Leu Arg Trp Cys Gly Asp Pro Ser Thr Ser Asp Met Asn Tyr Val Ser
                165   170   175
Cys Pro His Trp Ser Glu Asn Cys Pro Asn Asn Pro Ile Thr Val Phe
            180   185   190
Trp Lys Val Ile Ser Gln Lys Phe Ala Glu Asp Ala Cys Gly Val Val
        195   200   205
Gln Val Met Leu Asn Gly Ser Leu Arg Glu Pro Phe Tyr Lys Asn Ser
    210   215   220
Thr Phe Gly Ser Val Glu Val Phe Ser Leu Asp Pro Asn Lys Val His
225   230   235   240
Lys Leu Gln Ala Trp Val Met His Asp Ile Glu Gly Ala Ser Ser Asn
                245   250   255
Ala Cys Ser Ser Ser Ser Leu Asn Glu Leu Lys Met Ile Val Gln Lys
            260   265   270
Arg Asn Met Ile Phe Ala Cys Val Asp Asn Tyr Arg Pro Ala Arg Phe
        275   280   285
Leu Gln Cys Val Lys Asn Pro Glu His Pro Ser Cys Arg Leu Asn Thr
    290   295   300

<210> 321
<211> 303
<212> PRT
<213> Rattus norvegicus

<220>
<223> Rat CD38 Q64244

<400> 321
Met Ala Asn Tyr Glu Phe Ser Gln Val Ser Glu Asp Arg Pro Gly Cys
 1   5   10   15
Arg Leu Thr Arg Lys Ala Gln Ile Gly Leu Gly Val Gly Leu Leu Leu
            20   25   30
Leu Val Ala Leu Val Val Val Val Val Ile Val Leu Trp Pro Arg Ser
        35   40   45
Pro Leu Val Trp Lys Gly Lys Pro Thr Thr Lys His Phe Ala Asp Ile
    50   55   60
Ile Leu Gly Arg Cys Leu Ile Tyr Thr Gln Ile Leu Arg Pro Glu Met
65   70   75   80
Arg Asp Gln Asp Cys Lys Lys Ile Leu Ser Thr Phe Lys Arg Gly Phe
                85   90   95
Ile Ser Lys Asn Pro Cys Asn Ile Thr Asn Glu Asp Tyr Ala Pro Leu
            100   105   110
Val Lys Leu Val Thr Gln Thr Ile Pro Cys Asn Lys Thr Leu Phe Trp
        115   120   125
Ser Lys Ser Lys His Leu Ala His Gln Tyr Thr Trp Ile Gln Gly Lys
    130   135   140
Met Phe Thr Leu Glu Asp Thr Leu Leu Gly Tyr Ile Ala Asp Asp Leu
145   150   155   160
Arg Trp Cys Gly Asp Pro Ser Thr Ser Asp Met Asn Tyr Asp Ser Cys
                165   170   175
Pro His Trp Ser Glu Asn Cys Pro Asn Asn Pro Val Ala Val Phe Trp
            180   185   190
Asn Val Ile Ser Gln Lys Phe Ala Glu Asp Ala Cys Gly Val Val Gln
        195   200   205
Val Met Leu Asn Gly Ser Leu Ser Glu Pro Phe Tyr Arg Asn Ser Thr
    210   215   220
Phe Gly Ser Val Glu Val Phe Asn Leu Asp Pro Asn Lys Val His Lys
225   230   235   240
Leu Gln Ala Trp Val Met His Asp Ile Lys Gly Thr Ser Ser Asn Ala
                245   250   255
Cys Ser Ser Pro Ser Ile Asn Glu Leu Lys Ser Ile Val Asn Lys Arg
            260   265   270
Asn Met Ile Phe Ala Cys Gln Asp Asn Tyr Arg Pro Val Arg Phe Leu
        275   280   285
Gln Cys Val Lys Asn Pro Glu His Pro Ser Cys Arg Leu Asn Val
    290   295   300

<210> 322
<211> 298
<212> PRT
<213> Oryctolagus cuniculus

<220>
<223> Rabbit CD38 Q0MZ03

<400> 322
Met Pro Asp Tyr Glu Phe Ser Pro Ala Ser Gly Asp Arg Pro Arg Ser
 1   5   10   15
Trp Ile Ser Lys Gln Val Leu Ile Val Leu Gly Val Cys Leu Pro Val
            20   25   30
Ile Leu Ala Leu Ala Ile Trp Val Gly Val Leu Thr Trp Arg Gln Ser
        35   40   45
Ser Met Gly Ala Thr Asp His Val Ser Ala Ile Val Leu Gly Arg Cys

```
    50                  55                  60
Leu Thr Tyr Thr Arg Asn Met His Pro Glu Leu Arg Asn Gln Asp Cys
65                  70                  75                  80
Lys Lys Ile Leu Asn Thr Phe Thr Ser Ala Phe Val Ser Lys Asp Pro
                85                  90                  95
Cys Asn Ile Thr Lys Glu Asp Tyr Gln Pro Leu Ile Asp Leu Val Thr
            100                 105                 110
Gln Thr Val Pro Cys Asn Lys Thr Leu Phe Trp Ser Arg Ser Lys Glu
        115                 120                 125
Leu Ala His Gln Tyr Ser Gly Ile Gln Lys Glu Met Phe Thr Leu Glu
    130                 135                 140
Asp Thr Leu Leu Gly Tyr Ile Ala Asp Asn Leu Val Trp Cys Gly Asp
145                 150                 155                 160
Pro Arg Thr Ser Glu Val Lys Glu Glu Phe Cys Pro Tyr Arg Asn Glu
                165                 170                 175
Asn Cys Ser Ser Thr Ala Thr Ser Val Phe Trp Thr Val Val Ser Gln
            180                 185                 190
Lys Phe Ala Glu Ser Ala Cys Gly Thr Val Tyr Val Met Leu Asn Gly
        195                 200                 205
Ser Arg Thr Thr Ala Phe Ser Lys Ala Ser Thr Phe Gly Ser Val Glu
    210                 215                 220
Val Phe Asn Leu His Pro Asp Arg Val His Thr Leu His Ala Trp Val
225                 230                 235                 240
Met His Asp Ile Gly Gly Val Glu Arg Asp Ser Cys Leu Gly Ser Ser
                245                 250                 255
Ile Lys Glu Leu Lys Ser Ile Val Asn Gln Arg Asn Ile Ser Phe Phe
            260                 265                 270
Cys Gln Asp Asp Tyr Arg Pro Ala Arg Phe Val Gln Cys Val Arg His
        275                 280                 285
Pro Glu His Pro Ser Cys Ser Val Leu Met
    290                 295
```

<210> 323
<211> 301
<212> PRT
<213> Macaca fascicularis

<220>
<223> Cynomolgus monkey CD38 Q5VAN0

<400> 323

```
Met Ala Asn Cys Glu Phe Ser Pro Val Ser Gly Asp Lys Pro Cys Cys
 1               5                  10                  15
Arg Leu Ser Arg Arg Ala Gln Val Cys Leu Gly Val Cys Leu Leu Val
            20                  25                  30
Leu Leu Ile Leu Val Val Val Val Ala Val Val Leu Pro Arg Trp Arg
        35                  40                  45
Gln Gln Trp Ser Gly Ser Gly Thr Thr Ser Arg Phe Pro Glu Thr Val
    50                  55                  60
Leu Ala Arg Cys Val Lys Tyr Thr Glu Val His Pro Glu Met Arg His
65                  70                  75                  80
Val Asp Cys Gln Ser Val Trp Asp Ala Phe Lys Gly Ala Phe Ile Ser
                85                  90                  95
Lys Tyr Pro Cys Asn Ile Thr Glu Glu Asp Tyr Gln Pro Leu Val Lys
            100                 105                 110
Leu Gly Thr Gln Thr Val Pro Cys Asn Lys Thr Leu Leu Trp Ser Arg
```

```
        115                 120                 125
Ile Lys Asp Leu Ala His Gln Phe Thr Gln Val Gln Arg Asp Met Phe
    130                 135                 140
Thr Leu Glu Asp Met Leu Leu Gly Tyr Leu Ala Asp Asp Leu Thr Trp
145                 150                 155                 160
Cys Gly Glu Phe Asn Thr Phe Glu Ile Asn Tyr Gln Ser Cys Pro Asp
                165                 170                 175
Trp Arg Lys Asp Cys Ser Asn Asn Pro Val Ser Val Phe Trp Lys Thr
            180                 185                 190
Val Ser Arg Arg Phe Ala Glu Thr Ala Cys Gly Val Val His Val Met
        195                 200                 205
Leu Asn Gly Ser Arg Ser Lys Ile Phe Asp Lys Asn Ser Thr Phe Gly
    210                 215                 220
Ser Val Glu Val His Asn Leu Gln Pro Glu Lys Val Gln Ala Leu Glu
225                 230                 235                 240
Ala Trp Val Ile His Gly Gly Arg Glu Asp Ser Arg Asp Leu Cys Gln
                245                 250                 255
Asp Pro Thr Ile Lys Glu Leu Glu Ser Ile Ile Ser Lys Arg Asn Ile
            260                 265                 270
Arg Phe Phe Cys Lys Asn Ile Tyr Arg Pro Asp Lys Phe Leu Gln Cys
        275                 280                 285
Val Lys Asn Pro Glu Asp Ser Ser Cys Leu Ser Gly Ile
    290                 295                 300
```

<210> 324
<211> 411
<212> PRT
<213> Mus musculus

<220>
<223> Mouse Intracellular hyaluronan-binding protein 4
Q9JKS5

<400> 324

```
Met Lys Gly Ala Leu Gly Ser Pro Val Ala Ala Ala Gly Ala Ala Met
 1               5                  10                  15
Gln Glu Thr Phe Gly Cys Val Val Ala Asn Arg Phe His Gln Leu Leu
            20                  25                  30
Asp Asp Glu Ser Asp Pro Phe Asp Ile Leu Arg Glu Ala Glu His Arg
        35                  40                  45
Arg Gln Gln Gln Leu Gln Arg Lys Arg Arg Asp Glu Ala Ala Ala Ala
    50                  55                  60
Ser Gly Ala Gly His Arg Gly Gly Arg Ser Pro Ala Val Ala Ser Gly
65                  70                  75                  80
His Arg Pro Gly Ala Gly Gly Arg Arg Glu Ser Gln Lys Glu Arg Lys
                85                  90                  95
Ser Leu Ala Ala Ser Gly Ala Gln Gln Pro Asp Ser Pro Gly Gly Pro
            100                 105                 110
Gln Pro Pro Gly Gln Lys Arg Thr Pro Arg Arg Gly Glu Gln Gln Gly
        115                 120                 125
Trp Asn Asp Asn Arg Gly Thr Asp Val Val Leu Glu Arg Ala Glu Arg
    130                 135                 140
Arg Ser Tyr Arg Glu Tyr Arg Pro Tyr Glu Thr Glu Arg Gln Ala Asp
145                 150                 155                 160
Leu Pro Val Glu Lys Phe Thr Asp Glu Lys Pro Val Asp Arg Phe Asp
                165                 170                 175
```

```
Arg Asp Arg Pro Leu Arg Gly Arg Gly Gly Pro Arg Gly Gly Leu Arg
            180                 185                 190
Ser Arg Gly Arg Gly Gly Pro Gly Asn Arg Ala Phe Asp Ser Phe Asp
        195                 200                 205
Gln Arg Gly Lys Arg Asp Phe Glu Arg Tyr Ser Ser Asn Asp Lys Thr
    210                 215                 220
Asn Arg Met Glu Asp Ser Met Gly Gly Cys Gly Ile Arg Pro Trp Gly
225                 230                 235                 240
Ser Gly Lys Asp Thr Ser Asp Thr Glu Pro Pro Ala Pro Met Glu Glu
                245                 250                 255
Thr Ser Met Met Glu Glu Cys Gln Gly Thr Leu Asp Glu Glu Ser Ala
            260                 265                 270
Ala Lys Val Pro Glu Leu Glu Val Glu Glu Glu Asn Gln Val Gln Glu
        275                 280                 285
Met Thr Leu Asp Glu Trp Lys Asn Leu Gln Glu Gln Thr Arg Pro Lys
    290                 295                 300
Pro Glu Phe Asn Ile Arg Lys Pro Glu Ser Thr Val Pro Ser Lys Ala
305                 310                 315                 320
Val Val Ile His Lys Ser Arg Tyr Arg Asp Asp Met Val Lys Glu Asp
                325                 330                 335
Tyr Glu Asp Glu Ser His Val Phe Arg Lys Ala Ala Asn Asp Ile Thr
            340                 345                 350
Ser Gln Leu Glu Ile Asn Phe Gly Asn Leu Pro Arg Pro Gly Arg Gly
        355                 360                 365
Ala Arg Gly Ser Thr Arg Gly Gly Arg Gly Arg Met Arg Arg Thr Glu
    370                 375                 380
Asn Tyr Gly Pro Arg Ala Glu Val Val Thr Gln Asp Val Ala Pro Asn
385                 390                 395                 400
Pro Asp Asp Pro Glu Asp Phe Pro Ala Leu Ala
                405                 410
```

<210> 325
<211> 357
<212> PRT
<213> Gallus gallus

<220>
<223> Chicken Intracellular hyaluronan-binding protein 4
Q9I9R0

<400> 325

```
Met Met Lys Gly Ala Met Gly Cys Pro Val Ala Ala Val Met Glu Gly
 1               5                  10                  15
Ser Phe Ser Cys Thr Val Ala Asn Arg Phe Tyr Gln Leu Leu Asp Asp
            20                  25                  30
Glu Ser Asp Pro Phe Asp Asn Leu Arg Glu Ala Glu Arg Cys Trp Gln
        35                  40                  45
Gln Arg Lys Asn Leu Ser Lys Val Val Ala Arg Arg Gly Asp Pro Gly
    50                  55                  60
Ser Arg Gly Cys Ala Thr Arg Arg Glu Leu Gln Lys Gln Arg Lys Gln
65                  70                  75                  80
Leu Gly Thr Pro Ala Pro Pro Pro Gln Pro Gly Gln Lys Gln Ala Pro
                85                  90                  95
Lys Gln Glu Glu Cys Gly Gly Lys Asp Asn Ser Arg Ala Glu Lys Glu
            100                 105                 110
His Lys Thr Ala Trp Arg Pro Ser Phe Met Glu Tyr Leu Ser Ser Glu
```

```
        115                 120                 125
Thr Glu Ser Gln Ala Glu Leu Thr Ala Gln Ser Leu Phe Arg Pro Thr
    130                 135                 140
Ala Lys Leu Asn Tyr Glu Arg Pro Arg Gly Cys Gly Arg Gly Arg Gly
145                 150                 155                 160
Gly Met Gln Gly Arg Gly Arg Gly Gly Gly Ile Asn Lys Ser Phe Asp
                165                 170                 175
Gly Phe Asp Gln Arg Gly Lys Arg Glu Phe Gly Arg Gln Asn Asp Asn
            180                 185                 190
Asp Lys Ile Glu Met Glu Leu Thr Ala Pro Met Glu Ala Thr Ala Lys
        195                 200                 205
Thr Ala Lys Ser Pro Gly Val Ser Glu Gly Glu Leu Leu Asn Lys Val
    210                 215                 220
Ala Glu Gly Lys Pro Arg Glu Glu Val Val Gln Glu Met Thr Leu Asp
225                 230                 235                 240
Glu Trp Lys Asn Leu Gln Gln Gln Asn Arg Pro Lys His Glu Phe Asn
                245                 250                 255
Ile Arg Arg Pro Glu Ser Thr Val Pro Ser Lys Ala Val Val Ile His
            260                 265                 270
Lys Ser Lys Tyr Ser Asp Asp Ile Gln Lys Gly Glu Leu Glu Asp Asp
        275                 280                 285
Tyr His Ile Phe Arg Arg Ala Val Asn Asp Ile Thr Phe Gln Leu Asp
    290                 295                 300
Ile Asn Phe Gly Ser Leu Pro Arg Pro Gly Cys Gly Ser Arg Gly Ala
305                 310                 315                 320
Arg Gly Arg Gly Arg Gly Arg Gln Met Glu Glu Thr Gly Pro Gln Pro
                325                 330                 335
Glu Ala Met Val Gln Ile Val Ala Pro Asn Pro Asp Asp Pro Glu Asp
            340                 345                 350
Phe Pro Ala Leu Thr
        355
```

<210> 326
<211> 506
<212> PRT
<213> Saccharomyces cerevisiae

<220>
<223> Saccharomyces cerevisiae Baker's yeast CDC37
P06101

<400> 326

```
Met Ala Ile Asp Tyr Ser Lys Trp Asp Lys Ile Glu Leu Ser Asp Asp
 1               5                  10                  15
Ser Asp Val Glu Val His Pro Asn Val Asp Lys Lys Ser Phe Ile Lys
            20                  25                  30
Trp Lys Gln Gln Ser Ile His Glu Gln Arg Phe Lys Arg Asn Gln Asp
        35                  40                  45
Ile Lys Asn Leu Glu Thr Gln Val Asp Met Tyr Ser His Leu Asn Lys
    50                  55                  60
Arg Val Asp Arg Ile Leu Ser Asn Leu Pro Glu Ser Ser Leu Thr Asp
65                  70                  75                  80
Leu Pro Ala Val Thr Lys Phe Leu Asn Ala Asn Phe Asp Lys Met Glu
                85                  90                  95
Lys Ser Lys Gly Glu Asn Val Asp Pro Glu Ile Ala Thr Tyr Asn Glu
            100                 105                 110
```

```
Met Val Glu Asp Leu Phe Glu Gln Leu Ala Lys Asp Leu Asp Lys Glu
        115                 120                 125
Gly Lys Asp Ser Lys Ser Pro Ser Leu Ile Arg Asp Ala Ile Leu Lys
    130                 135                 140
His Arg Ala Lys Ile Asp Ser Val Thr Val Glu Ala Lys Lys Lys Leu
145                 150                 155                 160
Asp Glu Leu Tyr Lys Glu Lys Asn Ala His Ile Ser Ser Glu Asp Ile
                165                 170                 175
His Thr Gly Phe Asp Ser Ser Phe Met Asn Lys Gln Lys Gly Gly Ala
            180                 185                 190
Lys Pro Leu Glu Ala Thr Pro Ser Glu Ala Leu Ser Ser Ala Ala Glu
        195                 200                 205
Ser Asn Ile Leu Asn Lys Leu Ala Lys Ser Ser Val Pro Gln Thr Phe
    210                 215                 220
Ile Asp Phe Lys Asp Asp Pro Met Lys Leu Ala Lys Glu Thr Glu Glu
225                 230                 235                 240
Phe Gly Lys Ile Ser Ile Asn Glu Tyr Ser Lys Ser Gln Lys Phe Leu
                245                 250                 255
Leu Glu His Leu Pro Ile Ile Ser Glu Gln Gln Lys Asp Ala Leu Met
            260                 265                 270
Met Lys Ala Phe Glu Tyr Gln Leu His Gly Asp Asp Lys Met Thr Leu
        275                 280                 285
Gln Val Ile His Gln Ser Glu Leu Met Ala Tyr Ile Lys Glu Ile Tyr
    290                 295                 300
Asp Met Lys Lys Ile Pro Tyr Leu Asn Pro Met Glu Leu Ser Asn Val
305                 310                 315                 320
Ile Asn Met Phe Phe Glu Lys Val Ile Phe Asn Lys Asp Lys Pro Met
                325                 330                 335
Gly Lys Glu Ser Phe Leu Arg Ser Val Gln Glu Lys Phe Leu His Ile
            340                 345                 350
Gln Lys Arg Ser Lys Ile Leu Gln Gln Glu Glu Met Asp Glu Ser Asn
        355                 360                 365
Ala Glu Gly Val Glu Thr Ile Gln Leu Lys Ser Leu Asp Asp Ser Thr
    370                 375                 380
Glu Leu Glu Val Asn Leu Pro Asp Phe Asn Ser Lys Asp Pro Glu Glu
385                 390                 395                 400
Met Lys Lys Val Lys Val Phe Lys Thr Leu Ile Pro Glu Lys Met Gln
                405                 410                 415
Glu Ala Ile Met Thr Lys Asn Leu Asp Asn Ile Asn Lys Val Phe Glu
            420                 425                 430
Asp Ile Pro Ile Glu Glu Ala Glu Lys Leu Leu Glu Val Phe Asn Asp
        435                 440                 445
Ile Asp Ile Ile Gly Ile Lys Ala Ile Leu Glu Asn Glu Lys Asp Phe
    450                 455                 460
Gln Ser Leu Lys Asp Gln Tyr Glu Gln Asp His Glu Asp Ala Thr Met
465                 470                 475                 480
Glu Asn Leu Ser Leu Asn Asp Arg Asp Gly Gly Gly Asp Asn His Glu
                485                 490                 495
Glu Val Lys His Thr Ala Asp Thr Val Asp
            500                 505
```

<210> 327
<211> 389
<212> PRT
<213> Drosophila melanogaster

<220>

<223> Fruit fly CDC37 Q24276

<400> 327
Met Val Asp Tyr Ser Lys Trp Lys Asn Ile Glu Ile Ser Asp Asp Glu
 1   5   10   15
Asp Asp Thr His Pro Asn Ile Asp Thr Pro Ser Leu Phe Arg Trp Arg
            20   25   30
His Gln Ala Arg Val Glu Arg Met Ala Glu Met Asp His Glu Lys Asp
        35   40   45
Glu Leu Lys Lys Lys Arg Gln Ser Tyr Gln Ala Arg Leu Met Asp Val
    50   55   60
Lys Glu Arg Ile Ser Lys Lys Asp Gly Asp Glu Glu Ala Leu Lys Lys
65   70   75   80
Glu Leu Glu Lys Ile Glu Ala Glu Gly Lys Glu Leu Asp Arg Ile Glu
                85   90   95
Ser Glu Met Ile Lys Lys Glu Lys Lys Thr Pro Trp Asn Val Asp Thr
            100   105   110
Ile Ser Lys Pro Gly Phe Glu Lys Thr Val Ile Asn Lys Lys Ala Gly
        115   120   125
Arg Lys Pro Asp Glu Asn Leu Ser Glu Glu Glu Arg Glu Gln Arg Met
    130   135   140
Lys Gln Phe Val Lys Glu Asn Glu Lys Leu Cys Gln Gln Tyr Gly Met
145   150   155   160
Leu Arg Lys Tyr Asp Asp Ser Lys Arg Phe Leu Gln Glu His Leu His
                165   170   175
Leu Val Gly Glu Glu Thr Ala Asn Tyr Leu Val Ile Trp Ser Ile Asn
            180   185   190
Leu Glu Met Glu Glu Lys His Glu Leu Met Ala His Val Ala His Gln
        195   200   205
Cys Ile Cys Met Gln Tyr Ile Leu Glu Leu Ala Lys Gln Leu Asp Val
    210   215   220
Asp Pro Arg Ala Cys Val Ser Ser Phe Phe Ser Lys Ile Gln His Cys
225   230   235   240
His Pro Glu Tyr Arg Ala Gln Phe Asp Ser Glu Ile Glu Gly Phe Lys
                245   250   255
Gly Arg Ile Gln Lys Arg Ala Gln Glu Lys Ile Gln Glu Ala Ile Ala
            260   265   270
Gln Ala Glu Glu Glu Glu Arg Lys Glu Arg Leu Gly Pro Gly Gly Leu
        275   280   285
Asp Pro Ala Asp Val Phe Glu Ser Leu Pro Asp Glu Leu Lys Ala Cys
    290   295   300
Phe Glu Ser Arg Asp Val Glu Leu Leu Gln Lys Thr Ile Ala Ala Met
305   310   315   320
Pro Val Asp Val Ala Lys Leu His Met Lys Arg Cys Val Asp Ser Gly
                325   330   335
Leu Trp Val Pro Asn Ala Ala Asp Leu Glu Gly Asp Lys Lys Glu Glu
            340   345   350
Asp Asp Ser Asp Asp Val Ala Gly Gly Glu Glu Lys Thr Asp Asp Ala
        355   360   365
Lys Ser Glu Ser Ala Ala Lys Glu Glu Pro Ile Tyr Thr Gly Val Ser
    370   375   380
Thr Glu Asp Val Asp
385

<210> 328
<211> 379

<212> PRT
<213> Rattus norvegicus

<220>
<223> Rat CDC37 Q63692

<400> 328
Met Val Asp Tyr Ser Val Trp Asp His Ile Glu Val Ser Asp Asp Glu
 1   5   10   15
Asp Glu Thr His Pro Asn Ile Asp Thr Ala Ser Leu Phe Arg Trp Arg
            20   25   30
His Gln Ala Arg Val Glu Arg Met Glu Gln Phe Gln Lys Glu Lys Glu
        35   40   45
Glu Leu Asp Arg Gly Cys Arg Glu Cys Lys Arg Lys Val Ala Glu Cys
    50   55   60
Gln Arg Lys Leu Lys Glu Leu Glu Val Ala Glu Gly Gly Gly Gln Val
65   70   75   80
Glu Leu Glu Arg Leu Arg Ala Glu Ala Gln Gln Leu Arg Lys Glu Glu
                85   90   95
Arg Ser Trp Glu Gln Lys Leu Glu Asp Met Arg Lys Lys Glu Lys Asn
            100   105   110
Met Pro Trp Asn Val Asp Thr Leu Ser Lys Asp Gly Phe Ser Lys Ser
        115   120   125
Met Val Asn Thr Lys Pro Glu Lys Ala Glu Glu Asp Ser Glu Glu Ala
    130   135   140
Arg Glu Gln Lys His Lys Thr Phe Val Glu Lys Tyr Glu Lys Gln Ile
145   150   155   160
Lys His Phe Gly Met Leu His Arg Trp Asp Asp Ser Gln Lys Tyr Leu
                165   170   175
Ser Asp Asn Val His Leu Val Cys Glu Glu Thr Ala Asn Tyr Leu Val
            180   185   190
Ile Trp Cys Ile Asp Leu Glu Val Glu Glu Lys Cys Ala Leu Met Glu
        195   200   205
Gln Val Ala His Gln Thr Met Val Met Gln Phe Ile Leu Glu Leu Ala
    210   215   220
Lys Ser Leu Lys Val Asp Pro Arg Ala Cys Phe Arg Gln Phe Phe Thr
225   230   235   240
Lys Ile Lys Thr Ala Asp Gln Gln Tyr Met Glu Gly Phe Lys Tyr Glu
                245   250   255
Leu Glu Ala Phe Lys Glu Arg Val Arg Gly Arg Ala Lys Leu Arg Ile
            260   265   270
Glu Lys Ala Met Lys Glu Tyr Glu Glu Glu Glu Arg Lys Lys Arg Leu
        275   280   285
Gly Pro Gly Gly Leu Asp Pro Val Glu Val Tyr Glu Ser Leu Pro Glu
    290   295   300
Glu Leu Gln Lys Cys Phe Asp Val Lys Asp Val Gln Met Leu Gln Asp
305   310   315   320
Ala Ile Ser Lys Met Asp Pro Thr Asp Ala Lys Tyr His Met Gln Arg
                325   330   335
Cys Ile Asp Ser Gly Leu Trp Val Pro Asn Ser Lys Ser Gly Glu Ala
            340   345   350
Lys Glu Gly Glu Glu Ala Gly Pro Gly Asp Pro Leu Leu Glu Ala Val
        355   360   365
Pro Lys Ala Gly Asn Glu Lys Asp Ile Ser Ala
    370   375

<210> 329
<211> 379
<212> PRT
<213> Mus musculus

<220>
<223> Mouse CDC37 Q61081

<400> 329
Met Val Asp Tyr Ser Val Trp Asp His Ile Glu Val Ser Asp Asp Glu
 1   5   10   15
Asp Glu Thr His Pro Asn Ile Asp Thr Ala Ser Leu Phe Arg Trp Arg
            20   25   30
His Gln Ala Arg Val Glu Arg Met Glu Gln Phe Gln Lys Glu Lys Glu
        35   40   45
Glu Leu Asp Arg Gly Cys Arg Glu Cys Lys Arg Lys Val Ala Glu Cys
    50   55   60
Gln Arg Lys Leu Lys Glu Leu Glu Val Ala Glu Ser Asp Gly Gln Val
65   70   75   80
Glu Leu Glu Arg Leu Arg Ala Glu Ala Gln Gln Leu Arg Lys Glu Glu
                85   90   95
Arg Ser Trp Glu Gln Lys Leu Glu Asp Met Arg Lys Lys Glu Lys Asn
            100   105   110
Met Pro Trp Asn Val Asp Thr Leu Ser Lys Asp Gly Phe Ser Lys Ser
        115   120   125
Met Val Asn Thr Lys Pro Glu Lys Ala Glu Glu Asp Ser Glu Glu Ala
    130   135   140
Arg Glu Gln Lys His Lys Thr Phe Val Glu Lys Tyr Glu Lys Gln Ile
145   150   155   160
Lys His Phe Gly Met Leu His Arg Trp Asp Asp Ser Gln Lys Tyr Leu
                165   170   175
Ser Asp Asn Val His Leu Val Cys Glu Glu Thr Ala Asn Tyr Leu Val
            180   185   190
Ile Trp Cys Ile Asp Leu Glu Val Glu Glu Lys Cys Ala Leu Met Glu
        195   200   205
Gln Val Ala His Gln Thr Met Val Met Gln Phe Ile Leu Glu Leu Ala
    210   215   220
Lys Ser Leu Lys Val Asp Pro Arg Ala Cys Phe Arg Gln Phe Phe Thr
225   230   235   240
Lys Ile Lys Thr Ala Asp His Gln Tyr Met Glu Gly Phe Lys Tyr Glu
                245   250   255
Leu Glu Ala Phe Lys Glu Arg Val Arg Gly Arg Ala Lys Leu Arg Ile
            260   265   270
Glu Lys Ala Met Lys Glu Tyr Glu Glu Glu Glu Arg Lys Lys Arg Leu
        275   280   285
Gly Pro Gly Gly Leu Asp Pro Val Glu Val Tyr Glu Ser Leu Pro Glu
    290   295   300
Glu Leu Gln Lys Cys Phe Asp Val Lys Asp Val Gln Met Leu Gln Asp
305   310   315   320
Ala Ile Ser Lys Met Asp Pro Thr Asp Ala Lys Tyr His Met Gln Arg
                325   330   335
Cys Ile Asp Ser Gly Leu Trp Val Pro Asn Ser Lys Ser Gly Glu Ala
            340   345   350
Lys Glu Gly Glu Glu Ala Gly Pro Gly Asp Pro Leu Leu Glu Ala Val
        355   360   365
Pro Lys Ala Gly Asn Glu Lys Asp Val Ser Ala
    370   375

<210> 330
<211> 466
<212> PRT
<213> Schizosaccharomyces pombe

<220>
<223> Fission yeast CDC37 O94740

<400> 330
Met Ala Ile Asp Tyr Ser Lys Trp Asp Lys Leu Glu Leu Ser Asp Asp
 1   5   10   15
Ser Asp Ile Glu Val His Pro Asn Val Asp Lys Lys Ser Phe Ile Arg
            20   25   30
Trp Arg Gln Arg Asp Ile His Glu Lys Arg Ala Val Arg Lys Gln Lys
        35   40   45
Met Glu Asp Ile Lys Gly Ala Met Ala Met Asn Arg Arg Leu Leu Ser
    50   55   60
Arg Ile Ser Glu Met Glu Thr Val Leu Glu Lys Glu Ser Pro Ser Asp
65   70   75   80
Pro Tyr Val Leu Leu Gly Ser Phe Leu Glu Ala Lys Lys Ser Glu Asp
                85   90   95
Met Asp Ser Ala Ile Pro Gly Gly Met Ser Tyr His His Met Leu Met
            100   105   110
Ser Leu Leu Lys Val Ile Lys Asp Ala Glu Asp Thr Thr Glu Glu Lys
        115   120   125
Ser Met Asp Asp Ser Asp Lys Cys Leu Arg Arg Leu Lys Ser His Lys
    130   135   140
Glu Arg Leu Leu Lys Leu Leu Glu Asp Ala Gln Lys Glu Tyr Asp Thr
145   150   155   160
Leu Glu Ala Glu Ser Lys Asn Tyr Ile Thr Ser Glu Asp Leu His Leu
                165   170   175
Gly Phe Asp Ser Thr Tyr Val Gln Lys Lys Glu Pro Glu Lys Pro Lys
            180   185   190
Lys Thr Lys Thr Lys Lys Glu Thr Ile Gln Val Ile Glu Ser Leu Asn
        195   200   205
Asn Pro Thr Pro Pro Thr Asp Phe Pro Gly Ala Lys Glu Gln Ala Ser
    210   215   220
Thr Gly Asn Ala Pro Lys Asn Pro Val Asn Glu Asn Glu Ser Glu Asp
225   230   235   240
Glu Glu Gly Leu Ser Leu Ser Glu Asp Gly Lys Lys Phe Ala Asn Ile
                245   250   255
Asp Phe Gly Asp Tyr Ser Ser Ser Glu Glu Phe Leu Lys Glu His Leu
            260   265   270
Asn Ile Leu Ala Asp Glu Glu Glu Ser Asp Ala Ile Leu Leu Glu Ala
        275   280   285
Phe Asn Ala Glu Leu Glu Gly Lys Pro Ser Leu Ala Lys Gln Tyr Val
    290   295   300
His Gln Ala Leu Leu Ile Ser Tyr Cys Arg Gln Leu Gly Pro Asn Gly
305   310   315   320
Leu Ser Ile Phe Phe Gln Lys Ile Lys Asp Pro Asn His Gln Ser Gln
                325   330   335
Arg Leu Phe Leu Glu Asp Val His Asn Thr Tyr Val Arg Ile His Glu
            340   345   350
Arg Ser Ala Ala Ile Ser Lys Glu Gln Ala Glu Ser Gly Glu Gly Val
        355   360   365

Glu Gln Ile Gln Leu Cys Ala Val Asp Pro Asn Thr Lys Leu Ser Ile
370 375 380
Thr Ile Pro Glu Ala Gly Ser Thr Asp Pro Glu Thr Gln Lys Ala Arg
385 390 395 400
Ala Ala Phe Glu Ser Phe Pro Pro Asn Leu Gln Lys Ala Leu Met Thr
405 410 415
Asn Asp Leu Asp Lys Ile Asn Val Val Leu Gly Lys Met Ala Val Glu
420 425 430
Asn Ala Glu Glu Val Val Glu Lys Leu Ser Ser Thr Gly Met Leu Ser
435 440 445
Ile Glu Glu Gly Ile Ile Asp Thr Thr Lys Gly Glu Thr Ile Pro Gln
450 455 460
Leu Ser
465

<210> 331
<211> 399
<212> PRT
<213> Drosophila virilis

<220>
<223> Drosophila virilis Fruit fly CDC37 Q24740

<400> 331
Met Val Asp Tyr Ser Lys Trp Lys Asn Ile Glu Ile Ser Asp Asp Glu
1 5 10 15
Asp Glu Thr His Pro Asn Ile Asp Thr Pro Ser Leu Phe Arg Trp Arg
20 25 30
His Gln Ala Arg Val Glu Arg Met Ala Glu Ser Glu Lys Glu Lys Glu
35 40 45
Glu Leu Lys Lys Lys Arg Gln Ser Tyr Gln Ala Arg Leu Ile Asn Val
50 55 60
Lys Glu Leu Ile Ser Lys Lys Glu Gly Asp Glu Val Ala Leu Lys Lys
65 70 75 80
Glu Leu Glu Lys Ile Glu Asn Glu Gly Lys Glu Leu Asp Arg Gln Glu
85 90 95
Asn Glu Leu Leu Lys Arg Glu Lys Lys Thr Pro Trp Asn Val Asp Thr
100 105 110
Ile Ser Lys Pro Gly Phe Glu Lys Thr Val Ile Asn Lys Lys Pro Pro
115 120 125
Arg Lys Ala Ala Glu Asp Leu Thr Glu Glu Glu Arg Glu Gln Arg Met
130 135 140
Lys Gln Phe Val Lys Glu Asn Glu Lys Leu Cys Lys Gln Tyr Gly Met
145 150 155 160
Leu Arg Lys Tyr Asp Asp Ser Lys Arg Phe Leu Gln Glu His Leu Asp
165 170 175
Leu Val Cys Glu Glu Thr Ala Asn Tyr Leu Val Ile Trp Ser Ile Asn
180 185 190
Leu Glu Met Glu Glu Lys His Asp Leu Met Ala His Val Ala His Gln
195 200 205
Cys Ile Cys Met Gln Tyr Ile Leu Glu Leu Ala Lys Gln Leu Asp Val
210 215 220
Asp Pro Arg Ala Cys Val Ser Ser Phe Phe Ser Lys Ile Gln Gln Cys
225 230 235 240
Val Pro Glu Tyr Arg Gln Gln Phe Glu Ser Glu Ile Glu Gly Phe Lys
245 250 255

```
Glu Arg Ile Gln Lys Arg Ala Gln Glu Lys Leu Gln Glu Ala Met Ala
            260                 265                 270
Gln Leu Glu Glu Glu Glu Lys Gln Glu Arg Met Gly Pro Gly Gly Leu
        275                 280                 285
Asp Pro Ala Asp Val Phe Glu Ser Leu Pro Glu Glu Leu Lys Ala Cys
    290                 295                 300
Phe Glu Ser Arg Asp Ile Glu Leu Leu Gln Lys Thr Ile Ala Thr Met
305                 310                 315                 320
Pro Val Asp Gln Ala Lys Tyr His Met Lys Arg Cys Val Asp Ser Gly
                325                 330                 335
Leu Trp Val Pro Asn Ala Ala Asp Val Gln Leu Gly Asn Asp Glu Thr
            340                 345                 350
Glu Ala Lys Asp Asp Glu Thr Thr Thr Ala Thr Asn Glu Thr Pro Thr
        355                 360                 365
Glu Lys Glu Asn Ser Lys Ser Gln Asn Glu Lys Ser Ala Asp Ala Ala
    370                 375                 380
Lys Glu Glu Pro Leu Tyr Ala Gly Val Ser Thr Asp Asp Val Asp
385                 390                 395


<210> 332
<211> 393
<212> PRT
<213> Gallus gallus

<220>
<223> Chicken CDC37 Q57476


<400> 332
Met Val Asp Tyr Ser Val Trp Asp His Ile Glu Val Ser Asp Asp Glu
 1               5                  10                  15
Asp Glu Thr His Pro Asn Ile Asp Thr Ala Ser Leu Phe Arg Trp Arg
            20                  25                  30
His Gln Ala Arg Val Glu Arg Met Glu Gln Phe Gln Lys Glu Lys Glu
        35                  40                  45
Glu Leu Asp Lys Gly Cys Arg Glu Cys Lys Arg Lys Leu Ala Glu Cys
    50                  55                  60
Gln Lys Lys Leu Lys Glu Leu Glu Val Ala Glu Pro Gly Gly Gly Ser
65                  70                  75                  80
Gly Gly Gly Arg Gly Glu Arg Glu Arg Leu Gln Ala Glu Ala Gln Gln
                85                  90                  95
Leu Arg His Glu Glu Arg Asn Trp Glu Ser Lys Met Glu Glu Leu Arg
            100                 105                 110
Lys Lys Glu Lys Asn Met Pro Trp Asn Val His Thr Leu Ser Lys Asp
        115                 120                 125
Gly Phe Ser Lys Ser Val Phe Asn Val Lys Ala Glu Glu Lys Glu Glu
    130                 135                 140
Thr Glu Glu Gln Lys Glu Gln Lys His Lys Thr Phe Val Glu Arg His
145                 150                 155                 160
Glu Lys Gln Ile Lys His Phe Gly Met Leu Arg Arg Trp Asp Asp Ser
                165                 170                 175
Gln Lys Tyr Leu Ser Asp Asn Pro His Leu Val Cys Glu Glu Thr Ala
            180                 185                 190
Asn Tyr Leu Val Ile Trp Cys Ile Asp Leu Glu Val Glu Glu Lys Gln
        195                 200                 205
Ala Leu Met Glu Gln Val Ala His Gln Thr Ile Val Met Gln Phe Ile
    210                 215                 220
```

```
Leu Glu Leu Ala Lys Ser Leu Lys Val Asp Pro Arg Ala Cys Phe Arg
225                 230                 235                 240
Gln Phe Phe Thr Lys Ile Lys Thr Ala Asp Gln Gln Tyr Met Glu Gly
                245                 250                 255
Phe Asn Asp Glu Leu Glu Ala Phe Lys Glu Arg Val Arg Gly Arg Ala
            260                 265                 270
Lys Ala Arg Ile Glu Arg Ala Met Arg Glu Tyr Glu Glu Glu Glu Arg
        275                 280                 285
Gln Lys Arg Leu Gly Pro Gly Gly Leu Asp Pro Val Asp Val Tyr Glu
    290                 295                 300
Ser Leu Pro Pro Glu Leu Gln Lys Cys Phe Asp Ala Lys Asp Val Gln
305                 310                 315                 320
Met Leu Gln Asp Thr Ile Ser Arg Met Asp Pro Thr Glu Ala Lys Tyr
                325                 330                 335
His Met Gln Arg Cys Ile Asp Ser Gly Leu Trp Val Pro Asn Ala Lys
            340                 345                 350
Ala Ala Ala Glu Gly Gly Gly Gln Gly Gly Ala His Gly Gln Pro Gly
        355                 360                 365
Gly Ala Asp Ser Glu Ala Leu Tyr Glu Glu Ile Pro Lys Glu Ser Gly
    370                 375                 380
Glu Glu Glu Gly Gly Glu Gly Lys Ala
385                 390


<210> 333
<211> 380
<212> PRT
<213> Bos taurus

<220>
<223> Cow CDC37 Q5EAC6


<400> 333
Met Val Asp Tyr Ser Val Trp Asp His Ile Glu Val Ser Asp Asp Glu
 1                5                  10                  15
Asp Glu Thr His Pro Asn Ile Asp Thr Ala Ser Leu Phe Arg Trp Arg
            20                  25                  30
His Gln Ala Arg Val Glu Arg Met Glu Gln Phe Gln Lys Glu Lys Glu
        35                  40                  45
Glu Leu Asp Arg Gly Cys Arg Glu Cys Lys Arg Lys Val Ala Glu Cys
    50                  55                  60
Gln Arg Lys Leu Lys Glu Leu Glu Val Ala Glu Gly Glu Gly Gly Lys
65                  70                  75                  80
Ala Glu Leu Glu Arg Leu Gln Ala Glu Ala Gln Gln Leu Arg Lys Glu
                85                  90                  95
Glu Arg Ser Trp Glu Gln Lys Leu Glu Glu Met Arg Lys Lys Glu Lys
            100                 105                 110
Ser Met Pro Trp Asn Val Asp Thr Leu Ser Lys Asp Gly Phe Ser Lys
        115                 120                 125
Ser Met Val Asn Thr Lys Pro Glu Gln Ala Glu Glu Glu Ser Glu Glu
    130                 135                 140
Val Arg Glu Gln Lys His Lys Thr Phe Val Glu Lys Tyr Glu Lys Gln
145                 150                 155                 160
Ile Lys His Phe Gly Met Leu Arg Arg Trp Asp Asp Ser Gln Lys Tyr
                165                 170                 175
Leu Ser Asp Asn Val His Leu Val Cys Glu Glu Thr Ala Asn Tyr Leu
            180                 185                 190
```

```
Val Ile Trp Cys Ile Asp Leu Glu Val Glu Glu Lys Cys Ala Leu Met
        195                 200                 205
Glu Gln Val Ala His Gln Thr Ile Val Met Gln Phe Ile Leu Glu Leu
    210                 215                 220
Ala Lys Ser Leu Lys Val Asp Pro Arg Ala Cys Phe Arg Gln Phe Phe
225                 230                 235                 240
Thr Lys Ile Lys Thr Ala Asp Arg Gln Tyr Met Glu Gly Phe Asn Asp
                245                 250                 255
Glu Leu Glu Ala Phe Lys Asp Arg Val Arg Gly Arg Ala Lys Leu Arg
            260                 265                 270
Ile Glu Lys Ala Met Lys Glu Tyr Glu Glu Glu Glu Arg Lys Lys Arg
        275                 280                 285
Leu Gly Pro Gly Gly Leu Asp Pro Val Glu Val Tyr Glu Ser Leu Pro
    290                 295                 300
Glu Glu Leu Gln Lys Cys Phe Asp Ala Lys Asp Val Gln Met Leu Gln
305                 310                 315                 320
Asp Ala Ile Ser Lys Met Asp Pro Thr Asp Ala Lys Tyr His Met Gln
                325                 330                 335
Arg Cys Ile Asp Ser Gly Leu Trp Val Pro Asn Ser Lys Ser Ser Glu
            340                 345                 350
Ala Lys Asp Gly Glu Glu Ala Gly Thr Gly Asp Pro Leu Leu Glu Ala
        355                 360                 365
Thr Ser Lys Ser Gly Asp Glu Lys Asp Val Ser Val
    370                 375                 380


<210> 334
<211> 508
<212> PRT
<213> Candida albicans

<220>
<223> Candida albicans Yeast CDC37 Q8X1E6


<400> 334
Met Pro Ile Asp Tyr Ser Lys Trp Asp Lys Ile Glu Ile Ser Asp Asp
 1               5                  10                  15
Ser Asp Val Glu Val His Pro Asn Val Asp Lys Gln Ser Phe Ile Arg
            20                  25                  30
Trp Lys Gln Arg Asp Ile His Glu Lys Arg Met Gln Arg Asn Ile Glu
        35                  40                  45
Ile Lys Ser Ile Leu Ile Gln Leu Thr Met Tyr Ala Lys Leu Asn Glu
    50                  55                  60
Arg Val Asp Tyr Leu Leu Glu Lys Leu Thr Ser Thr Glu Leu Leu Asp
65                  70                  75                  80
Ser Glu Lys Val Met Ser Lys Leu Asn Ser Glu Phe Asp Pro Gln Glu
                85                  90                  95
Lys Phe Asp Tyr Asp Lys Leu Ile Lys Asp Lys Gly Ser Thr Leu Arg
            100                 105                 110
Lys Gly Leu Lys Asp Leu Lys Phe Asp Arg Glu Glu Ile Glu Asn Thr
        115                 120                 125
Pro Cys Tyr Asn Glu Met Ile Glu Asp Leu Phe Val Gln Ile Lys Asp
    130                 135                 140
Asp His Pro Glu Thr Lys Thr Asp Gly Asp Lys Leu Ile Glu Tyr Leu
145                 150                 155                 160
Lys Glu His Arg Asn Arg Ile Asp Asp Val Leu Ser Lys Gln Thr Ile
                165                 170                 175
```

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Lys Leu Asp Asp Leu Leu Tyr Gln Lys Ala Gln Leu Ile Val Ser Asp
            180                 185                 190
Asp Leu His Thr Gly Phe Asp Arg Ser Phe Leu Asn Lys Asp Lys Pro
        195                 200                 205
Glu Glu Lys Glu Glu Asn Gln Asp Lys Pro Lys Ala Pro Glu Ala Lys
    210                 215                 220
Lys Thr Thr Val Thr Thr Thr Glu Thr Ile Asn Ser Pro Lys Pro Val
225                 230                 235                 240
Glu Glu Asn Thr Asp Lys Glu Ile Leu Asp Glu Leu Glu Ile Leu Pro
                245                 250                 255
Ala Thr Lys Glu Phe Ala Lys Ile Pro Ser Asp Asn Leu Ser Lys Ala
            260                 265                 270
Ala Glu Phe Leu Ile Lys His Pro Ser Ile Cys Thr Glu Gln Gln Lys
        275                 280                 285
Asp Ala Leu Ile Met Thr Ala Phe Asp Leu Gln Leu Glu Asn Lys Ser
    290                 295                 300
Asp Glu Ala Lys His Ile Val His Gln Ser Leu Leu Leu Gln Tyr Val
305                 310                 315                 320
Gly Gln Leu Ser Asp Asn Gly Lys Ala Ala Pro Ala Asn Val Ile Asn
                325                 330                 335
Ala Ile Lys Leu Phe Phe Ser Lys Ile Ala Ala Glu Ser Ser Pro Ala
            340                 345                 350
Lys His Ala Phe Leu Glu Asp Val Asn Gln Thr Phe Asn His Ile Lys
        355                 360                 365
Gly Arg Cys Glu Ile Ile Lys Glu Glu Gln Lys Gln Asn Ala Ala Asn
    370                 375                 380
Lys Glu Gly Thr Gly Glu Glu Glu Glu Glu Glu Ala Leu Ile Gln Leu
385                 390                 395                 400
Lys Ala Leu Asp Asp Asn Thr Glu Leu Ser Val Asn Ile Pro Gln Glu
                405                 410                 415
Gly Thr Lys Glu Tyr Glu Ile Phe Thr Thr Lys Leu Pro Ile Glu Phe
            420                 425                 430
Gln Asn Ala Ile Lys Thr Glu Ser Ile Asp Glu Val Asn Lys Glu Phe
        435                 440                 445
Ala Lys Leu Lys Ile Glu Asp Ala Glu Arg Ile Leu Glu Ile Phe Asn
    450                 455                 460
Glu Cys Gly Val Ile Gly Ile Ser Gly Tyr Ile Glu Asp Glu Lys Glu
465                 470                 475                 480
Phe Glu Glu Leu Lys Lys Glu Tyr Ala His Glu Thr Ala Asn Gln Glu
                485                 490                 495
Glu Asp Gln Ser Ala Ser Val Glu Asp Thr Val Asp
            500                 505


<210> 335
<211> 370
<212> PRT
<213> Caenorhabditis elegans

<220>
<223> Caenorhabditis elegans CDC37 O02108


<400> 335
Met Pro Ile Asp Tyr Ser Lys Trp Lys Asp Ile Glu Val Ser Asp Asp
 1               5                  10                  15
Glu Asp Asp Thr His Pro Asn Ile Asp Thr Pro Ser Leu Phe Arg Trp
            20                  25                  30
```

```
Arg His Gln Ala Arg Leu Glu Arg Met Ala Glu Lys Lys Met Glu Gln
        35                  40                  45
Glu Lys Ile Asp Lys Glu Lys Gly Thr Thr Ser Lys Lys Met Glu Glu
    50                  55                  60
Leu Glu Lys Lys Leu Ala Ala Ala Asp Val Thr Asp Lys Ser Asp Ile
65                  70                  75                  80
Gln Lys Gln Ile Asp Glu Val Lys Ala Gln Glu Glu Ala Trp Arg Lys
                85                  90                  95
Lys Glu Ala Glu Leu Glu Glu Lys Glu Arg Leu Glu Pro Trp Asn Val
            100                 105                 110
Asp Thr Ile Gly His Glu Ala Phe Ser Thr Ser Arg Ile Asn Lys Ile
        115                 120                 125
Thr Glu Lys Lys Pro Gln Ala Pro Lys Thr Asp Glu Glu Asp Thr His
    130                 135                 140
Ala Met Ser Thr Phe Phe Glu Thr His Glu Ser Leu Leu Glu Lys Met
145                 150                 155                 160
Ala Val Leu Lys Asn Gly Ala Lys Ser Thr Glu Leu Phe Leu Ala Glu
                165                 170                 175
His Pro His Met Ala Ser Glu Tyr Thr Ala Asn Trp Leu Thr Ile Glu
            180                 185                 190
Ala Leu Asn Ala Ala Ile Asp Phe Asn Glu Glu Lys Met Lys Thr Met
        195                 200                 205
Ala Glu Gln Cys Ile Ile Ile Gln Tyr Leu Leu Glu Leu Ser Lys Ser
    210                 215                 220
Leu Asn Ala Val Ala Thr Asn Thr Thr Val Gln Lys Gln Phe Phe Lys
225                 230                 235                 240
Lys Phe Glu Ala Ala Glu Pro Val Tyr Met Lys His Tyr Gln Asp Glu
                245                 250                 255
Val Lys Ala Phe Glu Asp Arg Leu Arg Thr Arg Ala Gln Thr Lys Arg
            260                 265                 270
Asp Ala Ala Met Glu Glu Ala Glu Ala Glu Glu Lys Ala Glu Arg Met
        275                 280                 285
Lys Ser Ala Pro Gly Gly Ile Asp Pro Gln Glu Val Phe Glu Gln Leu
    290                 295                 300
Pro Glu Glu Met Arg Lys Cys Phe Glu Ala His Asp Ile Glu Ala Leu
305                 310                 315                 320
Lys Gly Val Ala Gln Lys Met Asp Glu Glu Val Phe Lys Tyr His Phe
                325                 330                 335
Asp Arg Cys Ile Ala Ser Gly Leu Trp Val Pro Gly Lys Ala Asp Asp
            340                 345                 350
Asp Asp Asp Asp Glu Glu Ala Ala Pro Ala Glu Glu Glu Pro Thr Thr
        355                 360                 365
Ser Ser
    370
```

<210> 336
<211> 377
<212> PRT
<213> Tetraodon fluviatilis

<220>
<223> Tetraodon fluviatilis Green pufferfish CDC37
Q9DGQ7

<400> 336
Met Ser Arg Ile Asp Tyr Ser Val Trp Asp His Ile Glu Val Ser Asp

```
 1               5                  10                  15
Asp Glu Asp Val Ser His Pro Asn Ile Asp Thr Pro Ser Leu Phe Arg
            20                  25                  30
Trp Arg His Gln Ala Arg Val Glu Arg Met Glu Asp Phe Lys Lys Lys
        35                  40                  45
Gly Asp Asp Leu Asn Lys Gly Leu Gln Glu Cys Arg Arg Lys Leu Ala
    50                  55                  60
Glu Ala Gln Lys Lys Val Arg Glu Leu Ser Ile Ser Ala Ala Gly Asp
65                  70                  75                  80
Ala Lys Ala Glu Leu Thr Lys Thr Gln Thr Glu Glu Lys Lys Leu Lys
                85                  90                  95
Lys Glu Glu Arg Asp Trp Ala Arg Lys Leu Glu Glu His Asn His Glu
            100                 105                 110
Glu Lys Lys Met Pro Trp Asn Val Asp Thr Leu Ser Lys Asp Gly Phe
        115                 120                 125
Ser Lys Ser Ile Val Asn Val Lys Ala Asp Ser Ala Glu Asp Thr Glu
    130                 135                 140
Glu Glu Lys Glu Lys Lys His Lys Thr Phe Val Glu Arg Tyr Glu Lys
145                 150                 155                 160
Gln Ile Lys His Phe Gly Met Leu His Arg Trp Asp Asp Ser Gln Arg
                165                 170                 175
Tyr Leu Ser Asp Asn Pro Asp Leu Val Cys Glu Glu Thr Ala Asn Tyr
            180                 185                 190
Leu Val Ile Met Cys Ile Asp Leu Glu Val Glu Glu Lys His Ala Leu
        195                 200                 205
Met Glu Gln Val Ala His Gln Thr Ile Val Met Gln Phe Ile Leu Glu
    210                 215                 220
Leu Ala Lys Ser Leu Lys Val Asp Pro Arg Gly Cys Phe Arg Gln Phe
225                 230                 235                 240
Phe Glu Lys Ile Lys Thr Ala Asp Gln Gln Tyr Gln Asp Ala Phe Asn
                245                 250                 255
Asp Glu Leu Glu Ser Phe Lys Glu Arg Val Arg Gly Arg Ala Lys Ile
            260                 265                 270
Arg Ile Glu Lys Ala Met Lys Glu Tyr Glu Glu Glu Glu Arg Gln Lys
        275                 280                 285
Arg Leu Gly Pro Gly Gly Leu Asp Pro Val Glu Val Tyr Glu Ser Leu
    290                 295                 300
Pro Pro Glu Met Gln Lys Cys Phe Asp Glu Lys Asp Ile Gln Met Leu
305                 310                 315                 320
Gln Asp Val Ile Thr Lys Met Asp Pro Thr Glu Ala Lys Ala His Met
                325                 330                 335
Lys Arg Cys Ile Asp Ser Gly Leu Trp Val Pro Asn Ser Lys Met Asp
            340                 345                 350
Glu Ser Asp Glu Lys Glu Asp Gly Ser Thr Tyr Glu Glu Val Lys Gln
        355                 360                 365
Glu Gln Glu Glu Pro Ala Lys Lys Glu
    370                 375


<210> 337
<211> 558
<212> PRT
<213> Mus musculus

<220>
<223> Mouse Hyaluronan-binding protein 2 Q8K0D2
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<400> 337
Met Phe Val Arg Met Leu Val Phe Arg Val Leu Leu Leu Ile Ala Leu
 1   5   10   15
Val Gly Lys Ser Val Ile Gly Leu Ser Leu Met Ser Phe Ile Ala Pro
            20   25   30
Pro Asp Pro Asp Trp Thr Pro Asp Asp Tyr Tyr Tyr Ser Tyr Glu Gln
        35   40   45
Ser Ser Pro Asp Glu Asp Pro Ser Val Thr Gln Thr Thr Pro Glu Asn
    50   55   60
Pro Asp Trp Tyr Tyr Glu Asp Asp Asp Pro Cys Gln Ser Asn Pro Cys
65   70   75   80
Glu His Gly Gly Asp Cys Ile Ile Arg Gly Asp Thr Phe Ser Cys Ser
                85   90   95
Cys Pro Ala Pro Phe Ser Gly Ser Arg Cys Gln Thr Ala Gln Asn Lys
            100   105   110
Cys Lys Asp Asn Pro Cys Val His Gly Asp Cys Leu Ile Thr Gln Lys
        115   120   125
His Pro Tyr Tyr Arg Cys Ala Cys Lys Tyr Pro Tyr Thr Gly Pro Asp
    130   135   140
Cys Ser Lys Val Leu Pro Ala Cys Arg Pro Asn Pro Cys Gln Asn Gly
145   150   155   160
Gly Val Cys Ser Arg His Arg Arg Arg Ser Arg Phe Thr Cys Ala Cys
                165   170   175
Pro Asp Gln Tyr Lys Gly Lys Phe Cys Glu Ile Gly Pro Asp Asp Cys
            180   185   190
Tyr Val Gly Asp Gly Tyr Ser Tyr Arg Gly Lys Val Ser Lys Thr Val
        195   200   205
Asn Gln Asn Pro Cys Leu Tyr Trp Asn Ser His Leu Leu Leu Gln Glu
    210   215   220
Thr Tyr Asn Met Phe Met Glu Asp Ala Glu Thr His Gly Ile Ala Glu
225   230   235   240
His Asn Phe Cys Arg Asn Pro Asp Gly Asp His Lys Pro Trp Cys Phe
                245   250   255
Val Lys Val Asn Ser Glu Lys Val Lys Trp Glu Tyr Cys Asp Val Thr
            260   265   270
Val Cys Pro Val Pro Asp Thr Pro Asn Pro Val Glu Ser Leu Leu Glu
        275   280   285
Pro Val Met Glu Leu Pro Gly Phe Glu Ser Cys Gly Lys Thr Glu Val
    290   295   300
Ala Glu His Ala Val Lys Arg Ile Tyr Gly Gly Phe Lys Ser Thr Ala
305   310   315   320
Gly Lys His Pro Trp Gln Val Ser Leu Gln Thr Ser Leu Pro Leu Thr
                325   330   335
Thr Ser Met Pro Gln Gly His Phe Cys Gly Gly Ala Leu Ile His Pro
            340   345   350
Cys Trp Val Leu Thr Ala Ala His Cys Thr Asp Ile Asn Thr Lys His
        355   360   365
Leu Lys Val Val Leu Gly Asp Gln Asp Leu Lys Lys Thr Glu Ser His
    370   375   380
Glu Gln Thr Phe Arg Val Glu Lys Ile Leu Lys Tyr Ser Gln Tyr Asn
385   390   395   400
Glu Arg Asp Glu Ile Pro His Asn Asp Ile Ala Leu Leu Lys Leu Lys
                405   410   415
Pro Val Gly Gly His Cys Ala Leu Glu Ser Arg Tyr Val Lys Thr Val
            420   425   430
Cys Leu Pro Ser Asp Pro Phe Pro Ser Gly Thr Glu Cys His Ile Ser
        435   440   445
Gly Trp Gly Val Thr Glu Thr Gly Glu Gly Ser Arg Gln Leu Leu Asp

```
    450                 455                 460
Ala Lys Val Lys Leu Ile Ala Asn Pro Leu Cys Asn Ser Arg Gln Leu
465                 470                 475                 480
Tyr Asp His Thr Ile Asp Asp Ser Met Ile Cys Ala Gly Asn Leu Gln
                485                 490                 495
Lys Pro Gly Ser Asp Thr Cys Gln Gly Asp Ser Gly Gly Pro Leu Thr
            500                 505                 510
Cys Glu Lys Asp Gly Thr Tyr Tyr Val Tyr Gly Ile Val Ser Trp Gly
        515                 520                 525
Gln Glu Cys Gly Lys Lys Pro Gly Val Tyr Thr Gln Val Thr Lys Phe
    530                 535                 540
Leu Asn Trp Ile Lys Thr Thr Met His Arg Glu Ala Gly Leu
545                 550                 555


<210> 338
<211> 558
<212> PRT
<213> Rattus norvegicus

<220>
<223> Rat Hyaluronan-binding protein 2 Q6L711


<400> 338
Met Ser Val Val Met Leu Val Phe Arg Val Leu Leu Leu Ile Ala Leu
 1               5                  10                  15
Val Gly Asn Ser Ala Ile Gly Leu Ser Leu Met Pro Phe Ile Ala Pro
            20                  25                  30
Pro Asp Pro Asp Trp Thr Pro Asp Asp Tyr Tyr Tyr Ser Tyr Glu Gln
        35                  40                  45
Ser Ser Pro Asp Lys Asp Ala Ser Val Thr Gln Thr Ser Pro Glu Asn
    50                  55                  60
Pro Asp Trp Tyr Tyr Glu Asp Asp Asp Pro Cys Gln Ser Asn Pro Cys
65                  70                  75                  80
Glu His Gly Gly Asp Cys Ile Ile Arg Gly Asn Thr Phe Ser Cys Ser
                85                  90                  95
Cys Pro Ala Pro Phe Ser Gly Ser Arg Cys Gln Thr Val Gln Asn Lys
            100                 105                 110
Cys Lys Asp Asn Pro Cys Val Gln Gly Asp Cys Leu Ile Thr Gln Thr
        115                 120                 125
Pro Pro Tyr Tyr Arg Cys Ala Cys Lys Tyr Pro Tyr Thr Gly Pro Asp
    130                 135                 140
Cys Ser Lys Val Leu Pro Val Cys Arg Pro Asn Pro Cys Gln Asn Gly
145                 150                 155                 160
Gly Val Cys Ser Arg His Arg Arg Arg Ser Arg Phe Ser Cys Ala Cys
                165                 170                 175
Pro Asp Gln Tyr Lys Gly Arg Phe Cys Glu Ile Gly Pro Asp Asp Cys
            180                 185                 190
Tyr Val Gly Asp Gly Tyr Ser Tyr Arg Gly Lys Val Ser Arg Thr Val
        195                 200                 205
Asn Gln Asn Pro Cys Leu Tyr Trp Asn Ser His Leu Leu Leu Gln Glu
    210                 215                 220
Asn Tyr Asn Met Phe Met Glu Asp Ala Glu Thr His Gly Ile Ala Asp
225                 230                 235                 240
His Asn Phe Cys Arg Asn Pro Asp Gly Asp His Lys Pro Trp Cys Phe
                245                 250                 255
Val Lys Val Asn Ser Glu Lys Val Lys Trp Glu Tyr Cys Asn Val Glu
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            260                 265                 270
Val Cys Pro Glu Ser Asp Ala Ala Asn Pro Val Gly Ser Leu Gln Glu
        275                 280                 285
Pro Val Met Glu Leu Pro Gly Phe Asp Ser Cys Gly Lys Thr Glu Met
    290                 295                 300
Thr Glu His Ala Val Lys Arg Ile Tyr Gly Gly Phe Lys Ser Thr Ala
305                 310                 315                 320
Gly Lys His Pro Trp Gln Val Ser Leu Gln Thr Ser Leu Pro Leu Thr
                325                 330                 335
Thr Ser Met Pro Gln Gly His Phe Cys Gly Gly Ser Leu Ile His Pro
            340                 345                 350
Cys Trp Val Leu Thr Ala Ala His Cys Thr Asp Met Ser Thr Lys His
        355                 360                 365
Leu Lys Val Val Leu Gly Asp Gln Asp Leu Lys Lys Thr Glu Ser His
    370                 375                 380
Glu Gln Thr Phe Arg Val Glu Lys Ile Leu Lys Tyr Ser Gln Tyr Asn
385                 390                 395                 400
Glu Arg Asp Glu Ile Pro His Asn Asp Ile Ala Leu Leu Lys Leu Lys
                405                 410                 415
Pro Val Gly Gly His Cys Ala Leu Glu Ser Lys Tyr Val Lys Thr Val
            420                 425                 430
Cys Leu Pro Ser Asp Pro Phe Pro Ser Gly Thr Glu Cys His Ile Ser
        435                 440                 445
Gly Trp Gly Val Thr Glu Thr Gly Glu Gly Ser Arg Gln Leu Leu Asp
    450                 455                 460
Ala Lys Val Lys Leu Ile Ala Asn Ala Leu Cys Asn Ser Arg Gln Leu
465                 470                 475                 480
Tyr Asp His Thr Ile Asp Asp Ser Met Ile Cys Ala Gly Asn Leu Gln
                485                 490                 495
Lys Pro Gly Ser Asp Thr Cys Gln Gly Asp Ser Gly Gly Pro Leu Thr
            500                 505                 510
Cys Glu Lys Asp Gly Thr Tyr Tyr Val Tyr Gly Ile Val Ser Trp Gly
        515                 520                 525
Gln Glu Cys Gly Lys Lys Pro Gly Val Tyr Thr Gln Val Thr Lys Phe
    530                 535                 540
Leu Asn Trp Ile Lys Thr Thr Met His Lys Glu Ala Gly Leu
545                 550                 555


<210> 339
<211> 558
<212> PRT
<213> Bos taurus

<220>
<223> Cow Hyaluronan-binding protein 2 Q5E9Z2


<400> 339
Met Phe Ala Arg Met Ser Asp Leu His Val Leu Leu Leu Met Val Leu
 1               5                  10                  15
Ala Gly Lys Thr Ala Phe Gly Leu Ser Leu Leu Ser Phe Leu Thr Glu
            20                  25                  30
Pro Asp Pro Asp Trp Thr Pro Asp Gln Tyr Glu Tyr Ser Gln Glu Tyr
        35                  40                  45
Asn Asn Gln Glu Glu Asn Ala Ser Ser Thr Thr Ala Tyr Ser Asp Asn
    50                  55                  60
Pro Asp Trp Tyr Tyr Glu Glu Asp Asp Pro Cys Leu Ser Asn Pro Cys
```

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65                  70                  75                  80
Thr His Gly Gly Asp Cys Leu Val Ser Gly Ala Thr Phe Thr Cys Arg
                85                  90                  95
Cys Pro Asp Pro Phe Ser Gly Asn Arg Cys Gln Asn Val Gln Asn Lys
            100                 105                 110
Cys Lys Asn Asn Pro Cys Gly Arg Gly Asp Cys Leu Ile Thr Gln Ser
        115                 120                 125
Pro Pro Tyr His Arg Cys Ala Cys Lys His Pro Tyr Arg Gly Ser Asp
    130                 135                 140
Cys Ser Arg Val Val Pro Val Cys Arg Pro Asn Pro Cys Gln Asn Gly
145                 150                 155                 160
Gly Thr Cys Ser Arg Gln Arg Arg Arg Ser Lys Phe Thr Cys Ala Cys
                165                 170                 175
Pro Asp Gln Phe Lys Gly Lys Leu Cys Glu Ile Gly Pro Asp Asp Cys
            180                 185                 190
Tyr Val Asp Asp Gly Tyr Ser Tyr Arg Gly Arg Val Ser Lys Thr Ile
        195                 200                 205
His Gln His Thr Cys Leu Tyr Trp Asn Ser His Leu Leu Leu Gln Glu
    210                 215                 220
Lys Tyr Asn Met Phe Met Glu Asp Ala Glu Ala His Gly Ile Gly Glu
225                 230                 235                 240
His Asn Phe Cys Arg Asn Pro Asp Gly Asp Lys Lys Pro Trp Cys Phe
                245                 250                 255
Ile Lys Val Asn Asn Val Lys Val Lys Trp Glu Tyr Cys Asp Val Pro
            260                 265                 270
Ala Cys Ser Ala Leu Asp Val Ala Asn Pro Glu Gly Arg Pro Thr Glu
        275                 280                 285
Pro Leu Thr Lys Phe Pro Glu Phe Gly Ser Cys Gly Arg Thr Glu Ile
    290                 295                 300
Ala Glu Lys Lys Val Lys Arg Ile Phe Gly Gly Phe Lys Ser Thr Ala
305                 310                 315                 320
Gly Lys His Pro Trp Gln Ala Ser Leu Gln Thr Ser Leu Arg Leu Thr
                325                 330                 335
Val Ser Thr Pro Gln Gly His Tyr Cys Gly Gly Ala Leu Ile His Pro
            340                 345                 350
Cys Trp Val Leu Thr Ala Ala His Cys Thr Glu Ile Lys Thr Lys Tyr
        355                 360                 365
Leu Lys Val Val Leu Gly Asp Gln Asp Leu Thr Lys Thr Glu Phe His
    370                 375                 380
Glu Gln Ser Phe Gly Val Gln Lys Ile Phe Lys Tyr Ser His Tyr Ile
385                 390                 395                 400
Glu Ile Asp Asp Ile Pro Tyr Asn Asp Ile Ala Leu Leu Lys Leu Lys
                405                 410                 415
Pro Val Asp Gly His Cys Ala Leu Glu Ser Lys Tyr Val Lys Thr Val
            420                 425                 430
Cys Leu Pro Asp Gly Pro Phe Leu Ser Gly Thr Glu Cys Tyr Ile Ser
        435                 440                 445
Gly Trp Gly Val Thr Glu Thr Gly Glu Gly Ser Arg His Leu Leu Asp
    450                 455                 460
Ala Lys Val Lys Leu Ile Ser Asn Thr Ile Cys Asn Ser Arg Gln Leu
465                 470                 475                 480
Tyr Asp His Ser Ile Asp Asp Asn Met Ile Cys Ala Gly Asn Leu Gln
                485                 490                 495
Lys Pro Gly Gln Asp Ser Cys Gln Gly Asp Ser Gly Gly Pro Leu Thr
            500                 505                 510
Cys Glu Lys Asp Gly Thr Ser Tyr Ile Tyr Gly Ile Val Ser Trp Gly
        515                 520                 525
Leu Glu Cys Gly Lys Arg Pro Gly Val Tyr Thr Gln Val Thr Lys Phe
```

```
    530                 535                 540
Leu Thr Trp Ile Lys Ala Thr Met Glu Lys Glu Ala Ser Phe
545                 550                 555


<210> 340
<211> 2315
<212> PRT
<213> Homo sapiens

<220>
<223> human Phosphacan NP_002842


<400> 340
Met Arg Ile Leu Lys Arg Phe Leu Ala Cys Ile Gln Leu Leu Cys Val
 1               5                  10                  15
Cys Arg Leu Asp Trp Ala Asn Gly Tyr Tyr Arg Gln Gln Arg Lys Leu
            20                  25                  30
Val Glu Glu Ile Gly Trp Ser Tyr Thr Gly Ala Leu Asn Gln Lys Asn
        35                  40                  45
Trp Gly Lys Lys Tyr Pro Thr Cys Asn Ser Pro Lys Gln Ser Pro Ile
    50                  55                  60
Asn Ile Asp Glu Asp Leu Thr Gln Val Asn Val Asn Leu Lys Lys Leu
65                  70                  75                  80
Lys Phe Gln Gly Trp Asp Lys Thr Ser Leu Glu Asn Thr Phe Ile His
                85                  90                  95
Asn Thr Gly Lys Thr Val Glu Ile Asn Leu Thr Asn Asp Tyr Arg Val
            100                 105                 110
Ser Gly Gly Val Ser Glu Met Val Phe Lys Ala Ser Lys Ile Thr Phe
        115                 120                 125
His Trp Gly Lys Cys Asn Met Ser Ser Asp Gly Ser Glu His Ser Leu
    130                 135                 140
Glu Gly Gln Lys Phe Pro Leu Glu Met Gln Ile Tyr Cys Phe Asp Ala
145                 150                 155                 160
Asp Arg Phe Ser Ser Phe Glu Glu Ala Val Lys Gly Lys Gly Lys Leu
                165                 170                 175
Arg Ala Leu Ser Ile Leu Phe Glu Val Gly Thr Glu Glu Asn Leu Asp
            180                 185                 190
Phe Lys Ala Ile Ile Asp Gly Val Glu Ser Val Ser Arg Phe Gly Lys
        195                 200                 205
Gln Ala Ala Leu Asp Pro Phe Ile Leu Leu Asn Leu Leu Pro Asn Ser
    210                 215                 220
Thr Asp Lys Tyr Tyr Ile Tyr Asn Gly Ser Leu Thr Ser Pro Pro Cys
225                 230                 235                 240
Thr Asp Thr Val Asp Trp Ile Val Phe Lys Asp Thr Val Ser Ile Ser
                245                 250                 255
Glu Ser Gln Leu Ala Val Phe Cys Glu Val Leu Thr Met Gln Gln Ser
            260                 265                 270
Gly Tyr Val Met Leu Met Asp Tyr Leu Gln Asn Asn Phe Arg Glu Gln
        275                 280                 285
Gln Tyr Lys Phe Ser Arg Gln Val Phe Ser Ser Tyr Thr Gly Lys Glu
    290                 295                 300
Glu Ile His Glu Ala Val Cys Ser Ser Glu Pro Glu Asn Val Gln Ala
305                 310                 315                 320
Asp Pro Glu Asn Tyr Thr Ser Leu Leu Val Thr Trp Glu Arg Pro Arg
                325                 330                 335
Val Val Tyr Asp Thr Met Ile Glu Lys Phe Ala Val Leu Tyr Gln Gln
```

```
            340                 345                 350
Leu Asp Gly Glu Asp Gln Thr Lys His Glu Phe Leu Thr Asp Gly Tyr
        355                 360                 365
Gln Asp Leu Gly Ala Ile Leu Asn Asn Leu Leu Pro Asn Met Ser Tyr
    370                 375                 380
Val Leu Gln Ile Val Ala Ile Cys Thr Asn Gly Leu Tyr Gly Lys Tyr
385                 390                 395                 400
Ser Asp Gln Leu Ile Val Asp Met Pro Thr Asp Asn Pro Glu Leu Asp
                405                 410                 415
Leu Phe Pro Glu Leu Ile Gly Thr Glu Glu Ile Ile Lys Glu Glu Glu
            420                 425                 430
Glu Gly Lys Asp Ile Glu Glu Gly Ala Ile Val Asn Pro Gly Arg Asp
        435                 440                 445
Ser Ala Thr Asn Gln Ile Arg Lys Lys Glu Pro Gln Ile Ser Thr Thr
    450                 455                 460
Thr His Tyr Asn Arg Ile Gly Thr Lys Tyr Asn Glu Ala Lys Thr Asn
465                 470                 475                 480
Arg Ser Pro Thr Arg Gly Ser Glu Phe Ser Gly Lys Gly Asp Val Pro
                485                 490                 495
Asn Thr Ser Leu Asn Ser Thr Ser Gln Pro Val Thr Lys Leu Ala Thr
            500                 505                 510
Glu Lys Asp Ile Ser Leu Thr Ser Gln Thr Val Thr Glu Leu Pro Pro
        515                 520                 525
His Thr Val Glu Gly Thr Ser Ala Ser Leu Asn Asp Gly Ser Lys Thr
    530                 535                 540
Val Leu Arg Ser Pro His Met Asn Leu Ser Gly Thr Ala Glu Ser Leu
545                 550                 555                 560
Asn Thr Val Ser Ile Thr Glu Tyr Glu Glu Glu Ser Leu Leu Thr Ser
                565                 570                 575
Phe Lys Leu Asp Thr Gly Ala Glu Asp Ser Ser Gly Ser Ser Pro Ala
            580                 585                 590
Thr Ser Ala Ile Pro Phe Ile Ser Glu Asn Ile Ser Gln Gly Tyr Ile
        595                 600                 605
Phe Ser Ser Glu Asn Pro Glu Thr Ile Thr Tyr Asp Val Leu Ile Pro
    610                 615                 620
Glu Ser Ala Arg Asn Ala Ser Glu Asp Ser Thr Ser Ser Gly Ser Glu
625                 630                 635                 640
Glu Ser Leu Lys Asp Pro Ser Met Glu Gly Asn Val Trp Phe Pro Ser
                645                 650                 655
Ser Thr Asp Ile Thr Ala Gln Pro Asp Val Gly Ser Gly Arg Glu Ser
            660                 665                 670
Phe Leu Gln Thr Asn Tyr Thr Glu Ile Arg Val Asp Glu Ser Glu Lys
        675                 680                 685
Thr Thr Lys Ser Phe Ser Ala Gly Pro Val Met Ser Gln Gly Pro Ser
    690                 695                 700
Val Thr Asp Leu Glu Met Pro His Tyr Ser Thr Phe Ala Tyr Phe Pro
705                 710                 715                 720
Thr Glu Val Thr Pro His Ala Phe Thr Pro Ser Ser Arg Gln Gln Asp
                725                 730                 735
Leu Val Ser Thr Val Asn Val Val Tyr Ser Gln Thr Thr Gln Pro Val
            740                 745                 750
Tyr Asn Gly Glu Thr Pro Leu Gln Pro Ser Tyr Ser Ser Glu Val Phe
        755                 760                 765
Pro Leu Val Thr Pro Leu Leu Leu Asp Asn Gln Ile Leu Asn Thr Thr
    770                 775                 780
Pro Ala Ala Ser Ser Ser Asp Ser Ala Leu His Ala Thr Pro Val Phe
785                 790                 795                 800
Pro Ser Val Asp Val Ser Phe Glu Ser Ile Leu Ser Ser Tyr Asp Gly
```

```
                805                 810                 815
Ala Pro Leu Leu Pro Phe Ser Ser Ala Ser Phe Ser Ser Glu Leu Phe
            820                 825                 830
Arg His Leu His Thr Val Ser Gln Ile Leu Pro Gln Val Thr Ser Ala
        835                 840                 845
Thr Glu Ser Asp Lys Val Pro Leu His Ala Ser Leu Pro Val Ala Gly
    850                 855                 860
Gly Asp Leu Leu Leu Glu Pro Ser Leu Ala Gln Tyr Ser Asp Val Leu
865                 870                 875                 880
Ser Thr Thr His Ala Ala Ser Glu Thr Leu Glu Phe Gly Ser Glu Ser
                885                 890                 895
Gly Val Leu Tyr Lys Thr Leu Met Phe Ser Gln Val Glu Pro Pro Ser
            900                 905                 910
Ser Asp Ala Met Met His Ala Arg Ser Ser Gly Pro Glu Pro Ser Tyr
        915                 920                 925
Ala Leu Ser Asp Asn Glu Gly Ser Gln His Ile Phe Thr Val Ser Tyr
    930                 935                 940
Ser Ser Ala Ile Pro Val His Asp Ser Val Gly Val Thr Tyr Gln Gly
945                 950                 955                 960
Ser Leu Phe Ser Gly Pro Ser His Ile Pro Ile Pro Lys Ser Ser Leu
                965                 970                 975
Ile Thr Pro Thr Ala Ser Leu Leu Gln Pro Thr His Ala Leu Ser Gly
            980                 985                 990
Asp Gly Glu Trp Ser Gly Ala Ser Ser Asp Ser Glu Phe Leu Leu Pro
        995                 1000                1005
Asp Thr Asp Gly Leu Thr Ala Leu Asn Ile Ser Ser Pro Val Ser Val
    1010                1015                1020
Ala Glu Phe Thr Tyr Thr Thr Ser Val Phe Gly Asp Asp Asn Lys Ala
1025                1030                1035                1040
Leu Ser Lys Ser Glu Ile Ile Tyr Gly Asn Glu Thr Glu Leu Gln Ile
                1045                1050                1055
Pro Ser Phe Asn Glu Met Val Tyr Pro Ser Glu Ser Thr Val Met Pro
            1060                1065                1070
Asn Met Tyr Asp Asn Val Asn Lys Leu Asn Ala Ser Leu Gln Glu Thr
        1075                1080                1085
Ser Val Ser Ile Ser Ser Thr Lys Gly Met Phe Pro Gly Ser Leu Ala
    1090                1095                1100
His Thr Thr Thr Lys Val Phe Asp His Glu Ile Ser Gln Val Pro Glu
1105                1110                1115                1120
Asn Asn Phe Ser Val Gln Pro Thr His Thr Val Ser Gln Ala Ser Gly
                1125                1130                1135
Asp Thr Ser Leu Lys Pro Val Leu Ser Ala Asn Ser Glu Pro Ala Ser
            1140                1145                1150
Ser Asp Pro Ala Ser Ser Glu Met Leu Ser Pro Ser Thr Gln Leu Leu
        1155                1160                1165
Phe Tyr Glu Thr Ser Ala Ser Phe Ser Thr Glu Val Leu Leu Gln Pro
    1170                1175                1180
Ser Phe Gln Ala Ser Asp Val Asp Thr Leu Leu Lys Thr Val Leu Pro
1185                1190                1195                1200
Ala Val Pro Ser Asp Pro Ile Leu Val Glu Thr Pro Lys Val Asp Lys
                1205                1210                1215
Ile Ser Ser Thr Met Leu His Leu Ile Val Ser Asn Ser Ala Ser Ser
            1220                1225                1230
Glu Asn Met Leu His Ser Thr Ser Val Pro Val Phe Asp Val Ser Pro
        1235                1240                1245
Thr Ser His Met His Ser Ala Ser Leu Gln Gly Leu Thr Ile Ser Tyr
    1250                1255                1260
Ala Ser Glu Lys Tyr Glu Pro Val Leu Leu Lys Ser Glu Ser Ser His
```

```
1265                1270                1275                1280
Gln Val Val Pro Ser Leu Tyr Ser Asn Asp Glu Leu Phe Gln Thr Ala
                1285                1290                1295
Asn Leu Glu Ile Asn Gln Ala His Pro Pro Lys Gly Arg His Val Phe
            1300                1305                1310
Ala Thr Pro Val Leu Ser Ile Asp Glu Pro Leu Asn Thr Leu Ile Asn
        1315                1320                1325
Lys Leu Ile His Ser Asp Glu Ile Leu Thr Ser Thr Lys Ser Ser Val
    1330                1335                1340
Thr Gly Lys Val Phe Ala Gly Ile Pro Thr Val Ala Ser Asp Thr Phe
1345                1350                1355                1360
Val Ser Thr Asp His Ser Val Pro Ile Gly Asn Gly His Val Ala Ile
                1365                1370                1375
Thr Ala Val Ser Pro His Arg Asp Gly Ser Val Thr Ser Thr Lys Leu
            1380                1385                1390
Leu Phe Pro Ser Lys Ala Thr Ser Glu Leu Ser His Ser Ala Lys Ser
        1395                1400                1405
Asp Ala Gly Leu Val Gly Gly Gly Glu Asp Gly Asp Thr Asp Asp Asp
    1410                1415                1420
Gly Asp Asp Asp Asp Asp Asp Arg Gly Ser Asp Gly Leu Ser Ile His
1425                1430                1435                1440
Lys Cys Met Ser Cys Ser Ser Tyr Arg Glu Ser Gln Glu Lys Val Met
                1445                1450                1455
Asn Asp Ser Asp Thr His Glu Asn Ser Leu Met Asp Gln Asn Asn Pro
            1460                1465                1470
Ile Ser Tyr Ser Leu Ser Glu Asn Ser Glu Glu Asp Asn Arg Val Thr
        1475                1480                1485
Ser Val Ser Ser Asp Ser Gln Thr Gly Met Asp Arg Ser Pro Gly Lys
    1490                1495                1500
Ser Pro Ser Ala Asn Gly Leu Ser Gln Lys His Asn Asp Gly Lys Glu
1505                1510                1515                1520
Glu Asn Asp Ile Gln Thr Gly Ser Ala Leu Leu Pro Leu Ser Pro Glu
                1525                1530                1535
Ser Lys Ala Trp Ala Val Leu Thr Ser Asp Glu Glu Ser Gly Ser Gly
            1540                1545                1550
Gln Gly Thr Ser Asp Ser Leu Asn Glu Asn Glu Thr Ser Thr Asp Phe
        1555                1560                1565
Ser Phe Ala Asp Thr Asn Glu Lys Asp Ala Asp Gly Ile Leu Ala Ala
    1570                1575                1580
Gly Asp Ser Glu Ile Thr Pro Gly Phe Pro Gln Ser Pro Thr Ser Ser
1585                1590                1595                1600
Val Thr Ser Glu Asn Ser Glu Val Phe His Val Ser Glu Ala Glu Ala
                1605                1610                1615
Ser Asn Ser Ser His Glu Ser Arg Ile Gly Leu Ala Glu Gly Leu Glu
            1620                1625                1630
Ser Glu Lys Lys Ala Val Ile Pro Leu Val Ile Val Ser Ala Leu Thr
        1635                1640                1645
Phe Ile Cys Leu Val Val Leu Val Gly Ile Leu Ile Tyr Trp Arg Lys
    1650                1655                1660
Cys Phe Gln Thr Ala His Phe Tyr Leu Glu Asp Ser Thr Ser Pro Arg
1665                1670                1675                1680
Val Ile Ser Thr Pro Pro Thr Pro Ile Phe Pro Ile Ser Asp Asp Val
                1685                1690                1695
Gly Ala Ile Pro Ile Lys His Phe Pro Lys His Val Ala Asp Leu His
            1700                1705                1710
Ala Ser Ser Gly Phe Thr Glu Glu Phe Glu Thr Leu Lys Glu Phe Tyr
        1715                1720                1725
Gln Glu Val Gln Ser Cys Thr Val Asp Leu Gly Ile Thr Ala Asp Ser
```

```
    1730                1735                1740
Ser Asn His Pro Asp Asn Lys His Lys Asn Arg Tyr Ile Asn Ile Val
1745                1750                1755                1760
Ala Tyr Asp His Ser Arg Val Lys Leu Ala Gln Leu Ala Glu Lys Asp
                1765                1770                1775
Gly Lys Leu Thr Asp Tyr Ile Asn Ala Asn Tyr Val Asp Gly Tyr Asn
            1780                1785                1790
Arg Pro Lys Ala Tyr Ile Ala Ala Gln Gly Pro Leu Lys Ser Thr Ala
        1795                1800                1805
Glu Asp Phe Trp Arg Met Ile Trp Glu His Asn Val Glu Val Ile Val
    1810                1815                1820
Met Ile Thr Asn Leu Val Glu Lys Gly Arg Arg Lys Cys Asp Gln Tyr
1825                1830                1835                1840
Trp Pro Ala Asp Gly Ser Glu Glu Tyr Gly Asn Phe Leu Val Thr Gln
                1845                1850                1855
Lys Ser Val Gln Val Leu Ala Tyr Tyr Thr Val Arg Asn Phe Thr Leu
            1860                1865                1870
Arg Asn Thr Lys Ile Lys Lys Gly Ser Gln Lys Gly Arg Pro Ser Gly
        1875                1880                1885
Arg Val Val Thr Gln Tyr His Tyr Thr Gln Trp Pro Asp Met Gly Val
    1890                1895                1900
Pro Glu Tyr Ser Leu Pro Val Leu Thr Phe Val Arg Lys Ala Ala Tyr
1905                1910                1915                1920
Ala Lys Arg His Ala Val Gly Pro Val Val Val His Cys Ser Ala Gly
                1925                1930                1935
Val Gly Arg Thr Gly Thr Tyr Ile Val Leu Asp Ser Met Leu Gln Gln
            1940                1945                1950
Ile Gln His Glu Gly Thr Val Asn Ile Phe Gly Phe Leu Lys His Ile
        1955                1960                1965
Arg Ser Gln Arg Asn Tyr Leu Val Gln Thr Glu Glu Gln Tyr Val Phe
    1970                1975                1980
Ile His Asp Thr Leu Val Glu Ala Ile Leu Ser Lys Glu Thr Glu Val
1985                1990                1995                2000
Leu Asp Ser His Ile His Ala Tyr Val Asn Ala Leu Leu Ile Pro Gly
                2005                2010                2015
Pro Ala Gly Lys Thr Lys Leu Glu Lys Gln Phe Gln Leu Leu Ser Gln
            2020                2025                2030
Ser Asn Ile Gln Gln Ser Asp Tyr Ser Ala Ala Leu Lys Gln Cys Asn
        2035                2040                2045
Arg Glu Lys Asn Arg Thr Ser Ser Ile Ile Pro Val Glu Arg Ser Arg
    2050                2055                2060
Val Gly Ile Ser Ser Leu Ser Gly Glu Gly Thr Asp Tyr Ile Asn Ala
2065                2070                2075                2080
Ser Tyr Ile Met Gly Tyr Tyr Gln Ser Asn Glu Phe Ile Ile Thr Gln
                2085                2090                2095
His Pro Leu Leu His Thr Ile Lys Asp Phe Trp Arg Met Ile Trp Asp
            2100                2105                2110
His Asn Ala Gln Leu Val Val Met Ile Pro Asp Gly Gln Asn Met Ala
        2115                2120                2125
Glu Asp Glu Phe Val Tyr Trp Pro Asn Lys Asp Glu Pro Ile Asn Cys
    2130                2135                2140
Glu Ser Phe Lys Val Thr Leu Met Ala Glu Glu His Lys Cys Leu Ser
2145                2150                2155                2160
Asn Glu Glu Lys Leu Ile Ile Gln Asp Phe Ile Leu Glu Ala Thr Gln
                2165                2170                2175
Asp Asp Tyr Val Leu Glu Val Arg His Phe Gln Cys Pro Lys Trp Pro
            2180                2185                2190
Asn Pro Asp Ser Pro Ile Ser Lys Thr Phe Glu Leu Ile Ser Val Ile
```

```
        2195                2200                2205
Lys Glu Glu Ala Ala Asn Arg Asp Gly Pro Met Ile Val His Asp Glu
    2210                2215                2220
His Gly Gly Val Thr Ala Gly Thr Phe Cys Ala Leu Thr Thr Leu Met
2225                2230                2235                2240
His Gln Leu Glu Lys Glu Asn Ser Val Asp Val Tyr Gln Val Ala Lys
                2245                2250                2255
Met Ile Asn Leu Met Arg Pro Gly Val Phe Ala Asp Ile Glu Gln Tyr
            2260                2265                2270
Gln Phe Leu Tyr Lys Val Ile Leu Ser Leu Val Ser Thr Arg Gln Glu
        2275                2280                2285
Glu Asn Pro Ser Thr Ser Leu Asp Ser Asn Gly Ala Ala Leu Pro Asp
    2290                2295                2300
Gly Asn Ile Ala Glu Ser Leu Glu Ser Leu Val
2305                2310                2315


<210> 341
<211> 159
<212> PRT
<213> Homo sapiens

<220>
<223> CD44 Hyaluronan-binding domain



<400> 341
Ala Gln Ile Asp Leu Asn Ile Thr Cys Arg Phe Ala Gly Val Phe His
 1               5                  10                  15
Val Glu Lys Asn Gly Arg Tyr Ser Ile Ser Arg Thr Glu Ala Ala Asp
            20                  25                  30
Leu Cys Lys Ala Phe Asn Ser Thr Leu Pro Thr Met Ala Gln Met Glu
        35                  40                  45
Lys Ala Leu Ser Ile Gly Phe Glu Thr Cys Arg Tyr Gly Phe Ile Glu
    50                  55                  60
Gly His Val Val Ile Pro Arg Ile His Pro Asn Ser Ile Cys Ala Ala
65                  70                  75                  80
Asn Asn Thr Gly Val Tyr Ile Leu Thr Ser Asn Thr Ser Gln Tyr Asp
                85                  90                  95
Thr Tyr Cys Phe Asn Ala Ser Ala Pro Pro Glu Glu Asp Cys Thr Ser
            100                 105                 110
Val Thr Asp Leu Pro Asn Ala Phe Asp Gly Pro Ile Thr Ile Thr Ile
        115                 120                 125
Val Asn Arg Asp Gly Thr Arg Tyr Val Gln Lys Gly Glu Tyr Arg Thr
    130                 135                 140
Asn Pro Glu Asp Ile Tyr Pro Ser Asn Pro Thr Asp Asp Asp Val
145                 150                 155


<210> 342
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> linker
```

<400> 342
Gly Gly Gly Gly Gly
 1   5

<210> 343
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> linker

<400> 343
Gly Gly Gly Gly Ser
 1   5

<210> 344
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> linker

<400> 344
Ser Ser Ser Ser Gly
 1   5

<210> 345
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> linker

<400> 345
Gly Lys Ser Ser Gly Ser Gly Ser Glu Ser Lys Ser
 1   5   10

<210> 346
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> linker

<400> 346
Gly Gly Ser Thr Ser Gly Ser Gly Lys Ser Ser Glu Gly Lys Gly
 1   5   10   15

<210> 347

<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> linker

<400> 347
Gly Ser Thr Ser Gly Ser Gly Lys Ser Ser Ser Glu Gly Ser Gly Ser
 1   5   10   15
Thr Lys Gly

<210> 348
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> linker

<400> 348
Gly Ser Thr Ser Gly Ser Gly Lys Pro Gly Ser Gly Glu Gly Ser Thr
 1   5   10   15
Lys Gly

<210> 349
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> linker

<400> 349
Glu Gly Lys Ser Ser Gly Ser Gly Ser Glu Ser Lys Glu Phe
 1   5   10

<210> 350
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> linker

<400> 350
Ala Ala Pro Ala
 1

<210> 351
<211> 27
<212> DNA

<213> Artificial Sequence

<220>
<223> Gly4Ser with NcoI ends

<400> 351
ccatgggcgg cggcggctct gccatgg 27

<210> 352
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> (Gly4Ser)2 with NcoI ends

<400> 352
ccatgggcgg cggcggctct ggcggcggcg gctctgccat gg 42

<210> 353
<211> 75
<212> DNA
<213> Artificial Sequence

<220>
<223> (Ser4Gly)4 with NcoI ends

<400> 353
ccatggcctc gtcgtcgtcg ggctcgtcgt cgtcgggctc gtcgtcgtcg ggctcgtcgt 60
cgtcgggcgc catgg 75

<210> 354
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> (Ser4Gly)2 with NcoI ends

<400> 354
ccatggcctc gtcgtcgtcg ggctcgtcgt cgtcgggcgc catgg 45

<210> 355
<211> 330
<212> PRT
<213> Homo sapiens

<220>
<223> hIgG1 heavy chain constant

<400> 355
Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
 1   5   10   15
Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
            20   25   30
Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
        35   40   45
Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser

```
    50                  55                  60
Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65                  70                  75                  80
Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
                85                  90                  95
Lys Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
            100                 105                 110
Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
        115                 120                 125
Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
    130                 135                 140
Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
145                 150                 155                 160
Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu
                165                 170                 175
Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu
            180                 185                 190
His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn
        195                 200                 205
Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly
    210                 215                 220
Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu
225                 230                 235                 240
Leu Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr
                245                 250                 255
Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
            260                 265                 270
Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
        275                 280                 285
Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
    290                 295                 300
Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
305                 310                 315                 320
Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
                325                 330


<210> 356
<211> 326
<212> PRT
<213> Homo sapiens

<220>
<223> hIgG2 heavy chain constant

<400> 356
Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg
 1               5                  10                  15
Ser Thr Ser Glu Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
            20                  25                  30
Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
        35                  40                  45
Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
    50                  55                  60
Leu Ser Ser Val Val Thr Val Pro Ser Ser Asn Phe Gly Thr Gln Thr
65                  70                  75                  80
Tyr Thr Cys Asn Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys
                85                  90                  95
```

```
Thr Val Glu Arg Lys Cys Cys Val Glu Cys Pro Pro Cys Pro Ala Pro
            100                 105                 110
Pro Val Ala Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp
        115                 120                 125
Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp
    130                 135                 140
Val Ser His Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly
145                 150                 155                 160
Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn
                165                 170                 175
Ser Thr Phe Arg Val Val Ser Val Leu Thr Val Val His Gln Asp Trp
            180                 185                 190
Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro
        195                 200                 205
Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Gln Pro Arg Glu
    210                 215                 220
Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr Lys Asn
225                 230                 235                 240
Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile
                245                 250                 255
Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr
            260                 265                 270
Thr Pro Pro Met Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys
        275                 280                 285
Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys
    290                 295                 300
Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu
305                 310                 315                 320
Ser Leu Ser Pro Gly Lys
                325
```

<210> 357
<211> 377
<212> PRT
<213> Homo sapiens

<220>
<223> hIgG3 heavy chain constant

<400> 357

```
Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg
 1               5                  10                  15
Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
            20                  25                  30
Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
        35                  40                  45
Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
    50                  55                  60
Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65                  70                  75                  80
Tyr Thr Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
                85                  90                  95
Arg Val Glu Leu Lys Thr Pro Leu Gly Asp Thr Thr His Thr Cys Pro
            100                 105                 110
Arg Cys Pro Glu Pro Lys Ser Cys Asp Thr Pro Pro Pro Cys Pro Arg
        115                 120                 125
Cys Pro Glu Pro Lys Ser Cys Asp Thr Pro Pro Pro Cys Pro Arg Cys
```

```
    130                 135                 140
Pro Glu Pro Lys Ser Cys Asp Thr Pro Pro Pro Cys Pro Arg Cys Pro
145                 150                 155                 160
Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys
                165                 170                 175
Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val
            180                 185                 190
Val Val Asp Val Ser His Glu Asp Pro Glu Val Gln Phe Lys Trp Tyr
        195                 200                 205
Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu
    210                 215                 220
Gln Tyr Asn Ser Thr Phe Arg Val Val Ser Val Leu Thr Val Leu His
225                 230                 235                 240
Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys
                245                 250                 255
Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Gln
            260                 265                 270
Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met
        275                 280                 285
Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro
    290                 295                 300
Ser Asp Ile Ala Val Glu Trp Glu Ser Ser Gly Gln Pro Glu Asn Asn
305                 310                 315                 320
Tyr Asn Thr Thr Pro Pro Met Leu Asp Ser Asp Gly Ser Phe Phe Leu
                325                 330                 335
Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Ile
            340                 345                 350
Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn Arg Phe Thr Gln
        355                 360                 365
Lys Ser Leu Ser Leu Ser Pro Gly Lys
    370                 375


<210> 358
<211> 327
<212> PRT
<213> Homo sapiens

<220>
<223> hIgG4 heavy chain constant

<400> 358
Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg
 1               5                  10                  15
Ser Thr Ser Glu Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
            20                  25                  30
Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
        35                  40                  45
Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
    50                  55                  60
Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Lys Thr
65                  70                  75                  80
Tyr Thr Cys Asn Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys
                85                  90                  95
Arg Val Glu Ser Lys Tyr Gly Pro Pro Cys Pro Ser Cys Pro Ala Pro
            100                 105                 110
Glu Phe Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys
        115                 120                 125
```

```
Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val
    130                 135                 140
Asp Val Ser Gln Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp
145                 150                 155                 160
Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe
                165                 170                 175
Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp
            180                 185                 190
Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu
        195                 200                 205
Pro Ser Ser Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg
    210                 215                 220
Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Gln Glu Glu Met Thr Lys
225                 230                 235                 240
Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp
                245                 250                 255
Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys
            260                 265                 270
Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser
        275                 280                 285
Arg Leu Thr Val Asp Lys Ser Arg Trp Gln Glu Gly Asn Val Phe Ser
    290                 295                 300
Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser
305                 310                 315                 320
Leu Ser Leu Ser Leu Gly Lys
                325
```

<210> 359
<211> 231
<212> PRT
<213> Artificial Sequence

<220>
<223> hIgG1 Fc

<400> 359

```
Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro
 1               5                  10                  15
Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys
            20                  25                  30
Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val
        35                  40                  45
Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp
    50                  55                  60
Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr
65                  70                  75                  80
Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp
                85                  90                  95
Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu
            100                 105                 110
Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg
        115                 120                 125
Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr Lys
    130                 135                 140
Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp
145                 150                 155                 160
Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys
```

```
                165                 170                 175
Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser
            180                 185                 190
Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser
        195                 200                 205
Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser
    210                 215                 220
Leu Ser Leu Ser Pro Gly Lys
225                 230
```

<210> 360
<211> 93
<212> PRT
<213> Homo sapiens

<220>
<223> TSG-6 Link domain

<400> 360

```
Gly Val Tyr His Arg Glu Ala Arg Ser Gly Lys Tyr Lys Leu Thr Tyr
 1               5                  10                  15
Ala Glu Ala Lys Ala Val Cys Glu Phe Glu Gly Gly His Leu Ala Thr
            20                  25                  30
Tyr Lys Gln Leu Glu Ala Ala Arg Lys Ile Gly Phe His Val Cys Ala
        35                  40                  45
Ala Gly Trp Met Ala Lys Gly Arg Val Gly Tyr Pro Ile Val Lys Pro
    50                  55                  60
Gly Pro Asn Cys Gly Phe Gly Lys Thr Gly Ile Ile Asp Tyr Gly Ile
65                  70                  75                  80
Arg Leu Asn Arg Ser Glu Arg Trp Asp Ala Tyr Cys Tyr
                85                  90
```

<210> 361
<211> 93
<212> PRT
<213> Homo sapiens

<220>
<223> TSG-6 Link domain variant K20A/K34A/K41A

<400> 361

```
Gly Val Tyr His Arg Glu Ala Arg Ser Gly Lys Tyr Lys Leu Thr Tyr
 1               5                  10                  15
Ala Glu Ala Ala Ala Val Cys Glu Phe Glu Gly Gly His Leu Ala Thr
            20                  25                  30
Tyr Ala Gln Leu Glu Ala Ala Arg Ala Ile Gly Phe His Val Cys Ala
        35                  40                  45
Ala Gly Trp Met Ala Lys Gly Arg Val Gly Tyr Pro Ile Val Lys Pro
    50                  55                  60
Gly Pro Asn Cys Gly Phe Gly Lys Thr Gly Ile Ile Asp Tyr Gly Ile
65                  70                  75                  80
Arg Leu Asn Arg Ser Glu Arg Trp Asp Ala Tyr Cys Tyr
                85                  90
```

<210> 362

<211> 39
<212> PRT
<213> Artificial Sequence

<220>
<223> c-jun leucine zipper

<400> 362
Arg Ile Ala Arg Leu Glu Glu Lys Val Lys Thr Leu Lys Ala Gln Asn
 1   5   10   15
Ser Glu Leu Ala Ser Thr Ala Asn Met Leu Arg Glu Gln Val Ala Gln
            20   25   30
Leu Lys Gln Lys Val Met Asn
        35

<210> 363
<211> 39
<212> PRT
<213> Artificial Sequence

<220>
<223> c-fos leucine zipper

<400> 363
Leu Thr Asp Thr Leu Gln Ala Glu Thr Asp Gln Leu Glu Asp Glu Lys
 1   5   10   15
Ser Ala Leu Gln Thr Glu Ile Ala Asn Leu Leu Lys Glu Lys Glu Lys
            20   25   30
Leu Glu Phe Ile Leu Ala Ala
        35

<210> 364
<211> 33
<212> PRT
<213> Artificial Sequence

<220>
<223> GCN4 leucine zipper

<400> 364
Arg Met Lys Gln Leu Glu Asp Lys Val Glu Glu Leu Leu Ser Lys Asn
 1   5   10   15
Tyr His Leu Glu Asn Glu Val Ala Arg Leu Lys Lys Leu Val Gly Glu
            20   25   30
Arg

<210> 365
<211> 33
<212> PRT
<213> Artificial Sequence

<220>
<223> GCN4 leucine zipper- trimer

<400> 365
Arg Met Lys Gln Ile Glu Asp Lys Ile Glu Glu Ile Leu Ser Lys Ile
 1   5   10   15
Tyr His Ile Glu Asn Glu Ile Ala Arg Ile Lys Lys Leu Ile Gly Glu
            20   25   30
Arg

<210> 366
<211> 33
<212> PRT
<213> Artificial Sequence

<220>
<223> GCN4 leucine zipper- tetramer

<400> 366
Arg Met Lys Gln Ile Glu Asp Lys Leu Glu Glu Ile Leu Ser Lys Leu
 1   5   10   15
Tyr His Ile Glu Asn Glu Leu Ala Arg Ile Lys Lys Leu Leu Gly Glu
            20   25   30
Arg

<210> 367
<211> 44
<212> PRT
<213> Artificial Sequence

<220>
<223> R subunit of protein kinase A (PKA)

<400> 367
Ser His Ile Gln Ile Pro Pro Gly Leu Thr Glu Leu Leu Gln Gly Tyr
 1   5   10   15
Thr Val Glu Val Leu Arg Gln Gln Pro Pro Asp Leu Val Glu Phe Ala
            20   25   30
Val Glu Tyr Phe Thr Arg Leu Arg Glu Ala Arg Ala
        35   40

<210> 368
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> AD subunit

<400> 368
Gln Ile Glu Tyr Leu Ala Lys Gln Ile Val Asp Asn Ala Ile Gln Gln
 1   5   10   15
Ala

<210> 369
<211> 45
<212> PRT
<213> Artificial Sequence

<220>
<223> modified R subunit of protein kinase A (PKA)

<400> 369
Cys Ser His Ile Gln Ile Pro Pro Gly Leu Thr Glu Leu Leu Gln Gly
 1   5   10   15
Tyr Thr Val Glu Val Leu Arg Gln Gln Pro Pro Asp Leu Val Glu Phe
            20   25   30
Ala Val Glu Tyr Phe Thr Arg Leu Arg Glu Ala Arg Ala
        35   40   45

<210> 370
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> modified AD subunit

<400> 370
Cys Gly Gln Ile Glu Tyr Leu Ala Lys Gln Ile Val Asp Asn Ala Ile
 1   5   10   15
Gln Gln Ala Gly Cys
            20

<210> 371
<211> 93
<212> PRT
<213> Homo sapiens

<220>
<223> Stabilin-1 Link domain

<400> 371
Gly Val Phe His Leu Gln Ala Thr Ser Gly Pro Tyr Gly Leu Asn Phe
 1   5   10   15
Ser Glu Ala Glu Ala Ala Cys Glu Ala Gln Gly Ala Val Leu Ala Ser
            20   25   30
Phe Pro Gln Leu Ser Ala Ala Gln Gln Leu Gly Phe His Leu Cys Leu
        35   40   45
Met Gly Trp Leu Ala Asn Gly Ser Thr Ala His Pro Val Val Phe Pro
    50   55   60
Val Ala Asp Cys Gly Asn Gly Arg Val Gly Ile Val Ser Leu Gly Ala
65   70   75   80
Arg Lys Asn Leu Ser Glu Arg Trp Asp Ala Tyr Cys Phe
                85   90

<210> 372

<211> 93
<212> PRT
<213> Homo sapiens

<220>
<223> Stabilin-2 Link domain

<400> 372
Gly Val Phe His Leu Arg Ser Pro Leu Gly Gln Tyr Lys Leu Thr Phe
 1   5   10   15
Asp Lys Ala Arg Glu Ala Cys Ala Asn Glu Ala Ala Thr Met Ala Thr
            20   25   30
Tyr Asn Gln Leu Ser Tyr Ala Gln Lys Ala Lys Tyr His Leu Cys Ser
        35   40   45
Ala Gly Trp Leu Glu Thr Gly Arg Val Ala Tyr Pro Thr Ala Phe Ala
    50   55   60
Ser Gln Asn Cys Gly Ser Gly Val Val Gly Ile Val Asp Tyr Gly Pro
65   70   75   80
Arg Pro Asn Lys Ser Glu Met Trp Asp Val Phe Cys Tyr
                85   90

<210> 373
<211> 93
<212> PRT
<213> Homo sapiens

<220>
<223> CAB61358 Link domain

<400> 373
Gly Val Phe His Leu Arg Ser Pro Leu Gly Gln Tyr Lys Leu Thr Phe
 1   5   10   15
Asp Lys Ala Arg Glu Ala Cys Ala Asn Glu Ala Ala Thr Met Ala Thr
            20   25   30
Tyr Asn Gln Leu Ser Tyr Ala Gln Lys Ala Lys Tyr His Leu Cys Ser
        35   40   45
Ala Gly Trp Leu Glu Thr Gly Arg Val Ala Tyr Pro Thr Ala Phe Ala
    50   55   60
Ser Gln Asn Cys Gly Ser Gly Val Val Gly Ile Val Asp Tyr Gly Pro
65   70   75   80
Arg Pro Asn Lys Ser Glu Met Trp Asp Val Phe Cys Tyr
                85   90

<210> 374
<211> 95
<212> PRT
<213> Homo sapiens

<220>
<223> KIAA0527 Link domain

<400> 374
Lys Leu Phe Val Leu Glu Ser Gln Asn Gly Ser Gln Gly Leu Gln Leu
 1   5   10   15
Glu Ala Ala Arg Leu Ser Cys Lys Ser Arg Gly Ala His Leu Ala Ser
            20   25   30

```
Ala Asp Glu Leu Arg Arg Val Val Gln Asp Cys Ser Phe Ala Val Cys
        35                  40                  45
Thr Thr Gly Trp Leu Ala Asp Gly Thr Leu Gly Thr Thr Val Cys Ser
    50                  55                  60
Lys Gly Ser Gly Glu Gln Gln Ile Met Arg Ala Val Asp Val Arg Ile
65                  70                  75                  80
Glu Ser Asn Pro Val Pro Gly Gly Thr Tyr Ser Ala Leu Cys Ile
                85                  90                  95


<210> 375
<211> 88
<212> PRT
<213> Homo sapiens

<220>
<223> CD44 Link domain

<400> 375
Gly Val Phe His Val Glu Lys Asn Gly Arg Tyr Ser Ile Ser Arg Thr
 1               5                  10                  15
Glu Ala Ala Asp Leu Cys Lys Ala Phe Asn Ser Thr Leu Pro Thr Met
            20                  25                  30
Ala Gln Met Glu Lys Ala Leu Ser Ile Gly Phe Glu Thr Cys Arg Tyr
        35                  40                  45
Gly Phe Ile Glu Gly His Val Val Ile Pro Arg Ile His Pro Asn Ser
    50                  55                  60
Ile Cys Ala Ala Asn Asn Thr Gly Val Tyr Ile Leu Thr Ser Asn Thr
65                  70                  75                  80
Ser Gln Tyr Asp Thr Tyr Cys Phe
                85


<210> 376
<211> 90
<212> PRT
<213> Homo sapiens

<220>
<223> LYVE-1 Link domain

<400> 376
Gly Ile Thr Leu Val Ser Lys Lys Ala Asn Gln Gln Leu Asn Phe Thr
 1               5                  10                  15
Glu Ala Lys Glu Ala Cys Arg Leu Leu Gly Leu Ser Leu Ala Gly Lys
            20                  25                  30
Asp Gln Val Glu Thr Ala Leu Lys Ala Ser Phe Glu Thr Cys Ser Tyr
        35                  40                  45
Gly Trp Val Gly Asp Gly Phe Val Val Ile Ser Arg Ile Ser Pro Asn
    50                  55                  60
Pro Lys Cys Gly Lys Asn Gly Val Gly Val Leu Ile Trp Lys Val Pro
65                  70                  75                  80
Val Ser Arg Gln Phe Ala Ala Tyr Cys Tyr
                85                  90


<210> 377
<211> 95
```

<212> PRT
<213> Homo sapiens

<220>
<223> HAPLN1 Link domain 1

<400> 377
Val Val Phe Pro Tyr Phe Pro Arg Leu Gly Arg Tyr Asn Leu Asn Phe
 1   5   10   15
His Glu Ala Gln Gln Ala Cys Leu Asp Gln Asp Ala Val Ile Ala Ser
            20   25   30
Phe Asp Gln Leu Tyr Asp Ala Trp Arg Gly Gly Leu Asp Trp Cys Asn
        35   40   45
Ala Gly Trp Leu Ser Asp Gly Ser Val Gln Tyr Pro Ile Thr Lys Pro
    50   55   60
Arg Glu Pro Cys Gly Gly Gln Asn Thr Val Pro Gly Val Arg Asn Tyr
65   70   75   80
Gly Phe Trp Asp Lys Asp Lys Ser Arg Tyr Asp Val Phe Cys Phe
                85   90   95

<210> 378
<211> 92
<212> PRT
<213> Homo sapiens

<220>
<223> HAPLN1 Link domain 2

<400> 378
Gly Arg Phe Tyr Tyr Leu Ile His Pro Thr Lys Leu Thr Tyr Asp Glu
 1   5   10   15
Ala Val Gln Ala Cys Leu Asn Asp Gly Ala Gln Ile Ala Lys Val Gly
            20   25   30
Gln Ile Phe Ala Ala Trp Lys Ile Leu Gly Tyr Asp Arg Cys Asp Ala
        35   40   45
Gly Trp Leu Ala Asp Gly Ser Val Arg Tyr Pro Ile Ser Arg Pro Arg
    50   55   60
Arg Arg Cys Ser Pro Thr Glu Ala Ala Val Arg Phe Val Gly Phe Pro
65   70   75   80
Asp Lys Lys His Lys Leu Tyr Gly Val Tyr Cys Phe
                85   90

<210> 379
<211> 94
<212> PRT
<213> Homo sapiens

<220>
<223> HAPLN2 Link domain 1

<400> 379
Val Val Phe Pro Tyr Gln Pro Ser Arg Gly Arg Tyr Gln Phe Asn Tyr
 1   5   10   15
Tyr Glu Ala Lys Gln Ala Cys Glu Glu Gln Asp Gly Arg Leu Ala Thr
            20   25   30

```
Tyr Ser Gln Leu Tyr Gln Ala Trp Thr Glu Gly Leu Asp Trp Cys Asn
        35                  40                  45
Ala Gly Trp Leu Leu Glu Gly Ser Val Arg Tyr Pro Val Leu Thr Ala
    50                  55                  60
Arg Ala Pro Cys Gly Gly Arg Gly Arg Pro Gly Ile Arg Ser Tyr Gly
65                  70                  75                  80
Pro Arg Asp Arg Met Arg Asp Arg Tyr Asp Ala Phe Cys Phe
                85                  90
```

<210> 380
<211> 90
<212> PRT
<213> Homo sapiens

<220>
<223> HAPLN2 Link domain 2

<400> 380

```
Gly Gln Phe Phe Val Pro Gly Arg Leu Thr Leu Ser Glu Ala His Ala
 1               5                  10                  15
Ala Cys Arg Arg Arg Gly Ala Val Val Ala Lys Val Gly His Leu Tyr
            20                  25                  30
Ala Ala Trp Lys Phe Ser Gly Leu Asp Gln Cys Asp Gly Gly Trp Leu
        35                  40                  45
Ala Asp Gly Ser Val Arg Phe Pro Ile Thr Thr Pro Arg Pro Arg Cys
    50                  55                  60
Gly Gly Leu Pro Asp Pro Gly Val Arg Ser Phe Gly Phe Pro Arg Pro
65                  70                  75                  80
Gln Gln Ala Ala Tyr Gly Thr Tyr Cys Tyr
                85                  90
```

<210> 381
<211> 95
<212> PRT
<213> Homo sapiens

<220>
<223> APLN3 Link domain 1

<400> 381

```
Val Val Phe Pro Tyr Gln Ser Pro Asn Gly Arg Tyr Gln Phe Asn Phe
 1               5                  10                  15
His Glu Gly Gln Gln Val Cys Ala Glu Gln Ala Ala Val Val Ala Ser
            20                  25                  30
Phe Glu Gln Leu Phe Arg Ala Trp Glu Glu Gly Leu Asp Trp Cys Asn
        35                  40                  45
Ala Gly Trp Leu Gln Asp Ala Thr Val Gln Tyr Pro Ile Met Leu Pro
    50                  55                  60
Arg Gln Pro Cys Gly Gly Pro Gly Leu Ala Pro Gly Val Arg Ser Tyr
65                  70                  75                  80
Gly Pro Arg His Arg Arg Leu His Arg Tyr Asp Val Phe Cys Phe
                85                  90                  95
```

<210> 382

<211> 92
<212> PRT
<213> Homo sapiens

<220>
<223> HAPLN3 Link domain 2

<400> 382
Gly Arg Val Tyr Tyr Leu Glu His Pro Glu Lys Leu Thr Leu Thr Glu
 1   5   10   15
Ala Arg Glu Ala Cys Gln Glu Asp Asp Ala Thr Ile Ala Lys Val Gly
            20   25   30
Gln Leu Phe Ala Ala Trp Lys Phe His Gly Leu Asp Arg Cys Asp Ala
        35   40   45
Gly Trp Leu Ala Asp Gly Ser Val Arg Tyr Pro Val Val His Pro His
    50   55   60
Pro Asn Cys Gly Pro Pro Glu Pro Gly Val Arg Ser Phe Gly Phe Pro
65   70   75   80
Asp Pro Gln Ser Arg Leu Tyr Gly Val Tyr Cys Tyr
                85   90

<210> 383
<211> 105
<212> PRT
<213> Homo sapiens

<220>
<223> HAPLN4 Link domain 1

<400> 383
Val Val Phe Pro Tyr His Pro Arg Gly Gly Arg Tyr Lys Leu Thr Phe
 1   5   10   15
Ala Glu Ala Gln Arg Ala Cys Ala Glu Gln Asp Gly Ile Leu Ala Ser
            20   25   30
Ala Glu Gln Leu His Ala Ala Trp Arg Asp Gly Leu Asp Trp Cys Asn
        35   40   45
Ala Gly Trp Leu Arg Asp Gly Ser Val Gln Tyr Pro Val Asn Arg Pro
    50   55   60
Arg Glu Pro Cys Gly Gly Leu Gly Gly Thr Gly Ser Ala Gly Gly Gly
65   70   75   80
Gly Asp Ala Asn Gly Gly Leu Arg Asn Tyr Gly Tyr Arg His Asn Ala
                85   90   95
Glu Glu Arg Tyr Asp Ala Phe Cys Phe
            100   105

<210> 384
<211> 92
<212> PRT
<213> Homo sapiens

<220>
<223> HAPLN4 Link domain 2

<400> 384
Gly Arg Val Phe Phe Leu Lys Pro Leu Arg Pro Val Pro Phe Ser Gly
 1   5   10   15

```
Ala Ala Arg Ala Cys Ala Ala Arg Gly Ala Ala Val Ala Lys Val Gly
            20                  25                  30
Gln Leu Phe Ala Ala Trp Lys Leu Gln Leu Leu Asp Arg Cys Thr Ala
        35                  40                  45
Gly Trp Leu Ala Asp Gly Ser Ala Arg Tyr Pro Ile Val Asn Pro Arg
    50                  55                  60
Ala Arg Cys Gly Gly Arg Arg Pro Gly Val Arg Ser Leu Gly Phe Pro
65                  70                  75                  80
Asp Ala Thr Arg Arg Leu Phe Gly Val Tyr Cys Tyr
                85                  90
```

<210> 385
<211> 95
<212> PRT
<213> Homo sapiens

<220>
<223> Aggrecan Link domain 1

<400> 385

```
Ile Val Phe His Tyr Arg Ala Ile Ser Thr Arg Tyr Thr Leu Asp Phe
 1               5                  10                  15
Asp Arg Ala Gln Arg Ala Cys Leu Gln Asn Ser Ala Ile Ile Ala Thr
            20                  25                  30
Pro Glu Gln Leu Gln Ala Ala Tyr Glu Asp Gly Phe His Gln Cys Asp
        35                  40                  45
Ala Gly Trp Leu Ala Asp Gln Thr Val Arg Tyr Pro Ile His Thr Pro
    50                  55                  60
Arg Glu Gly Cys Tyr Gly Asp Lys Asp Glu Phe Pro Gly Val Arg Thr
65                  70                  75                  80
Tyr Gly Ile Arg Asp Thr Asn Glu Thr Tyr Asp Val Tyr Cys Phe
                85                  90                  95
```

<210> 386
<211> 96
<212> PRT
<213> Homo sapiens

<220>
<223> Aggrecan Link domain 2

<400> 386

```
Glu Val Phe Tyr Ala Thr Ser Pro Glu Lys Phe Thr Phe Gln Glu Ala
 1               5                  10                  15
Ala Asn Glu Cys Arg Arg Leu Gly Ala Arg Leu Ala Thr Thr Gly Gln
            20                  25                  30
Leu Tyr Leu Ala Trp Gln Ala Gly Met Asp Met Cys Ser Ala Gly Trp
        35                  40                  45
Leu Ala Asp Arg Ser Val Arg Tyr Pro Ile Ser Lys Ala Arg Pro Asn
    50                  55                  60
Cys Gly Gly Asn Leu Leu Gly Val Arg Thr Val Tyr Val His Ala Asn
65                  70                  75                  80
Gln Thr Gly Tyr Pro Asp Pro Ser Ser Arg Tyr Asp Ala Ile Cys Tyr
                85                  90                  95
```

<210> 387
<211> 95
<212> PRT
<213> Homo sapiens

<220>
<223> Aggrecan Link domain 3

<400> 387
Val Val Phe His Tyr Arg Pro Gly Pro Thr Arg Tyr Ser Leu Thr Phe
 1   5   10   15
Glu Glu Ala Gln Gln Ala Cys Leu Arg Thr Gly Ala Val Ile Ala Ser
            20   25   30
Pro Glu Gln Leu Gln Ala Ala Tyr Glu Ala Gly Tyr Glu Gln Cys Asp
        35   40   45
Ala Gly Trp Leu Arg Asp Gln Thr Val Arg Tyr Pro Ile Val Ser Pro
    50   55   60
Arg Thr Pro Cys Val Gly Asp Lys Asp Ser Ser Pro Gly Val Arg Thr
65   70   75   80
Tyr Gly Val Arg Pro Ser Thr Glu Thr Tyr Asp Val Tyr Cys Phe
                85   90   95

<210> 388
<211> 96
<212> PRT
<213> Homo sapiens

<220>
<223> Aggrecan Link domain 4

<400> 388
Glu Val Phe Phe Ala Thr Arg Leu Glu Gln Phe Thr Phe Gln Glu Ala
 1   5   10   15
Leu Glu Phe Cys Glu Ser His Asn Ala Thr Leu Ala Thr Thr Gly Gln
            20   25   30
Leu Tyr Ala Ala Trp Ser Arg Gly Leu Asp Lys Cys Tyr Ala Gly Trp
        35   40   45
Leu Ala Asp Gly Ser Leu Arg Tyr Pro Ile Val Thr Pro Arg Pro Ala
    50   55   60
Cys Gly Gly Asp Lys Pro Gly Val Arg Thr Val Tyr Leu Tyr Pro Asn
65   70   75   80
Gln Thr Gly Leu Pro Asp Pro Leu Ser Arg His His Ala Phe Cys Phe
                85   90   95

<210> 389
<211> 95
<212> PRT
<213> Homo sapiens

<220>
<223> Brevican Link domain 1

<400> 389
Val Val Phe Leu Tyr Arg Glu Gly Ser Ala Arg Tyr Ala Phe Ser Phe
 1   5   10   15

```
Ser Gly Ala Gln Glu Ala Cys Ala Arg Ile Gly Ala His Ile Ala Thr
            20                  25                  30
Pro Glu Gln Leu Tyr Ala Ala Tyr Leu Gly Gly Tyr Glu Gln Cys Asp
        35                  40                  45
Ala Gly Trp Leu Ser Asp Gln Thr Val Arg Tyr Pro Ile Gln Thr Pro
    50                  55                  60
Arg Glu Ala Cys Tyr Gly Asp Met Asp Gly Phe Pro Gly Val Arg Asn
65                  70                  75                  80
Tyr Gly Val Val Asp Pro Asp Asp Leu Tyr Asp Val Tyr Cys Tyr
                85                  90                  95


<210> 390
<211> 96
<212> PRT
<213> Homo sapiens

<220>
<223> Brevican Link domain 2

<400> 390
Glu Leu Phe Leu Gly Asp Pro Pro Glu Lys Leu Thr Leu Glu Glu Ala
 1               5                  10                  15
Arg Ala Tyr Cys Gln Glu Arg Gly Ala Glu Ile Ala Thr Thr Gly Gln
            20                  25                  30
Leu Tyr Ala Ala Trp Asp Gly Gly Leu Asp His Cys Ser Pro Gly Trp
        35                  40                  45
Leu Ala Asp Gly Ser Val Arg Tyr Pro Ile Val Thr Pro Ser Gln Arg
    50                  55                  60
Cys Gly Gly Gly Leu Pro Gly Val Lys Thr Leu Phe Leu Phe Pro Asn
65                  70                  75                  80
Gln Thr Gly Phe Pro Asn Lys His Ser Arg Phe Asn Val Tyr Cys Phe
                85                  90                  95


<210> 391
<211> 95
<212> PRT
<213> Homo sapiens

<220>
<223> Versican Link domain 1

<400> 391
Val Val Phe His Tyr Arg Ala Ala Thr Ser Arg Tyr Thr Leu Asn Phe
 1               5                  10                  15
Glu Ala Ala Gln Lys Ala Cys Leu Asp Val Gly Ala Val Ile Ala Thr
            20                  25                  30
Pro Glu Gln Leu Phe Ala Ala Tyr Glu Asp Gly Phe Glu Gln Cys Asp
        35                  40                  45
Ala Gly Trp Leu Ala Asp Gln Thr Val Arg Tyr Pro Ile Arg Ala Pro
    50                  55                  60
Arg Val Gly Cys Tyr Gly Asp Lys Met Gly Lys Ala Gly Val Arg Thr
65                  70                  75                  80
Tyr Gly Phe Arg Ser Pro Gln Glu Thr Tyr Asp Val Tyr Cys Tyr
                85                  90                  95
```

<210> 392
<211> 96
<212> PRT
<213> Homo sapiens

<220>
<223> Versican Link domain 2

<400> 392
Asp Val Phe His Leu Thr Val Pro Ser Lys Phe Thr Phe Glu Glu Ala
 1   5   10   15
Ala Lys Glu Cys Glu Asn Gln Asp Ala Arg Leu Ala Thr Val Gly Glu
            20   25   30
Leu Gln Ala Ala Trp Arg Asn Gly Phe Asp Gln Cys Asp Tyr Gly Trp
        35   40   45
Leu Ser Asp Ala Ser Val Arg His Pro Val Thr Val Ala Arg Ala Gln
    50   55   60
Cys Gly Gly Gly Leu Leu Gly Val Arg Thr Leu Tyr Arg Phe Glu Asn
65   70   75   80
Gln Thr Gly Phe Pro Pro Pro Asp Ser Arg Phe Asp Ala Tyr Cys Phe
                85   90   95

<210> 393
<211> 95
<212> PRT
<213> Homo sapiens

<220>
<223> Neurocan Link domain 1

<400> 393
Val Val Phe His Tyr Arg Ser Ala Arg Asp Arg Tyr Ala Leu Thr Phe
 1   5   10   15
Ala Glu Ala Gln Glu Ala Cys Arg Leu Ser Ser Ala Ile Ile Ala Ala
            20   25   30
Pro Arg His Leu Gln Ala Ala Phe Glu Asp Gly Phe Asp Asn Cys Asp
        35   40   45
Ala Gly Trp Leu Ser Asp Arg Thr Val Arg Tyr Pro Ile Thr Gln Ser
    50   55   60
Arg Pro Gly Cys Tyr Gly Asp Arg Ser Ser Leu Pro Gly Val Arg Ser
65   70   75   80
Tyr Gly Arg Arg Asn Pro Gln Glu Leu Tyr Asp Val Tyr Cys Phe
                85   90   95

<210> 394
<211> 96
<212> PRT
<213> Homo sapiens

<220>
<223> Neurocan Link domain 2

<400> 394
Glu Val Phe Tyr Val Gly Pro Ala Arg Arg Leu Thr Leu Ala Gly Ala
 1   5   10   15
Arg Ala Gln Cys Arg Arg Gln Gly Ala Ala Leu Ala Ser Val Gly Gln

```
            20                  25                  30
Leu His Leu Ala Trp His Glu Gly Leu Asp Gln Cys Asp Pro Gly Trp
        35                  40                  45
Leu Ala Asp Gly Ser Val Arg Tyr Pro Ile Gln Thr Pro Arg Arg Arg
    50                  55                  60
Cys Gly Gly Pro Ala Pro Gly Val Arg Thr Val Tyr Arg Phe Ala Asn
65                  70                  75                  80
Arg Thr Gly Phe Pro Ser Pro Ala Glu Arg Phe Asp Ala Tyr Cys Phe
                85                  90                  95
```

<210> 395
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> HAS1 Forward primer

<400> 395
tacaaccaga agttcctggg 20

<210> 396
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> HAS1 Reverse primer

<400> 396
ctggaggtgt acttggtagc 20

<210> 397
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> HAS2 forward primer

<400> 397
gtatcagttt ggtttacaat c 21

<210> 398
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> HAS2 reverse primer

<400> 398
gcaccatgtc atattgttgt c 21

<210> 399
<211> 20
<212> DNA

<213> Artificial Sequence

<220>
<223> HAS3 forward primer

<400> 399
cttaagggtt gcttgcttgc 20

<210> 400
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> HAS3 reverse primer

<400> 400
gttcgtggga gatgaaggaa 20

<210> 401
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> HYAL1 forward primer

<400> 401
gtgctgccct atgtccagat 20

<210> 402
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> HYAL1 reverse primer

<400> 402
attttcccag ctcacccaga 20

<210> 403
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> HYAL2 forward primer

<400> 403
tctaccattg gcgagagtg 19

<210> 404
<211> 18
<212> DNA
<213> Artificial Sequence

<220>

<223> HYAL2 reverse primer

<400> 404
gcagccgtgt caggtaat 18

<210> 405
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> GAPDH forward primer

<400> 405
tgcaccacca actgcttagc 20

<210> 406
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> GAPDH reverse primer

<400> 406
ggcatggact gtggtcatga g 21

<210> 407
<211> 277
<212> PRT
<213> Homo sapiens

<220>
<223> human TSG-6 preprotein Q144R

<220>
<221> SIGNAL
<222> (1)...(17)
<223> signal sequence

<400> 407
Met Ile Ile Leu Ile Tyr Leu Phe Leu Leu Leu Trp Glu Asp Thr Gln
 1   5   10   15
Gly Trp Gly Phe Lys Asp Gly Ile Phe His Asn Ser Ile Trp Leu Glu
            20   25   30
Arg Ala Ala Gly Val Tyr His Arg Glu Ala Arg Ser Gly Lys Tyr Lys
        35   40   45
Leu Thr Tyr Ala Glu Ala Lys Ala Val Cys Glu Phe Glu Gly Gly His
    50   55   60
Leu Ala Thr Tyr Lys Gln Leu Glu Ala Ala Arg Lys Ile Gly Phe His
65   70   75   80
Val Cys Ala Ala Gly Trp Met Ala Lys Gly Arg Val Gly Tyr Pro Ile
                85   90   95
Val Lys Pro Gly Pro Asn Cys Gly Phe Gly Lys Thr Gly Ile Ile Asp
            100   105   110
Tyr Gly Ile Arg Leu Asn Arg Ser Glu Arg Trp Asp Ala Tyr Cys Tyr
        115   120   125

Asn Pro His Ala Lys Glu Cys Gly Gly Val Phe Thr Asp Pro Lys Arg
    130   135   140
Ile Phe Lys Ser Pro Gly Phe Pro Asn Glu Tyr Glu Asp Asn Gln Ile
145   150   155   160
Cys Tyr Trp His Ile Arg Leu Lys Tyr Gly Gln Arg Ile His Leu Ser
                165   170   175
Phe Leu Asp Phe Asp Leu Glu Asp Asp Pro Gly Cys Leu Ala Asp Tyr
            180   185   190
Val Glu Ile Tyr Asp Ser Tyr Asp Asp Val His Gly Phe Val Gly Arg
        195   200   205
Tyr Cys Gly Asp Glu Leu Pro Asp Asp Ile Ile Ser Thr Gly Asn Val
    210   215   220
Met Thr Leu Lys Phe Leu Ser Asp Ala Ser Val Thr Ala Gly Gly Phe
225   230   235   240
Gln Ile Lys Tyr Val Ala Met Asp Pro Val Ser Lys Ser Ser Gln Gly
                245   250   255
Lys Asn Thr Ser Thr Thr Ser Thr Gly Asn Lys Asn Phe Leu Ala Gly
            260   265   270
Arg Phe Ser His Leu
        275

<210> 408
<211> 277
<212> PRT
<213> Pan troglodytes

<220>
<223> chimpanzee TSG-6 protein

<400> 408
Met Ile Ile Leu Ile Tyr Leu Phe Leu Leu Leu Trp Glu Asp Thr Gln
 1   5   10   15
Gly Trp Gly Phe Lys Asp Gly Ile Phe His Asn Ser Ile Trp Leu Glu
            20   25   30
Arg Ala Ala Gly Val Tyr His Arg Glu Ala Arg Ser Gly Lys Tyr Lys
        35   40   45
Leu Thr Tyr Ala Glu Ala Lys Ala Val Cys Glu Phe Glu Gly Gly His
    50   55   60
Leu Ala Thr Tyr Lys Gln Leu Glu Ala Ala Arg Lys Ile Gly Phe His
65   70   75   80
Val Cys Ala Ala Gly Trp Met Ala Lys Gly Arg Val Gly Tyr Pro Ile
                85   90   95
Val Lys Pro Gly Pro Asn Cys Gly Phe Gly Lys Thr Gly Ile Ile Asp
            100   105   110
Tyr Gly Val Arg Leu Asn Arg Ser Glu Arg Trp Asp Ala Tyr Cys Tyr
        115   120   125
Asn Pro His Ala Lys Glu Cys Gly Gly Val Phe Thr Asp Pro Lys Arg
    130   135   140
Ile Phe Lys Ser Pro Gly Phe Pro Asn Glu Tyr Glu Asp Asn Gln Ile
145   150   155   160
Cys Tyr Trp His Ile Arg Leu Lys Tyr Gly Gln Arg Ile His Leu Ser
                165   170   175
Phe Leu Asp Phe Asp Leu Glu Asp Asp Pro Gly Cys Leu Ala Asp Tyr
            180   185   190
Val Glu Ile Tyr Asp Ser Tyr Asp Asp Val His Gly Phe Val Gly Arg
        195   200   205
Tyr Cys Gly Asp Glu Leu Pro Asp Asp Ile Ile Ser Thr Gly Asn Val

```
    210                 215                 220
Met Thr Leu Lys Phe Leu Ser Asp Ala Ser Val Thr Ala Gly Gly Phe
225                 230                 235                 240
Gln Ile Lys Tyr Val Ala Met Asp Pro Val Ser Lys Ser Ser Gln Gly
                245                 250                 255
Lys Asn Thr Ser Thr Thr Ser Thr Gly Asn Lys Asn Phe Leu Ala Gly
            260                 265                 270
Arg Phe Ser His Leu
        275
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<210> 409
<211> 277
<212> PRT
<213> Equus caballus

<220>
<223> horse TSG-6 protein

<400> 409

```
Met Ile Ile Leu Ile Tyr Val Leu Val Leu Leu Trp Glu Glu Ala His
 1               5                  10                  15
Gly Trp Gly Phe Lys Asn Gly Ile Phe His Asn Ser Ile Trp Leu Glu
            20                  25                  30
Gln Ala Ala Gly Val Tyr His Arg Glu Ala Arg Ser Gly Lys Tyr Lys
        35                  40                  45
Leu Thr Tyr Ala Glu Ala Lys Ala Val Cys Glu Tyr Glu Gly Gly His
    50                  55                  60
Leu Ala Thr Tyr Lys Gln Leu Glu Ala Ala Arg Lys Ile Gly Phe His
65                  70                  75                  80
Val Cys Ala Ala Gly Trp Met Ala Lys Gly Arg Val Gly Tyr Pro Ile
                85                  90                  95
Val Lys Pro Gly Pro Asn Cys Gly Phe Gly Lys Thr Gly Ile Ile Asp
            100                 105                 110
Tyr Gly Ile Arg Leu Asn Arg Ser Glu Arg Trp Asp Ala Tyr Cys Tyr
        115                 120                 125
Asn Pro His Ala Lys Glu Cys Gly Gly Ile Phe Thr Asp Thr Lys Arg
    130                 135                 140
Ile Phe Lys Ser Pro Gly Phe Pro Asn Glu Tyr Asp Asp Asn Gln Val
145                 150                 155                 160
Cys Tyr Trp His Ile Arg Leu Lys Tyr Gly Gln Arg Ile His Leu Ser
                165                 170                 175
Phe Leu Asp Phe Asp Leu Glu Asp Asp Thr Gly Cys Leu Ala Asp Tyr
            180                 185                 190
Val Glu Ile Tyr Asp Ser Tyr Asp Asp Val His Gly Phe Val Gly Arg
        195                 200                 205
Tyr Cys Gly Asp Glu Leu Pro Glu Asp Ile Ile Ser Thr Gly Asn Val
    210                 215                 220
Met Thr Leu Lys Phe Leu Ser Asp Ala Ser Val Thr Ala Gly Gly Phe
225                 230                 235                 240
Gln Ile Lys Tyr Val Ala Val Asp Pro Pro Ser Lys Pro Ser Gln Gly
                245                 250                 255
Lys Asn Thr Ser Thr Thr Ser Thr Gly Asn Lys Ser Phe Leu Ala Pro
            260                 265                 270
Ser Phe Thr His Leu
        275
```

<210> 410
<211> 277
<212> PRT
<213> Canis lupis

<220>
<223> dog TSG-6 protein

<400> 410
Met Ile Ile Phe Ile Ser Leu Phe Val Leu Leu Trp Glu Glu Ala His
 1   5   10   15
Gly Trp Gly Phe Asn Asn Gly Ile Phe His Asn Ser Ile Trp Leu Glu
            20   25   30
Gln Ala Ala Gly Val Tyr His Arg Glu Ala Arg Ser Gly Arg Tyr Arg
        35   40   45
Leu Thr Tyr Ala Glu Ala Lys Ala Val Cys Glu Phe Glu Gly Gly Arg
    50   55   60
Leu Ala Thr Tyr Lys Gln Leu Glu Ala Ala Arg Lys Ile Gly Phe His
65   70   75   80
Val Cys Ala Ala Gly Trp Met Ala Lys Gly Arg Val Gly Tyr Pro Ile
                85   90   95
Val Lys Pro Gly Pro Asn Cys Gly Phe Gly Lys Thr Gly Ile Ile Asp
            100   105   110
Tyr Gly Val Arg Leu Asn Arg Ser Glu Arg Trp Asp Ala Tyr Cys Tyr
        115   120   125
Asn Pro His Ala Lys Glu Cys Gly Gly Val Phe Thr Asp Pro Lys Arg
    130   135   140
Ile Phe Lys Ser Pro Gly Phe Pro Asn Glu Tyr Asp Asp Asn Gln Ile
145   150   155   160
Cys Tyr Trp His Ile Arg Val Lys Tyr Gly Gln Arg Val His Leu Ser
                165   170   175
Phe Leu Asp Phe Asp Leu Glu Asp Asp Pro Ala Cys Leu Ala Asp Tyr
            180   185   190
Val Glu Ile Tyr Asp Ser Tyr Asp Asp Val His Gly Phe Val Gly Arg
        195   200   205
Tyr Cys Gly Asp Glu Leu Pro Glu Asp Ile Ile Ser Thr Gly Asn Val
    210   215   220
Met Thr Leu Lys Phe Leu Ser Asp Ala Ser Val Thr Ala Gly Gly Phe
225   230   235   240
Gln Ile Lys Tyr Ile Ala Val Asp Pro Leu Ser Lys Ser Ser Gln Gly
                245   250   255
Lys Asn Thr Ser Thr Thr Ser Thr Gly Asn Lys Asn Phe Leu Ala Gly
            260   265   270
Arg Phe Ser His Leu
        275

<210> 411
<211> 275
<212> PRT
<213> Mus musculus

<220>
<223> mouse TSG-6 protein

<400> 411
Met Val Val Leu Leu Cys Leu Cys Val Leu Leu Trp Glu Glu Ala His
 1   5   10   15
Gly Trp Gly Phe Lys Asn Gly Ile Phe His Asn Ser Ile Trp Leu Glu
            20   25   30
Gln Ala Ala Gly Val Tyr His Arg Glu Ala Arg Ala Gly Arg Tyr Lys
        35   40   45
Leu Thr Tyr Ala Glu Ala Lys Ala Val Cys Glu Phe Glu Gly Gly Arg
    50   55   60
Leu Ala Thr Tyr Lys Gln Leu Glu Ala Ala Arg Lys Ile Gly Phe His
65   70   75   80
Val Cys Ala Ala Gly Trp Met Ala Lys Gly Arg Val Gly Tyr Pro Ile
                85   90   95
Val Lys Pro Gly Pro Asn Cys Gly Phe Gly Lys Thr Gly Ile Ile Asp
            100   105   110
Tyr Gly Ile Arg Leu Asn Arg Ser Glu Arg Trp Asp Ala Tyr Cys Tyr
        115   120   125
Asn Pro His Ala Lys Glu Cys Gly Gly Val Phe Thr Asp Pro Lys Arg
    130   135   140
Ile Phe Lys Ser Pro Gly Phe Pro Asn Glu Tyr Asp Asp Asn Gln Val
145   150   155   160
Cys Tyr Trp His Ile Arg Leu Lys Tyr Gly Gln Arg Ile His Leu Ser
                165   170   175
Phe Leu Asp Phe Asp Leu Glu His Asp Pro Gly Cys Leu Ala Asp Tyr
            180   185   190
Val Glu Ile Tyr Asp Ser Tyr Asp Asp Val His Gly Phe Val Gly Arg
        195   200   205
Tyr Cys Gly Asp Glu Leu Pro Glu Asp Ile Ile Ser Thr Gly Asn Val
    210   215   220
Met Thr Leu Lys Phe Leu Ser Asp Ala Ser Val Thr Ala Gly Gly Phe
225   230   235   240
Gln Ile Lys Tyr Val Thr Val Asp Pro Ala Ser Lys Ser Ser Gln Ala
                245   250   255
Lys Asn Thr Ser Thr Thr Gly Asn Lys Lys Phe Leu Pro Gly Arg Phe
            260   265   270
Ser His Leu
        275

<210> 412
<211> 275
<212> PRT
<213> Gallus gallus

<220>
<223> chicken TSG-6 protein

<400> 412
Met Ile Ala Leu Ile Phe Phe Ser Ala Leu Leu Trp Asp Glu Ala Gln
 1   5   10   15
Ala Trp Gly Phe Lys Asp Gly Val Leu His Asn Ser Ile Trp Leu Glu
            20   25   30
Arg Ala Ala Gly Val Tyr His Arg Glu Ser Arg Ser Gly Lys Tyr Gln
        35   40   45
Leu Thr Tyr Ala Glu Ala Lys Ala Val Cys Glu Tyr Glu Gly Gly His
    50   55   60

```
Leu Ala Thr Tyr Gln Gln Leu Glu Ala Ala Arg Lys Ile Gly Phe His
65                  70                  75                  80
Val Cys Ala Ala Gly Trp Met Ala Lys Gly Arg Val Gly Tyr Pro Ile
                85                  90                  95
Val Lys Ala Gly Ala Asn Cys Gly Phe Gly Arg Thr Gly Ile Val Asp
            100                 105                 110
Tyr Gly Ile Arg Leu Asn Arg Ser Glu Arg Trp Asp Ala Tyr Cys Tyr
        115                 120                 125
Asn Pro Asn Gly Lys Glu Cys Gly Gly Val Phe Thr Asp Ser Lys His
    130                 135                 140
Val Phe Lys Ser Pro Gly Tyr Pro Asn Glu Tyr Glu Asn Asp Gln Ile
145                 150                 155                 160
Cys Tyr Trp His Ile Arg Val Lys Tyr Gly Gln Arg Ile His Leu Gln
                165                 170                 175
Phe Leu Glu Phe Asp Val Glu Asp Asp Thr Ala Cys Met Ala Asp Tyr
            180                 185                 190
Leu Glu Ile Tyr Asp Ser Tyr Asp Asp Ile Asn Gly Phe Val Gly Arg
        195                 200                 205
Phe Cys Gly Asp Glu Leu Pro Asp Asp Ile Ile Ser Thr Gly Asn Val
    210                 215                 220
Met Thr Leu Lys Phe Leu Ser Asp Ala Ser Val Thr Ala Gly Gly Phe
225                 230                 235                 240
Gln Ile Arg Tyr Val Thr Ile Asp Leu Pro Ser Lys Ala Gly Asp Gly
                245                 250                 255
Lys Asn Thr Thr Ser Gln Gly Lys Ala Asn Phe Leu Ser Gly Lys Phe
            260                 265                 270
Gly Ile Met
        275
```

<210> 413
<211> 266
<212> PRT
<213> Xenopus laevis

<220>
<223> African clawed frog TSG-6 protein

<400> 413

```
Met Lys Thr Met Ile Phe Leu Val Leu Val Phe Leu Asp Glu Thr Phe
 1                5                  10                  15
Gly Trp Gly Phe Lys Asn Gly Val Leu His Asn Ser Ile Trp Leu Glu
            20                  25                  30
Gln Ala Ala Gly Val Tyr His Arg Glu Ser Arg Asn Gly Lys Tyr Lys
        35                  40                  45
Leu Thr Tyr Arg Glu Ala Lys Ala Val Cys Glu Tyr Glu Gly Gly Arg
    50                  55                  60
Leu Ala Thr Tyr Glu Gln Leu Glu Ala Ala Arg Gln Ile Gly Phe His
65                  70                  75                  80
Val Cys Ala Ala Gly Trp Leu His Lys Gly Arg Val Gly Tyr Pro Ile
                85                  90                  95
Val Lys Pro Thr Phe Asn Cys Gly Phe Gly Lys Lys Gly Ile Ile Asp
            100                 105                 110
Tyr Gly Phe Arg Leu Asn Lys Ser Glu Arg Trp Asp Ala Tyr Cys Tyr
        115                 120                 125
Asn Pro His Ala Lys Glu Cys Gly Gly Val Leu Thr Glu Gln Glu Arg
```

```
    130                 135                 140
Ile Ile Lys Ser Pro Gly Tyr Pro Asp His Tyr Glu Asn Asp Gln Ile
145                 150                 155                 160
Cys Tyr Trp His Ile Arg Val Asn Tyr Gly Gln Arg Ile Phe Ile Glu
                165                 170                 175
Phe Leu Asp Leu Asp Ile Glu Glu Asp Ile Asp Cys Leu Ser Asp Tyr
            180                 185                 190
Phe Glu Ile Tyr Asp Ser Tyr Asp Asp Leu His Gly Leu Val Gly Arg
        195                 200                 205
Tyr Cys Gly Tyr Glu Leu Pro Asp Arg Ile Ile Ser Thr Gly Asn Val
    210                 215                 220
Met Thr Leu Lys Phe Leu Ser Asp Gly Ser Val Ile Gly Gly Gly Phe
225                 230                 235                 240
Gln Ile Lys Tyr Thr Ala Val Asp Ser Glu Arg Asn Glu Thr Asn Ala
                245                 250                 255
Ser Ser Glu Pro Tyr Asn Glu Phe Glu Tyr
            260                 265


<210> 414
<211> 271
<212> PRT
<213> Danio rerio

<220>
<223> zebrafish TSG-6 protein


<400> 414
Met Ser His Cys Gly Leu Arg Ala Met Arg Ala Leu Thr Ala Val Phe
 1               5                  10                  15
Gly Val Leu Ile Val Leu Lys Glu Thr Glu Ala Trp Gly Tyr Lys Asn
            20                  25                  30
Gly Ile Leu His Asn Ser Ile Trp Leu Glu Gln Ala Ala Gly Val Tyr
        35                  40                  45
His Arg Glu Ser Arg Lys Gly Arg Tyr Gln Leu Thr Tyr Lys Glu Ala
    50                  55                  60
Lys Ala Val Cys Asn Phe Glu Gly Gly Thr Leu Ala Thr Phe Asp Gln
65                  70                  75                  80
Leu Glu Ala Ala Arg Gln Ile Gly Phe His Val Cys Ala Ala Gly Trp
                85                  90                  95
Leu Asp Lys Gly Arg Val Gly Tyr Pro Ile Val Lys Ala Gly Ser Asn
            100                 105                 110
Cys Gly Phe Gly Lys Val Gly Ile Ile Asp Tyr Gly Tyr Arg Leu Asn
        115                 120                 125
Lys Ser Glu Arg Trp Asp Val Tyr Cys Tyr Asn Pro Val Ala Lys Glu
    130                 135                 140
Cys Gly Gly Val His Thr Asp Pro Glu Lys Val Leu Val Ser Pro Gly
145                 150                 155                 160
Tyr Pro Asp Glu Tyr Gln Asp Glu Gln Ile Cys Tyr Trp His Ile Arg
                165                 170                 175
Val Arg Phe Gly His Arg Ile Arg Leu His Phe Leu Asp Phe Asp Ile
            180                 185                 190
Glu Glu Asp Thr Asp Cys Leu Ser Asp His Leu Glu Ile Tyr Asp Ser
        195                 200                 205
Tyr Asp Asp Val Ser Gly Phe Val Gly Arg Tyr Cys Gly Asp Gln Leu
    210                 215                 220
Pro Asp Asp Phe Ile Ser Thr Gly Asn Val Met Thr Leu Lys Phe Leu
```

225 230 235 240
Ser Asp Ser Ser Val Thr Ala Gly Gly Phe Lys Leu Gln Tyr Ile Ser
245 250 255
Val Asn Ser Ser Gln Leu Phe Asp Leu Leu Ala Asp Ser Phe Ser
260 265 270

<210> 415
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> V5 tag

<400> 415
Gly Lys Pro Ile Pro Asn Pro Leu Leu Gly Leu Asp Ser Thr
1 5 10

<210> 416
<211> 95
<212> PRT
<213> Homo sapiens

<220>
<223> TSG-6 link domain aa 35-129 variant K21A/K35A/K42A

<400> 416
Ala Gly Val Tyr His Arg Glu Ala Arg Ser Gly Lys Tyr Lys Leu Thr
1 5 10 15
Tyr Ala Glu Ala Ala Ala Val Cys Glu Phe Glu Gly Gly His Leu Ala
20 25 30
Thr Tyr Ala Gln Leu Glu Ala Ala Arg Ala Ile Gly Phe His Val Cys
35 40 45
Ala Ala Gly Trp Met Ala Lys Gly Arg Val Gly Tyr Pro Ile Val Lys
50 55 60
Pro Gly Pro Asn Cys Gly Phe Gly Lys Thr Gly Ile Ile Asp Tyr Gly
65 70 75 80
Ile Arg Leu Asn Arg Ser Glu Arg Trp Asp Ala Tyr Cys Tyr Asn
85 90 95

<210> 417
<211> 94
<212> PRT
<213> Homo sapeins

<220>
<223> TSG-6 link domain aa 36-129

<400> 417
Gly Val Tyr His Arg Glu Ala Arg Ser Gly Lys Tyr Lys Leu Thr Tyr
1 5 10 15
Ala Glu Ala Lys Ala Val Cys Glu Phe Glu Gly Gly His Leu Ala Thr
20 25 30
Tyr Lys Gln Leu Glu Ala Ala Arg Lys Ile Gly Phe His Val Cys Ala
35 40 45

Ala Gly Trp Met Ala Lys Gly Arg Val Gly Tyr Pro Ile Val Lys Pro
    50   55   60
Gly Pro Asn Cys Gly Phe Gly Lys Thr Gly Ile Ile Asp Tyr Gly Ile
65   70   75   80
Arg Leu Asn Arg Ser Glu Arg Trp Asp Ala Tyr Cys Tyr Asn
                85   90

<210> 418
<211> 97
<212> PRT
<213> Homo sapiens

<220>
<223> TSG-6 link domain aa 36-132

<400> 418
Gly Val Tyr His Arg Glu Ala Arg Ser Gly Lys Tyr Lys Leu Thr Tyr
 1   5   10   15
Ala Glu Ala Lys Ala Val Cys Glu Phe Glu Gly Gly His Leu Ala Thr
            20   25   30
Tyr Lys Gln Leu Glu Ala Ala Arg Lys Ile Gly Phe His Val Cys Ala
        35   40   45
Ala Gly Trp Met Ala Lys Gly Arg Val Gly Tyr Pro Ile Val Lys Pro
    50   55   60
Gly Pro Asn Cys Gly Phe Gly Lys Thr Gly Ile Ile Asp Tyr Gly Ile
65   70   75   80
Arg Leu Asn Arg Ser Glu Arg Trp Asp Ala Tyr Cys Tyr Asn Pro His
                85   90   95
Ala

<210> 419
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> c-myc Tag

<400> 419
Glu Gln Lys Leu Ile Ser Glu Glu Asp Leu
 1   5   10

<210> 420
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Hemagglutinin tag

<400> 420
Tyr Pro Tyr Asp Val Pro Asp Tyr Ala
 1   5

<210> 421
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> VSV-G Tag

<400> 421
Tyr Thr Asp Ile Glu Met Asn Arg Leu Gly Lys
 1   5   10

<210> 422
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> HSV Tag

<400> 422
Gln Pro Glu Leu Ala Pro Glu Asp Pro Glu Asp
 1   5   10

<210> 423
<211> 308
<212> PRT
<213> Homo sapiens

<220>
<223> Aggrecan G1 domain

<400> 423
Thr Ser Leu Thr Ile Pro Cys Tyr Phe Ile Asp Pro Met His Pro Val
 1   5   10   15
Thr Thr Ala Pro Ser Thr Ala Pro Leu Ala Pro Arg Ile Lys Trp Ser
            20   25   30
Arg Val Ser Lys Glu Lys Glu Val Val Leu Leu Val Ala Thr Glu Gly
        35   40   45
Arg Val Arg Val Asn Ser Ala Tyr Gln Asp Lys Val Ser Leu Pro Asn
    50   55   60
Tyr Pro Ala Ile Pro Ser Asp Ala Thr Leu Glu Val Gln Ser Leu Arg
65   70   75   80
Ser Asn Asp Ser Gly Val Tyr Arg Cys Glu Val Met His Gly Ile Glu
                85   90   95
Asp Ser Glu Ala Thr Leu Glu Val Val Val Lys Gly Ile Val Phe His
            100   105   110
Tyr Arg Ala Ile Ser Thr Arg Tyr Thr Leu Asp Phe Asp Arg Ala Gln
        115   120   125
Arg Ala Cys Leu Gln Asn Ser Ala Ile Ile Ala Thr Pro Glu Gln Leu
    130   135   140
Gln Ala Ala Tyr Glu Asp Gly Phe His Gln Cys Asp Ala Gly Trp Leu
145   150   155   160
Ala Asp Gln Thr Val Arg Tyr Pro Ile His Thr Pro Arg Glu Gly Cys
                165   170   175

```
Tyr Gly Asp Lys Asp Glu Phe Pro Gly Val Arg Thr Tyr Gly Ile Arg
            180                 185                 190
Asp Thr Asn Glu Thr Tyr Asp Val Tyr Cys Phe Ala Glu Glu Met Glu
        195                 200                 205
Gly Glu Val Phe Tyr Ala Thr Ser Pro Glu Lys Phe Thr Phe Gln Glu
    210                 215                 220
Ala Ala Asn Glu Cys Arg Arg Leu Gly Ala Arg Leu Ala Thr Thr Gly
225                 230                 235                 240
Gln Leu Tyr Leu Ala Trp Gln Ala Gly Met Asp Met Cys Ser Ala Gly
                245                 250                 255
Trp Leu Ala Asp Arg Ser Val Arg Tyr Pro Ile Ser Lys Ala Arg Pro
            260                 265                 270
Asn Cys Gly Gly Asn Leu Leu Gly Val Arg Thr Val Tyr Val His Ala
        275                 280                 285
Asn Gln Thr Gly Tyr Pro Asp Pro Ser Ser Arg Tyr Asp Ala Ile Cys
    290                 295                 300
Tyr Thr Gly Glu
305
```

<210> 424
<211> 306
<212> PRT
<213> Homo sapiens

<220>
<223> Bervican G1 domain

<400> 424

```
Gly Ala Leu Thr Ile Pro Cys His Val His Tyr Leu Arg Pro Pro Pro
 1               5                  10                  15
Ser Arg Arg Ala Val Leu Gly Ser Pro Arg Val Lys Trp Thr Phe Leu
            20                  25                  30
Ser Arg Gly Arg Glu Ala Glu Val Leu Val Ala Arg Gly Val Arg Val
        35                  40                  45
Lys Val Asn Glu Ala Tyr Arg Phe Arg Val Ala Leu Pro Ala Tyr Pro
    50                  55                  60
Ala Ser Leu Thr Asp Val Ser Leu Ala Leu Ser Glu Leu Arg Pro Asn
65                  70                  75                  80
Asp Ser Gly Ile Tyr Arg Cys Glu Val Gln His Gly Ile Asp Asp Ser
                85                  90                  95
Ser Asp Ala Val Glu Val Lys Val Lys Gly Val Val Phe Leu Tyr Arg
            100                 105                 110
Glu Gly Ser Ala Arg Tyr Ala Phe Ser Phe Ser Gly Ala Gln Glu Ala
        115                 120                 125
Cys Ala Arg Ile Gly Ala His Ile Ala Thr Pro Glu Gln Leu Tyr Ala
    130                 135                 140
Ala Tyr Leu Gly Gly Tyr Glu Gln Cys Asp Ala Gly Trp Leu Ser Asp
145                 150                 155                 160
Gln Thr Val Arg Tyr Pro Ile Gln Thr Pro Arg Glu Ala Cys Tyr Gly
                165                 170                 175
Asp Met Asp Gly Phe Pro Gly Val Arg Asn Tyr Gly Val Val Asp Pro
            180                 185                 190
Asp Asp Leu Tyr Asp Val Tyr Cys Tyr Ala Glu Asp Leu Asn Gly Glu
        195                 200                 205
Leu Phe Leu Gly Asp Pro Pro Glu Lys Leu Thr Leu Glu Glu Ala Arg
    210                 215                 220
Ala Tyr Cys Gln Glu Arg Gly Ala Glu Ile Ala Thr Thr Gly Gln Leu
```

225 230 235 240
Tyr Ala Ala Trp Asp Gly Gly Leu Asp His Cys Ser Pro Gly Trp Leu
245 250 255
Ala Asp Gly Ser Val Arg Tyr Pro Ile Val Thr Pro Ser Gln Arg Cys
260 265 270
Gly Gly Gly Leu Pro Gly Val Lys Thr Leu Phe Leu Phe Pro Asn Gln
275 280 285
Thr Gly Phe Pro Asn Lys His Ser Arg Phe Asn Val Tyr Cys Phe Arg
290 295 300
Asp Ser
305

<210> 425
<211> 312
<212> PRT
<213> Homo sapiens

<220>
<223> Versican G1 domain

<400> 425
Gly Lys Val Ser Leu Pro Cys His Phe Ser Thr Met Pro Thr Leu Pro
1 5 10 15
Pro Ser Tyr Asn Thr Ser Glu Phe Leu Arg Ile Lys Trp Ser Lys Ile
20 25 30
Glu Val Asp Lys Asn Gly Lys Asp Leu Lys Glu Thr Thr Val Leu Val
35 40 45
Ala Gln Asn Gly Asn Ile Lys Ile Gly Gln Asp Tyr Lys Gly Arg Val
50 55 60
Ser Val Pro Thr His Pro Glu Ala Val Gly Asp Ala Ser Leu Thr Val
65 70 75 80
Val Lys Leu Leu Ala Ser Asp Ala Gly Leu Tyr Arg Cys Asp Val Met
85 90 95
Tyr Gly Ile Glu Asp Thr Gln Asp Thr Val Ser Leu Thr Val Asp Gly
100 105 110
Val Val Phe His Tyr Arg Ala Ala Thr Ser Arg Tyr Thr Leu Asn Phe
115 120 125
Glu Ala Ala Gln Lys Ala Cys Leu Asp Val Gly Ala Val Ile Ala Thr
130 135 140
Pro Glu Gln Leu Phe Ala Ala Tyr Glu Asp Gly Phe Glu Gln Cys Asp
145 150 155 160
Ala Gly Trp Leu Ala Asp Gln Thr Val Arg Tyr Pro Ile Arg Ala Pro
165 170 175
Arg Val Gly Cys Tyr Gly Asp Lys Met Gly Lys Ala Gly Val Arg Thr
180 185 190
Tyr Gly Phe Arg Ser Pro Gln Glu Thr Tyr Asp Val Tyr Cys Tyr Val
195 200 205
Asp His Leu Asp Gly Asp Val Phe His Leu Thr Val Pro Ser Lys Phe
210 215 220
Thr Phe Glu Glu Ala Ala Lys Glu Cys Glu Asn Gln Asp Ala Arg Leu
225 230 235 240
Ala Thr Val Gly Glu Leu Gln Ala Ala Trp Arg Asn Gly Phe Asp Gln
245 250 255
Cys Asp Tyr Gly Trp Leu Ser Asp Ala Ser Val Arg His Pro Val Thr
260 265 270
Val Ala Arg Ala Gln Cys Gly Gly Gly Leu Leu Gly Val Arg Thr Leu
275 280 285

```
Tyr Arg Phe Glu Asn Gln Thr Gly Phe Pro Pro Pro Asp Ser Arg Phe
    290                 295                 300
Asp Ala Tyr Cys Phe Lys Pro Lys
305                 310


<210> 426
<211> 307
<212> PRT
<213> Homo sapiens

<220>
<223> Neurocan G1 domain


<400> 426
Glu Leu Val Ala Leu Pro Cys Leu Phe Thr Leu Gln Pro Arg Pro Ser
 1               5                  10                  15
Ala Ala Arg Asp Ala Pro Arg Ile Lys Trp Thr Lys Val Arg Thr Ala
            20                  25                  30
Ser Gly Gln Arg Gln Asp Leu Pro Ile Leu Val Ala Lys Asp Asn Val
        35                  40                  45
Val Arg Val Ala Lys Ser Trp Gln Gly Arg Val Ser Leu Pro Ser Tyr
    50                  55                  60
Pro Arg Arg Arg Ala Asn Ala Thr Leu Leu Leu Gly Pro Leu Arg Ala
65                  70                  75                  80
Ser Asp Ser Gly Leu Tyr Arg Cys Gln Val Val Arg Gly Ile Glu Asp
                85                  90                  95
Glu Gln Asp Leu Val Pro Leu Glu Val Thr Gly Val Val Phe His Tyr
            100                 105                 110
Arg Ser Ala Arg Asp Arg Tyr Ala Leu Thr Phe Ala Glu Ala Gln Glu
        115                 120                 125
Ala Cys Arg Leu Ser Ser Ala Ile Ile Ala Ala Pro Arg His Leu Gln
    130                 135                 140
Ala Ala Phe Glu Asp Gly Phe Asp Asn Cys Asp Ala Gly Trp Leu Ser
145                 150                 155                 160
Asp Arg Thr Val Arg Tyr Pro Ile Thr Gln Ser Arg Pro Gly Cys Tyr
                165                 170                 175
Gly Asp Arg Ser Ser Leu Pro Gly Val Arg Ser Tyr Gly Arg Arg Asn
            180                 185                 190
Pro Gln Glu Leu Tyr Asp Val Tyr Cys Phe Ala Arg Glu Leu Gly Gly
        195                 200                 205
Glu Val Phe Tyr Val Gly Pro Ala Arg Arg Leu Thr Leu Ala Gly Ala
    210                 215                 220
Arg Ala Gln Cys Arg Arg Gln Gly Ala Ala Leu Ala Ser Val Gly Gln
225                 230                 235                 240
Leu His Leu Ala Trp His Glu Gly Leu Asp Gln Cys Asp Pro Gly Trp
                245                 250                 255
Leu Ala Asp Gly Ser Val Arg Tyr Pro Ile Gln Thr Pro Arg Arg Arg
            260                 265                 270
Cys Gly Gly Pro Ala Pro Gly Val Arg Thr Val Tyr Arg Phe Ala Asn
        275                 280                 285
Arg Thr Gly Phe Pro Ser Pro Ala Glu Arg Phe Asp Ala Tyr Cys Phe
    290                 295                 300
Arg Ala His
305
```