

6031421PCTsec1ist ST25  
SEQUENCE LISTING

<110> Universiteit Utrecht Holding B.V.  
<120> An antigen from the midguts and Malpighian tubules of ixodid ticks for the control of tick infestations  
<130> P6031421PCT  
<150> US 61/240,671  
<151> 2009-09-09  
<160> 399  
<170> PatentIn version 3.3  
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<212> PRT  
<213> Amblyomma variegatum  
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Phe Thr Cys Gln Cys Gly Lys Asp Gln Tyr Phe Asn Ala Thr Ala Gln  
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Arg Cys Tyr His Val Lys Ser Cys Gly Pro Tyr Pro Cys Thr Val Gly  
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Thr Cys Gln Asp Asn Asp Gly Ile Ser Glu Arg Thr Cys Gln Cys Leu  
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Asn Phe Glu Asn Met Ser Pro Lys Cys Phe Pro Glu Asn Asn Phe Lys  
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Thr Ala Cys Gly Asn Ala Gly Gly Glu Ile Glu Pro Thr Lys Arg Gly  
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Val Thr Cys Arg Cys Pro Asp Gly Met Lys Trp Glu Gly Asn Lys Cys  
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 Glu Cys Gly Glu Glu Arg Lys Val Val Glu Leu Thr Phe Lys Ala Glu  
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 Pro Leu Pro Pro Ala Leu Asn Arg Ile His Gln Cys Glu Asn Lys Gly  
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 Glu Asp Phe Cys Leu Phe Ala Pro His Leu Arg Ile Ile Asn Gly Ser  
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 Val Ser Glu Pro Thr Pro Val Asp Leu Cys Ala Glu Phe Phe Thr Lys  
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Lys Tyr Gly Ala Leu Thr Val Glu Leu Cys Ser Gly Asp Pro Asn Thr  
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Asp Ala Ala Thr Cys Asp Cys Ser Gly Ile His Gly Met Thr Lys Glu  
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Cys Glu Val Asp Glu Ala Phe Arg Asp Glu Cys Val Lys Ser Gly Gly  
85 90 95

Glu Gln Thr Phe Asp Gln Asn Gly Phe Pro Gln Cys Val Cys Pro Tyr  
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Gly Thr Gln Leu Glu Asn Asp Arg Cys Leu Ser Ile Ala Cys Leu Leu  
115 120 125

Pro Asn Phe Thr Cys Ala Asp Ile Cys Asn Asn Pro Lys Leu Arg Glu  
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Asp Asn Arg Cys Cys Gln Asn Trp Glu Ile Gly Ser Cys Asp Gly His  
145 150 155 160

Tyr Glu Glu Ser Phe Cys Pro Pro Gly Thr Thr Gly Asn Gly Ser Thr  
165 170 175

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

Gly Cys Thr Tyr Glu Asn Ser Ser Asn Pro Tyr Tyr Lys Cys Asn Cys  
195 200 205

Asp Asp Gly Glu Glu Leu Ser Ala Asp Gly Arg Thr Cys Gln Ala Arg  
Page 4

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215

220

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Glu Cys Val Tyr Lys Asp Gly Lys Ala Ser Cys His Cys Pro Ala Gly  
 245 250 255

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

Gln Pro Leu Leu Ser Lys Cys Val Ile Asp Ser Asn Glu Glu Ile Cys  
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Val Cys Glu Tyr Pro Leu Lys Trp Asp Ser Thr Lys Arg Gln Cys Thr  
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Leu Asp Arg Gln Phe Val Tyr Ile Ile Thr Phe Thr Gln Asp Gln Val  
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Tyr Leu Thr Ala Asn Thr Thr His Arg Cys Ala Asn Thr Glu Lys Leu  
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Ile Gln Ser Ala Ile Lys Asn Leu Tyr Gly Lys Ser Leu Met Ala Thr  
 340 345 350

Arg Leu Leu Lys Cys Gly Glu Ala His Glu Val Glu Leu Ser Phe Ser  
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Glu Asp Lys Arg Ser Gly Cys Phe Phe Ala Pro Ala Leu Tyr Ile Val  
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Asn Gly Ser Ser Ser Asp Pro Arg Ala Val Asp Leu Cys Asp Ala Tyr  
 405 410 415

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

His Tyr Glu Glu Ile Phe Cys Pro Pro Gly Thr Thr Gly Asn Gly Ser  
195 200 205

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

Arg Val Glu Cys Asn Glu Glu Glu Glu Ser Ser Cys Glu Asp Ser Gly  
260 265 270

Gln Glu Cys Val Tyr Lys Asp Gly Lys Ala Ser Cys His Cys Pro Ala  
275 280 285

Gly Ser Ala Leu Ile Gly Gly Val Cys Ser Glu Glu Cys Ser Phe Lys  
290 295 300

Cys Gln Pro Leu Leu Ser Lys Cys Val Ile Asp Ser Asn Glu Glu Ile  
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Cys Val Cys Glu Tyr Pro Leu Lys Trp Asp Ser Thr Lys Arg Gln Cys  
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340 345 350

Val Tyr Leu Thr Ala Asn Thr Thr His Arg Cys Ala His Thr Glu Lys  
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Leu Ile Gln Ser Ala Met Lys Asn Leu Tyr Gly Lys Ser Leu Met Ala  
370 375 380

Thr Arg Leu Leu Lys Cys Gly Glu Glu His Glu Val Glu Leu Ser Phe  
385 390 395 400

Ser Glu Glu Pro Ala Pro Ala Leu Leu His Arg Ile His Leu Cys Glu  
405 410 415

Asn Glu Asp Lys Arg Ser Gly Cys Phe Phe Ala Pro Ala Leu Tyr Ile  
420 425 430

Val Asn Gly Ser Ser Ser Gly Pro Arg Ala Val Asp Leu Cys Asp Ala



435 6031421PCTseclist ST25 440 445

Tyr Leu Asn Asn Thr Asp Ala Val Ser Ser Gly Ser His Lys Cys Val  
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Ser Glu Gly Ala Gly Lys Tyr Ser Leu Arg Cys Ala Leu Arg Ser Ala  
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Gly Ala Glu Met Val Gln Gln Gly Phe Leu Lys Val Gln Arg Cys His  
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Glu Gly Cys His Pro Asn Leu Cys Pro Gln Asp Cys Ile Cys Ile Pro  
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Lys Thr Pro Gln Pro Pro His His His Lys Trp Pro Phe Pro Thr Thr  
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Pro Thr Val Thr Gln Arg Gln Thr Ser Arg Val Trp Ala Thr Val Ala  
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Ile Val Ile Gly Ile Leu Ile Pro Ala Val Ile Val Val Ile Leu Leu  
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Ile Asn Gly Ser Gln Tyr Phe Thr Cys Leu Cys Glu Asn Glu Arg Tyr  
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Phe Asn Ala Thr Ala Gln Arg Cys Tyr His Leu Asp Ser Cys Ser Glu  
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 165 170 175  
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 180 185 190  
 Glu Ser Phe Cys Pro Pro Gly Thr Thr Gly Asn Arg Ser Ile Cys Thr  
 195 200 205  
 Asn Val Cys Ala Glu Asp Leu Leu Gly Ser Val Cys Glu His Gly Cys  
 210 215 220  
 Thr Tyr Glu Asn Ser Ser Asn Pro Tyr Tyr Lys Cys Asn Cys Asp Asp  
 225 230 235 240  
 Gly Glu Glu Leu Ser Ala Asp Gly Arg Thr Cys Gln Ala Arg Val Glu  
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 Cys Asn Glu Glu Glu Glu Ser Ser Cys Glu Asp Ser Gly Gln Glu Cys  
 260 265 270  
 Val Tyr Lys Asp Gly Lys Ala Ser Cys Gln Cys Pro Ala Gly Ser Ala  
 275 280 285  
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 Arg Gln Phe Val Tyr Ile Ile Thr Phe Thr Gln Asp Gln Val Tyr Leu  
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Thr Ala Asn Thr Thr His Arg Cys Ala Asn Thr Glu Lys Leu Ile Gln  
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Pro Ala Pro Ala Leu Leu His Arg Ile His Leu Cys Glu Asn Glu Asp  
405 410 415

Lys Arg Ser Gly Cys Phe Ser Ala Pro Ala Leu Tyr Ile Val Asn Gly  
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Ser Ser Ser Asp Pro Arg Ala Val Asp Leu Cys Asp Ala Tyr Leu Asn  
435 440 445

Asn Thr Asp Ala Val Ser Ser Gly Ser His Lys Cys Val Ser Glu Gly  
450 455 460

Ala Gly Asn Tyr Thr Leu Arg Cys Ala Leu Arg Ser Ala Gly Ala Glu  
465 470 475 480

Met Val Gln Gln Gly Phe Leu Lys Val Gln Arg Cys His Glu Gly Cys  
485 490 495

His Pro Asn Leu Cys Pro Gln Asp Cys Ile Cys Ile Pro Asp Ala Glu  
500 505 510

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 tgcgtttgcc cgtacggtac tcagctcgag aacgaccgtt gtctgtctat cgcttgctta 480  
 cttccggact tcacgtgtgc ggacatctgc aataacccga aactgagaga ggataaccgc 540  
 tgctgccaga actgggaaat cggatcatgt gatggtaatt atgaagaaag cttctgtcca 600  
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 <211> 596  
 <212> PRT  
 <213> Dermacentor reticulatus

## 6031421PCTseclist ST25

&lt;400&gt; 9

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

6031421PCTseclist ST25

Asp Gly Glu Ala Ser Cys Gln Cys Pro Val Gly Ser Ala Met Ile Gly  
 275 280 285  
 Ser Val Cys Ser Glu Thr Cys Ser Leu Thr Cys Gln Pro Leu Leu Ser  
 290 295 300  
 Lys Cys Ile Ile Asp Ser Asn Met Glu Ala Cys Val Cys Glu Tyr Pro  
 305 310 315 320  
 Leu Lys Trp Asp Thr Ala Lys Gln Gln Cys Ile Leu Asp Lys Gln Phe  
 325 330 335  
 Val Tyr Ile Thr Thr Phe Glu Gln Tyr Gln Arg Ser Ile Thr Ala Asn  
 340 345 350  
 Thr Tyr Thr Thr His Thr Cys Ala Lys Ile Gly Gln Leu Ile Asp Asp  
 355 360 365  
 Ala Met Lys Asn Leu Tyr Gly Lys Asn Leu Met Ala Thr Arg Leu Leu  
 370 375 380  
 Arg Cys Gly Glu Glu His Glu Leu Glu Leu Ser Phe Ser Glu Glu Pro  
 385 390 395 400  
 Ala Pro Ala Leu Leu Asn Arg Ile His Leu Cys Glu Asn Val Asp Lys  
 405 410 415  
 Ile Ser Gly Cys Phe Phe Pro Pro Ala Leu Tyr Ile Val Asn Gly Thr  
 420 425 430  
 Ser Ser Asp Pro Gln Ala Val Asp Leu Cys Asp Ala Tyr Leu Asn Asn  
 435 440 445  
 Thr Glu Ala Val Ser Ser Gly Ser His Lys Cys Val Ser Glu Gly Ala  
 450 455 460  
 Gly Ala Tyr Ile Leu Gln Cys Ala Leu Glu Arg Gly Ala Ala Ile Ile  
 465 470 475 480  
 Gln Gln Gly Ser Leu Lys Val Gln Gln Cys Asp Glu Gly Cys Arg Arg  
 485 490 495  
 Asn Pro Cys Pro Gln Asp Cys Ile Cys Glu Pro Asp Ala Ala Thr Ser  
 500 505 510  
 Tyr Lys Cys His Cys Arg Glu Asn Thr Thr Met Thr Pro Leu Lys Pro  
 515 520 525  
 His His Glu Lys Ala Ala Ala Pro Pro Thr Thr Ser Val Ala Pro Lys  
 530 535 540

6031421PCTsec1ist ST25

Ser Thr Gly Arg Val Trp Ala Ser Val Ala Ile Val Ile Gly Ile Leu  
545 550 555 560

Ile Pro Ala Val Ile Val Val Ile Leu Leu Met Lys Arg Lys Thr Ser  
565 570 575

Tyr Ile Val Thr Pro Val Lys Lys Ala Ser Ser Lys Asp Phe Gln Pro  
580 585 590

Leu Pro Thr Glu  
595

<210> 10  
<211> 1791  
<212> DNA  
<213> Dermacentor reticulatus

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ccgtgtgttc ctctcaacga taacaaatac ttcacgtgtc actgcggaga tgaccgatac 180  
ttcaatgcta cggctcaacg gtgctaccat ctcgatgctt gttcagcgat gctatgccat 240  
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gaacttgaga acggcacgtg taaatccatc gcttgcttgt ttccggactt tacgtgcaaa 480  
gatattctgca atgatgcaa gctgagagaa gataaccgct gttgtcagaa ctgggagaca 540  
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cctgtgggct ccgcaatgat aggtggcgtc tgctccgaaa cgtgctcgct cacatgtcag 900  
cctttgctaa gcaagtgtat aattgattca aacatggaag catgtgtctg cgaatatcca 960  
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6031421PCTseclist ST25

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 caagactgca tatgtgaacc agacgcagca acttcatata agtgccactg cagggaaaac 1560  
 accacgatga ctccacttaa gccacaccat gaaaaagcgg cagctccacc tacgacatcg 1620  
 gtagctccaa aatcaactgg ccgtgtctgg gcgagtgtgg ctattgtcat cggcatcttg 1680  
 atacctgctg ttatcgtcgt cattctgcta atgaagagga agacatcata catagttaca 1740  
 ccggtgaaaa aagcgagcag caaggacttt cagccactcc ctacagaata g 1791

<210> 11  
 <211> 598  
 <212> PRT  
 <213> Dermacentor variabilis

<400> 11

Met Asn Asp Val Trp Pro Leu Leu Pro Leu Val Leu Ala Ala Asn Leu  
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 20 25 30

Ala Gly Gln Leu Cys Gly Ile Thr Pro Cys Val Pro Leu Asn Asp Asn  
 35 40 45

Lys Tyr Phe Thr Cys His Cys Gly Asp Asp Arg Tyr Phe Asn Ala Thr  
 50 55 60

Ala Gln Arg Cys Tyr His Leu Asp Ala Cys Ser Ala Met Leu Cys His  
 65 70 75 80

Pro Gly Lys Cys Ile Asp Asn Asp Gly Asn Asp Val Ala Arg Cys Asp  
 85 90 95

Cys Ser Gly Ile His Gly Met Thr Glu Glu Cys Gln Val Asp Ser Ala  
 100 105 110

Phe Arg Asp Glu Cys Val Lys Ser Gly Gly Glu Gln Ser Leu Asp Arg  
 115 120 125

Asp Gly Arg Pro His Cys Ile Cys Pro His Gly Thr Glu Leu Glu Asp  
 130 135 140

Gly Thr Cys Lys Ser Ile Ala Cys Leu Leu Pro Asp Phe Thr Cys Lys  
 145 150 155 160

Asp Ile Cys Asn Asn Ala Lys Leu Arg Glu Asp Ser Arg Cys Cys Gln  
 165 170 175

Asn Trp Glu Ala Gly Ser Cys Asp Ala His Tyr Glu Glu Gly Ser Phe  
 180 185 190

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

6031421PCTsec1ist ST25

465                      470                      475                      480

Gln Gln Gly Ser Leu Lys Val Gln Gln Cys Asp Glu Gly Cys Arg Pro  
                                  485                                   490                                   495

Asn Pro Cys Pro Gln Asp Cys Ile Cys Glu Pro Asp Ala Thr Ser Ser  
                                  500                                   505                                   510

Tyr Lys Cys Asn Cys Arg Glu Asn Thr Thr Met Ala Pro Arg Lys Pro  
                                  515                                   520                                   525

His His Glu Lys Ala Ser Ala Pro Thr Thr Thr Ser Val Ala Pro Lys  
                                  530                                   535                                   540

Pro Thr Gly Tyr Val Trp Ala Ser Val Ala Ile Val Ile Gly Ile Leu  
                                  545                                   550                                   555                                   560

Ile Pro Ala Val Ile Val Val Ile Met Leu Met Lys Arg Lys Thr Ser  
                                  565                                   570                                   575

Tyr Ile Val Thr Pro Val Lys Lys Ala Ser Ser Lys Asp Phe Arg Pro  
                                  580                                   585                                   590

Leu Pro Thr Glu Glu Cys  
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<210> 12  
 <211> 1797  
 <212> DNA  
 <213> Dermacentor variabilis

<400> 12  
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 ccgtgtgttc ctctcaacga taacaaatac ttcacgtgtc actgcggaga tgaccgatac 180  
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 gaacttgagg atggcacttg taaatccatc gcctgcttgt tgccagactt tacgtgcaaa 480  
 gatattctgca ataatgccaa gctgagagaa gatagccgct gctgccagaa ctgggaggca 540  
 ggctcatgtg acgcccatta tgaagaagga agtttctgcc taccaggcac tattggaaat 600  
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 agttgcgaag agagtggatg aatatgcgtg atcaaagatg gagaagcttc gtgcgaatgc 840

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 acacgacttc tgaaatgcgg agaagagcac gaagtggaat tgtcattttc ggaagagcct 1200  
 gcaccagcac tgttgaacag aatacacttg tgcgagaact gggataaaac tagcggttgc 1260  
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 accaccatgg ctccacgtaa gccacaccat gaaaaagcgt cagctccaac tacgacgtcg 1620  
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 ccggtgaaaa aagcgagcag caaggatttt cggccactcc ctacagaaga gtgctga 1797

<210> 13  
 <211> 597  
 <212> PRT  
 <213> Haemaphysalis elliptica

<400> 13

Met Gln Ala Pro Thr Leu Val Ser Val Phe Ile Leu Val Ile Ala Trp  
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Gly Ser Ala Ser Pro Ile Asp Gly Asp Gly Gly Val Cys Ala Thr Ala  
 20 25 30

Gly Arg Ile Cys Gly Pro Val Pro Cys Val Pro Gln Asn Gly Gly Ser  
 35 40 45

His Phe Thr Cys Asp Cys Gly Lys Asp Gln Tyr Phe Asn Ala Thr Ala  
 50 55 60

Gln Arg Cys Tyr His Val Arg Asn Cys Ile Ala Asp Pro Cys Ile Ser  
 65 70 75 80

Gly Val Cys Arg Asp Asp Asp Gly Arg Ser Ala Arg Thr Cys Asp Cys  
 85 90 95

Ser Asn Ile Asn His Met Thr Pro Asp Cys Arg Val Glu Glu Lys Leu  
 100 105 110

Leu Met Ala Cys Gly Lys Tyr Phe Gly Gly Val Met Tyr Asn Glu Asp

115 6031421PCTseclist ST25  
120 125

Glu Glu Leu Ile Cys Ser Cys Pro Phe Gly Met Lys Phe Asn Gly Asp  
130 135 140

Gly Cys Glu Ser Ile Ala Cys Gly Val Ser Ala Phe Thr Cys Thr Gln  
145 150 155 160

Ile Cys Gly Glu Lys His Leu Arg Glu Asp Lys Arg Cys Cys Gln Gly  
165 170 175

Trp Asp Thr Ser Cys Tyr Ala Val Tyr Glu Glu Asn Thr Tyr Cys Lys  
180 185 190

Pro Gly Thr Val Pro Thr Gly Lys Asp Pro Lys Asn Leu Asn Cys Thr  
195 200 205

Asn Ile Cys Ala Ile Gly Arg Asp Pro Cys Glu Tyr Ser Cys Thr Tyr  
210 215 220

Lys Asp Ser Lys Ser Pro Gln Phe Thr Cys Thr Cys Pro Glu Gly Lys  
225 230 235 240

Glu Leu Tyr Asp Val Phe Arg Cys Arg Asp Lys Thr Met Cys Asn Glu  
245 250 255

Asn Glu Glu Val Glu Cys Ser Lys Lys Gly Gln Arg Cys Val Val Arg  
260 265 270

Glu Arg Arg Ala Val Cys Lys Cys Pro Asp Asp Lys Ile Phe Leu Asn  
275 280 285

Gly Gly Cys Ile Ala Ser Cys Thr Glu Pro Lys Lys Ser Thr Cys Ala  
290 295 300

Thr Thr Leu Gly Glu Cys Lys Ile Ile Asp Asn Val Glu Thr Cys Val  
305 310 315 320

Cys Ser Asp Pro Leu Ile Trp Asp Glu Ala Glu Lys Lys Cys Ile Leu  
325 330 335

Glu Lys Gln Phe Ile Tyr Asp Val Gln Phe Glu Phe Tyr Glu Phe Pro  
340 345 350

Lys Asn Pro Thr Glu Glu Trp Trp Ala Leu Arg Ile Asp Arg Ala Met  
355 360 365

Lys Asn Leu Tyr Gly Lys Ser Leu Arg Lys Thr Arg Leu Val Glu Phe  
370 375 380

Gly Lys Thr Ser Thr Thr Glu Met Thr Phe Ala Glu Glu Pro Asp Lys  
385 390 395 400

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Ala Leu Leu Asn Arg Ile Leu His Cys Arg Gln Tyr Gly Ser Ser Gly  
405 410 415

Ala Cys Leu Phe Ala Pro Asp Leu Tyr Val Val Asn Thr Thr Ala Lys  
420 425 430

Ala Pro Met Ala Val Asp Ile Cys Thr Arg Tyr Ile Asp Ala Ser Ser  
435 440 445

Leu Ile Asp Gln Gln Ile Leu Lys Cys His Asn Asp Gly Asp Gly Lys  
450 455 460

Tyr Ser Ile Arg Cys Arg Gly Lys Asn Thr Leu Pro Pro Ala Lys His  
465 470 475 480

Gly Glu Leu Thr Val Val Glu Cys Asp Asp Lys Ser Leu Cys Thr Glu  
485 490 495

Glu Lys Ser Arg Glu Cys Gln Lys Ser Gly Ser Glu Cys Val Val Arg  
500 505 510

Asn Asn Glu His His Cys Glu Asn Ala Pro Glu Gly Ser Leu Ser Thr  
515 520 525

Lys Gly Thr Ser Pro Ala Glu Pro Gly Lys Asp Thr Pro Thr Arg Pro  
530 535 540

Thr Ala Ser Pro Glu Glu Arg Thr Ser Ser Gly Glu Pro Gly Lys His  
545 550 555 560

Pro Ser Thr Glu Thr Thr Pro Ser Pro Asn Gly Gly Pro Asn Ser Ala  
565 570 575

Glu Arg Phe Ala Thr Thr Ser Ala Ala Leu Leu Ile Gly Ile Leu Ile  
580 585 590

Pro Val Val Leu Val  
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<210> 14

<211> 1794

<212> DNA

<213> Haemaphysalis elliptica

<400> 14

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tgtgtaccac aaaatggagg ttcacatttc acctgcgact gtggcaagga ccaatatttt 180

aatgcgaccg ctcaaagatg ttaccatgtt cgaaactgta tagcagaccc ctgtatctca 240

ggcgtttgtc gagatgacga cgggcgggtcg gctcgacact gtgactgctc aaacataaac 300

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 ttcaacggtg acggctgtga atccatcgcc tgtggagtga gtgcctttac atgcacccag 480  
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 gacccgaaaa atctcaactg cacaacata tgtgccatcg gtagagatcc gtgtgaatat 660  
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 gaactctacg acgtattcag gtgtagagac aaaaccatgt gcaatgaaaa cgaggaagtc 780  
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 ccgacacgac cgacggcatc cccagaagaa cggacttctt caggtgagcc tgggaaacac 1680  
 ccgtcgactg aaacaactcc atcaccaaat ggtggcccaa attcagctga acgctttgct 1740  
 actaccagcg ccgcgctttt aatcggtatc cttattccag tggtccttgt ttaa 1794

<210> 15  
 <211> 601  
 <212> PRT  
 <213> Hyalomma marginatum marginatum

<400> 15

Met Gly Lys Met Asn Asn Glu Arg Pro Leu Leu Leu Leu Ala Leu Val  
1 5 10 15

Ala Arg Leu Ala Ser Val Ala Ser Ala Glu Glu Ala Ala Asp Pro Asn  
20 25 30

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

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Leu Asn Gly Gly Lys Tyr Phe Thr Cys Ser Cys Glu Gln Glu Arg Tyr  
 50 55 60  
 Phe Asn Ala Thr Ala Gln Arg Cys Tyr His Leu Asp Thr Cys Ser Ala  
 65 70 75 80  
 Thr Met Cys His Pro Gly Lys Cys Leu Asp Asn Asp Gly Asn Asp Met  
 85 90 95  
 Ala Arg Cys Asp Cys Ser Gly Ile His Gly Met Thr Lys Glu Cys Glu  
 100 105 110  
 Val Asp Pro Ala Phe Lys Asp Glu Cys Val Lys Ser Gly Gly Gln Gln  
 115 120 125  
 Ser Phe Asp Lys Asn Gly Leu Pro Arg Cys Val Cys Pro His Gly Thr  
 130 135 140  
 Lys Pro Glu Asn Asp Arg Cys Val Ser Ile Ala Cys Leu Ile Pro Asn  
 145 150 155 160  
 Phe Thr Cys Lys Asp Ile Cys Asn Asn Thr Lys Leu Arg Glu Asp Asp  
 165 170 175  
 Arg Cys Cys Gln Asn Trp Glu Ala Gly Ser Cys Asp Gly His Tyr Glu  
 180 185 190  
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 Cys Thr Tyr Glu Asn Ser Ser Val Pro Asp Tyr Lys Cys Asn Cys Asp  
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Cys Glu Tyr Pro Leu Lys Trp Asp Ser Thr Lys Arg Gln Cys Ile Leu  
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 Asp Lys Gln Phe Val Tyr Ile Thr Thr Phe Glu Gln Tyr Gln Ser Pro  
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 Gly Ala Gly Arg Tyr Thr Leu Leu Cys Ala Leu Arg Ser Ser Gly Ala  
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 Cys His Pro Asn Pro Cys Pro Glu Asp Cys Ile Cys Glu Pro Ser Pro  
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 515 520 525  
 Val Lys Pro His His Glu Lys Ser Ser Phe Ala Ala Pro Pro Ala Gly  
 530 535 540  
 Gly Arg Lys Ser Thr Asn Arg Val Trp Ala Ser Val Ala Ile Ile Ile  
 545 550 555 560  
 Gly Ile Leu Ile Pro Ala Val Ile Val Val Ile Leu Leu Met Lys Arg  
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<211> 1806  
<212> DNA  
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1806

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 <211> 605  
 <212> PRT  
 <213> Rhipicephalus appendiculatus

<400> 17

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 35 40 45  
 Cys Val Pro Leu Asn Gly Ser Gln Tyr Phe Thr Cys Leu Cys Glu Asn  
 50 55 60  
 Glu Arg Tyr Phe Asn Ala Thr Ala Gln Arg Cys Tyr His Leu Asp Ser  
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 Cys Ser Glu Ile Leu Cys Leu Pro Gly Lys Cys Phe Asp Asn Asn Gly  
 85 90 95  
 Ser Asp Ala Ala Lys Cys Asp Cys Ser Gly Ile Arg Gly Met Thr Lys  
 100 105 110  
 Glu Cys Glu Val Asn Gly Ala Phe Arg Asp Glu Cys Val Lys Ser Gly  
 115 120 125  
 Gly Glu Gln Thr Phe Asp Arg Asn Gly Leu Pro Leu Cys Val Cys Pro  
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 His Gly Thr Lys Leu Glu Asn Gly Arg Cys Val Ser Thr Ala Cys Leu  
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 Leu Pro Asp Phe Thr Cys Ala Asp Ile Cys Asn Asn Leu Lys Leu Arg  
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 Glu Asp Asn Arg Cys Cys Gln Asn Trp Glu Ile Gly Ser Cys Asp Gly  
 180 185 190  
 His Tyr Glu Asp Ser Phe Cys Leu Pro Gly Thr Thr Gly Asp Gly Ser  
 195 200 205  
 Ile Cys Thr Asn Val Cys Ala Glu Asp Leu Leu Gly Ser Val Cys Glu  
 210 215 220  
 His Gly Cys Thr Tyr Glu Asn Ser Ser Asn Pro Tyr Tyr Lys Cys Asn  
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Cys Gly Asn Asp Glu<sub>245</sub> Glu Leu Ser Ala Asp<sub>250</sub> Gly Arg Thr Cys Gln<sub>255</sub> Ala  
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 Gly Ser<sub>290</sub> Ala Leu Ile Asp Gly<sub>295</sub> Val Cys Ser Glu Glu<sub>300</sub> Cys Ser Phe Lys  
 Cys Gln<sub>305</sub> Pro Leu Leu Ser<sub>310</sub> Lys Cys Val Ile Asp<sub>315</sub> Ser Asn Glu Glu<sub>320</sub> Thr  
 Cys Val Cys Glu Tyr<sub>325</sub> Pro Leu Lys Trp Asp<sub>330</sub> Ser Thr Lys Arg Gln<sub>335</sub> Cys  
 Ile Leu Asp Lys<sub>340</sub> Gln Phe Val Tyr Ile<sub>345</sub> Thr Thr Phe Lys Gln<sub>350</sub> Asp Gln  
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 Asn Glu Asp Lys<sub>420</sub> Arg Asp Gly Cys Phe<sub>425</sub> Phe Ala Pro Ala Leu<sub>430</sub> Tyr Ile  
 Val Asn Gly<sub>435</sub> Ser Ser Ser Gly Pro<sub>440</sub> Arg Ala Val Asp Leu<sub>445</sub> Cys Asp Ala  
 Tyr Leu<sub>450</sub> Asn Asn Thr Asp Ala<sub>455</sub> Val Ser Ser Gly Ser<sub>460</sub> His Lys Cys Val  
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 Glu Gly Cys Arg<sub>500</sub> Pro Asn Pro Tyr Pro<sub>505</sub> Leu Asp Cys Ile Cys<sub>510</sub> Glu Pro

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Asp Val Val Thr Ser Tyr Lys Cys Asn Cys Arg Glu Asn Thr Thr Ala  
515 520 525

Lys Thr Pro Gln Pro Pro His His His Lys Trp Ser Leu Pro Thr Thr  
530 535 540

Pro Pro Val Ser Gln Arg Gln Thr Ser Arg Val Trp Ala Thr Val Ala  
545 550 555 560

Ile Val Ile Gly Ile Leu Met Pro Ala Val Ile Val Val Ile Leu Leu  
565 570 575

Met Arg Arg Lys Thr Thr Tyr Ile Val Thr Pro Val Lys Lys Val Asn  
580 585 590

Ser Lys Asp Phe Arg Pro Leu Pro Thr Glu Glu Asn Cys  
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<212> DNA  
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caattcgttt acattacaac cttcaagcaa gaccaagttt cccttacggc caatactacg 1080  
cgcagatgtg ccatactga gaagctgatc caaagtgcc tgaaaaacct ctatggtaaa 1140

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<212> PRT  
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<400> 19

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35 40 45

Cys Val Pro Leu Asn Gly Ser Gln Tyr Phe Thr Cys Leu Cys Glu Asn  
50 55 60

Glu Arg Tyr Phe Asn Ala Thr Ala Gln Arg Cys Tyr His Leu Asp Ser  
65 70 75 80

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

Ser Asp Ala Ala Thr Cys Asp Cys Ser Gly Ile His Gly Met Thr Lys  
100 105 110

Ala Cys Glu Val Asn Gly Ala Phe Arg Asp Glu Cys Val Lys Ser Gly  
115 120 125

Gly Glu Gln Thr Phe Asp Arg Asn Gly Leu Pro Leu Cys Val Cys Pro  
130 135 140

His Gly Thr Lys Leu Glu Asn Asp Arg Cys Val Ser Ile Ala Cys Leu

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

Ser Glu Gly Ala Gly Arg Tyr Thr Leu Arg Cys Ala Leu Arg Ser Ser  
465 470 475 480

Gly Ala Glu Ile Val His Gln Gly Phe Leu Lys Val Gln Arg Cys His  
485 490 495

Val Pro Thr Thr Pro Thr Val Ser Gln Arg Gln Thr Ser Arg Val Trp  
500 505 510

Ala Thr Val Ala Ile Val Ile Gly Ile Leu Met Pro Ala Val Ile Val  
515 520 525

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

Glu Cys Glu Val Asp Gln Ala Phe Arg Asp Glu Cys Val Lys Ser Gly  
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 Gly Glu Gln Thr Phe Asp Gln Asn Gly Leu Pro Gln Cys Val Cys Pro  
 130 135 140  
 Tyr Gly Thr Gln Leu Glu Asn Asp Arg Cys Val Ser Ile Ala Cys Leu  
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 Leu Pro Asp Phe Thr Cys Ala Asp Ile Cys Asn Asn Pro Lys Leu Arg  
 165 170 175  
 Glu Asp Asn Arg Cys Cys Gln Asn Trp Glu Ile Gly Ser Cys Asp Gly  
 180 185 190  
 His Tyr Glu Glu Ser Phe Cys Pro Pro Gly Thr Thr Gly Asn Gly Ser  
 195 200 205  
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 210 215 220  
 His Gly Cys Thr Tyr Glu Asn Ser Ser Asn Pro Tyr Tyr Lys Cys Asn  
 225 230 235 240  
 Cys Asp Asp His Glu Glu Leu Ser Ala Asp Gly Arg Thr Cys Gln Ala  
 245 250 255  
 Arg Val Glu Cys Asn Glu Glu Glu Glu Ser Ser Cys Glu Asp Ser Gly  
 260 265 270  
 Gln Glu Cys Val Tyr Lys Asp Gly Lys Ala Ser Cys Gln Cys Pro Ala  
 275 280 285  
 Gly Ser Ala Leu Ile Gly Gly Val Cys Ser Glu Glu Cys Ser Phe Lys  
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 Cys Gln Pro Leu Leu Ser Lys Cys Val Ile Asp Ser Asn Glu Glu Ile  
 305 310 315 320  
 Cys Val Cys Glu Tyr Pro Leu Lys Trp Asp Ser Ala Lys Arg Gln Cys  
 325 330 335  
 Thr Leu Asp Lys Gln Phe Val Tyr Ile Thr Thr Phe Thr Gln Asp Gln  
 340 345 350  
 Val Phe Leu Thr Ala Asn Thr Thr His Arg Cys Ala Asn Thr Glu Lys  
 355 360 365  
 Leu Ile Gln Ser Ala Met Lys Asn Leu Tyr Gly Lys Ser Leu Met Ala  
 370 375 380  
 Thr Arg Leu Leu Lys Cys Gly Glu Glu His Glu Val Glu Leu Ser Phe

385 390 395 400

Ser Glu Glu Pro Ala Pro Ala Leu Leu Asn Arg Ile His Leu Cys Glu  
405 410 415

Asn Glu Asp Asn Arg Ser Gly Cys Phe Phe Ala Pro Ala Leu Tyr Ile  
420 425 430

Val Asn Gly Ser Ser Ser Gly Pro Arg Ala Val Asp Leu Cys Asp Ala  
435 440 445

Tyr Leu Asn Asn Thr Asp Ala Val Ser Ser Ala Ser His Lys Cys Val  
450 455 460

Ser Glu Gly Ala Gly Lys Tyr Thr Leu Arg Cys Ala Val Arg Ser Ala  
465 470 475 480

Gly Ala Asp Met Val Gln Gln Gly Phe Leu Lys Val Gln Arg Cys His  
485 490 495

Glu Gly Cys His Pro Asn Leu Cys Pro Gln Asp Cys Ile Cys Ile Pro  
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Asp Ala Glu Lys Pro Tyr Lys Cys Asp Cys Arg Glu Asn Thr Thr Ala  
515 520 525

Lys Thr Pro Gln Pro Pro His His His Lys Trp Pro Tyr Pro Thr Thr  
530 535 540

Pro Thr Val Ser Gln Arg Gln Thr Ser Arg Val Trp Ala Thr Val Ala  
545 550 555 560

Ile Val Ile Gly Ile Leu Met Pro Ala Val Ile Val Val Ile Leu Leu  
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580 585 590

Ser Lys Asp Phe Arg Pro Leu Pro Thr Glu Glu Glu Gly  
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<212> DNA
<213> Rhipicephalus evertsi evertsi
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6031421PCTsec1ist ST25

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Cys Thr Cys Glu Gln  
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Gly Phe Pro Gln Cys Val Cys Pro Tyr Gly  
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&lt;211&gt; 20

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 119

Glu Asn Asp Arg Cys Leu Ser Ile Ala Cys Leu Leu Pro Asn Phe Thr  
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&lt;211&gt; 7

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 120

Glu Glu Ser Phe Cys Pro Pro  
1 5

&lt;210&gt; 121

&lt;211&gt; 19

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 121

Thr Cys Thr Asn Val Cys Ala Glu Asp Leu Leu Gly Ser Val Cys Glu  
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His Gly Cys

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Asn Pro Tyr Tyr Lys Cys Asn Cys  
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Asp Gly Arg Thr Cys Gln Ala Arg Val  
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Gly Gln Glu Cys Val Tyr Lys  
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Gly Lys Ala Ser Cys His Cys Pro Ala Gly Ser Ala Leu Ile Gly Gly  
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Val Cys Ser Glu Glu Cys Ser Phe Lys Cys Gln Pro Leu Leu Ser Lys  
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Cys Val Ile  
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Glu Glu Ile Cys Val Cys Glu Tyr Pro Leu  
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Thr Gln Asp Gln Val Tyr Leu  
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Lys Leu Ile Gln Ser Ala Ile Lys Asn  
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Asp Pro Arg Ala Val Asp Leu Cys Asp Ala  
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Asp Ala Val Ser Ser Gly Ser His Lys Cys Val Ser  
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Gly Lys Tyr Ala Leu Arg Cys Ala Leu Arg  
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Glu Gly Cys His Pro Asn Leu Cys Pro Gln Asp Cys Ile Cys Ile Pro  
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Lys Pro Tyr Lys Cys Asp Cys  
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Thr Pro Gln Pro Pro His His Gln Lys  
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<210> 139  
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Ser Arg Val Trp Ala Thr Val Ala Ile Val Ile Gly Ile Leu Met Pro  
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Ala Val Ile Val Val Ile Leu Leu Ile  
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Thr Thr Tyr Ile Val Thr Pro Val Lys Lys  
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<400> 141

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

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Ser Thr Pro Tyr Tyr Lys Cys Asn Cys  
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Asp Gly Arg Thr Cys Gln Ala Arg Val  
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&lt;210&gt; 154

&lt;211&gt; 7

&lt;212&gt; PRT

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&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 154

Gly Gln Glu Cys Val Tyr Lys  
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&lt;210&gt; 155

&lt;211&gt; 35

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 155

Gly Lys Ala Ser Cys His Cys Pro Ala Gly Ser Ala Leu Ile Gly Gly  
1 5 10 15Val Cys Ser Glu Glu Cys Ser Phe Lys Cys Gln Pro Leu Leu Ser Lys  
20 25 30Cys Val Ile  
35

&lt;210&gt; 156

&lt;211&gt; 10

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&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 156

Glu Glu Ile Cys Val Cys Glu Tyr Pro Leu  
1 5 10

&lt;210&gt; 157

&lt;211&gt; 15

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&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 157

Thr Lys Arg Gln Cys Thr Leu Asn Lys Gln Phe Val Tyr Ile Thr  
1 5 10 15

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Thr Gln Asp Gln Val Tyr Leu  
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Thr Thr His Arg Cys Ala His Thr Glu Lys Leu Ile Gln  
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Pro Arg Ile Met Glu Arg Met Ala Thr Arg Leu Leu Lys Cys  
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Pro Ala Pro Ala Leu Leu His Arg Ile His Leu Cys  
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Arg Ser Gly Cys Phe Phe Ala Pro Ala Leu Tyr Ile Val Asn  
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Glu Gly Cys His Pro Asn Leu Cys Pro Gln Asp Cys Ile Cys Ile Pro  
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Lys Pro Tyr Lys Cys Asp Cys  
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&lt;211&gt; 10

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&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 168

Thr Pro Gln Pro Pro His His His Lys Trp  
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&lt;210&gt; 169

&lt;211&gt; 8

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&lt;400&gt; 169

Pro Thr Thr Pro Thr Val Thr Gln  
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&lt;210&gt; 170

&lt;211&gt; 24

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&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 170

Ser Arg Val Trp Ala Thr Val Ala Ile Val Ile Gly Ile Leu Ile Pro  
1 5 10 15Ala Val Ile Val Val Ile Leu Leu  
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&lt;223&gt; peptide

&lt;400&gt; 171

Thr Thr Tyr Ile Val Thr Pro Val Lys Lys  
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&lt;211&gt; 20

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

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Lys Pro Tyr Lys Cys Asp Cys  
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Lys Thr Leu Gln Pro Pro His His Gln Lys  
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Ser Arg Val Trp Ala Thr Val Ala Ile Val Ile Gly Ile Leu Ile Pro  
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Ala Val Ile Val Val Ile Leu Leu Ile  
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Cys Val Pro Leu Ser Asp  
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Thr Ala Gln Arg Cys Tyr His Leu Asp Ala Cys Thr Ala Met Leu Cys  
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His Pro Gly Lys  
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Asp Val Ala Thr Cys Asp Cys Ser Gly  
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Phe Arg Glu Glu Cys Val Lys  
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Gly Leu Pro His Cys Ile Cys Pro Asn  
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Ile Cys Asn Asp  
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Glu Gly Ser Phe Cys Leu Pro  
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His Gly Cys Thr Tyr  
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Leu Leu Ser Lys Cys Ile Ile  
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Thr Thr His Thr Cys Ala Lys Ile Gly Gln Leu Ile  
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Ala Thr Arg Leu Leu Arg Cys  
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Lys Ile Ser Gly Cys Phe Phe Pro Pro Ala Leu Tyr Ile Val Asn  
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<210> 222

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&lt;400&gt; 222

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&lt;210&gt; 223

&lt;211&gt; 13

&lt;212&gt; PRT

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&lt;220&gt;

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&lt;400&gt; 223

Glu Ala Val Ser Ser Gly Ser His Lys Cys Val Ser Glu  
 1 5 10

&lt;210&gt; 224

&lt;211&gt; 29

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 224

Ala Gly Ala Tyr Ile Leu Gln Cys Ala Leu Glu Arg Gly Ala Ala Ile  
 1 5 10 15

Ile Gln Gln Gly Ser Leu Lys Val Gln Gln Cys Asp Glu  
 20 25

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&lt;211&gt; 13

&lt;212&gt; PRT

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&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 225

Arg Arg Asn Pro Cys Pro Gln Asp Cys Ile Cys Glu Pro  
 1 5 10

&lt;210&gt; 226

&lt;211&gt; 9

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 226

Ala Ala Thr Ser Tyr Lys Cys His Cys  
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6031421PCTseclist ST25

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Pro Leu Lys Pro His His Glu Lys Ala Ala Ala Pro Pro Thr Thr Ser  
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Val Ala Pro

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<400> 228

Gly Arg Val Trp Ala Ser Val Ala Ile Val Ile Gly Ile Leu Ile Pro  
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Ala Val Ile Val Val Ile Leu Leu  
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Thr Ser Tyr Ile Val Thr Pro Val Lys Lys  
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Val Trp Pro Leu Leu Pro Leu Val Leu Ala Ala Asn Leu Ser Ala  
1 5 10 15

<210> 231  
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Pro Asp Asp Ile Cys Ala Ser Ala Gly Gln Leu Cys Gly Ile Thr Pro  
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Cys Val Pro Leu  
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&lt;211&gt; 9

&lt;212&gt; PRT

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&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 232

Lys Tyr Phe Thr Cys His Cys Gly Asp  
 1 5

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&lt;211&gt; 20

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 233

Thr Ala Gln Arg Cys Tyr His Leu Asp Ala Cys Ser Ala Met Leu Cys  
 1 5 10 15

His Pro Gly Lys  
 20

&lt;210&gt; 234

&lt;211&gt; 9

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 234

Asp Val Ala Arg Cys Asp Cys Ser Gly  
 1 5

&lt;210&gt; 235

&lt;211&gt; 7

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 235



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

&lt;210&gt; 246

&lt;211&gt; 12

&lt;212&gt; PRT

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&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 246

Met Glu Thr Cys Val Cys Glu Tyr Pro Leu Lys Trp  
 1 5 10

&lt;210&gt; 247

&lt;211&gt; 14

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 247

Ala Lys Gln Gln Cys Ile Leu Asp Lys Gln Phe Leu Tyr Thr  
 1 5 10

&lt;210&gt; 248

&lt;211&gt; 13

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 248

Thr Thr Arg Ser Cys Ala Lys Ile Gly Gln Leu Ile Asp  
 1 5 10

&lt;210&gt; 249

&lt;211&gt; 7

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

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&lt;400&gt; 249

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Ala Thr Arg Leu Leu Lys Cys  
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Thr Ser Gly Cys Phe Phe Pro Pro Ala Leu Tyr Ile Val Asn  
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Asp Pro Gln Ala Val Asp Leu Cys Asp Ala Tyr Leu Asn Ser Thr Ala  
1 5 10 15

Ala Val Ser Ser Gly Ser His Met Cys Val Ser  
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Gly Thr Tyr Leu Leu Gln Cys Ala Leu Gly Arg Gly Ala Ala Ile Ile  
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Gln Gln Gly Ser Leu Lys Val Gln Gln Cys Asp Glu  
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## 6031421PCTseclist ST25

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Thr Thr Thr Ser Val Ala Pro Lys Pro Thr Gly Tyr Val Trp Ala Ser  
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Val Ala Ile Val Ile Gly Ile Leu Ile Pro Ala Val Ile Val Val Ile  
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Met

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Thr Ser Tyr Ile Val Thr Pro Val Lys Lys  
 1 5 10

<210> 258  
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&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 258

Pro Thr Leu Val Ser Val Phe Ile Leu Val Ile Ala Trp  
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&lt;210&gt; 259

&lt;211&gt; 19

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&lt;213&gt; Artificial

&lt;220&gt;

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&lt;400&gt; 259

Asp Gly Gly Val Cys Ala Thr Ala Gly Arg Ile Cys Gly Pro Val Pro  
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Cys Val Pro

&lt;210&gt; 260

&lt;211&gt; 9

&lt;212&gt; PRT

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&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 260

Ser His Phe Thr Cys Asp Cys Gly Lys  
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&lt;210&gt; 261

&lt;211&gt; 22

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 261

Thr Ala Gln Arg Cys Tyr His Val Arg Asn Cys Ile Ala Asp Pro Cys  
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Ile Ser Gly Val Cys Arg  
 20

&lt;210&gt; 262

&lt;211&gt; 9

&lt;212&gt; PRT

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&lt;223&gt; peptide

&lt;400&gt; 262

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

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

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Ser Pro Gln Phe Thr Cys Thr Cys  
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Glu Leu Tyr Asp Val Phe Arg  
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Glu Val Glu Cys Ser Lys Lys Gly Gln Arg Cys Val Val Arg Glu Arg  
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Arg Ala Val Cys Lys Cys Pro Asp Asp  
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Leu Asn Gly Gly Cys Ile Ala Ser Cys Thr Glu  
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<400> 274

Lys Lys Ser Thr Cys Ala Thr Thr Leu Gly Glu Cys Lys Ile Ile Asp  
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Asn Val Glu Thr Cys Val Cys Ser Asp Pro  
20 25

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Glu Lys Lys Cys Ile Leu Glu Lys Gln Phe Ile Tyr Asp Val Gln Phe  
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Glu Phe Tyr

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

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Ala Pro Met Ala Val Asp Ile Cys Thr Arg Tyr Ile Asp Ala Ser Ser  
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Leu Ile Asp Gln Gln Ile Leu Lys Cys  
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Gly Glu Leu Thr Val Val Glu Cys Asp Asp Lys Ser Leu Cys Thr  
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Gln Lys Ser Gly Ser Glu Cys Val Val Arg  
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<400> 282

Thr Thr Ser Ala Ala Leu Leu Ile Gly Ile Leu Ile  
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Arg Pro Leu Leu Leu Leu Ala Leu Val Ala Arg Leu Ala Ser Val Ala  
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Ser

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<220>  
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<400> 284

Asp Pro Asn Ile Cys Ala Ser Val Gly Lys Leu Cys Gly Asp Val Pro  
Page 91

1

5

15

Cys Ala Pro

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<220>  
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<400> 285

Lys Tyr Phe Thr Cys Ser Cys Glu Gln  
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Thr Ala Gln Arg Cys Tyr His Leu Asp Thr  
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Ser Ala Thr Met Cys His Pro Gly Lys  
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Ala Arg Cys Asp Cys Ser Gly  
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Lys Glu Cys Glu Val Asp Pro  
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&lt;210&gt; 290

&lt;211&gt; 8

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&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 290

Phe Lys Asp Glu Cys Val Lys Ser  
 1 5

&lt;210&gt; 291

&lt;211&gt; 9

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 291

Gly Leu Pro Arg Cys Val Cys Pro His  
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&lt;210&gt; 292

&lt;211&gt; 18

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 292

Asn Asp Arg Cys Val Ser Ile Ala Cys Leu Ile Pro Asn Phe Thr Cys  
 1 5 10 15

Lys Asp

&lt;210&gt; 293

&lt;211&gt; 8

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&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 293

Glu Gly Thr Phe Cys Leu Pro Gly  
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&lt;210&gt; 294

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Ile Cys Thr Asn Val Cys Ala Glu Asp Leu Leu Gly Ser Ile Cys Glu  
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His Gly Cys

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Ser Val Pro Asp Tyr Lys Cys Asn Cys  
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Cys Arg Ala Arg Val Leu Cys  
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Asp Gln Lys Cys Val Tyr Lys  
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Gly Lys Ala Ser Cys Glu Cys Pro Pro Gly Ser Ala Leu Ile Asn Gly  
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Val Cys Ser Asp Glu Cys Ser Phe Lys Cys Gln Pro Leu Leu Ser Lys  
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Cys Val Ile Asp  
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Thr Thr Glu Arg Leu Val Glu  
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Tyr Gly Lys Ser Leu Ile Ser Thr Arg Leu Leu Lys Cys  
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Pro Ala Pro Ala Leu Leu Asn Arg Met His Leu Cys Glu  
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Ser Ile Arg Gly Cys Phe Phe Pro Pro Ala Leu Tyr Ile Val Asn  
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Asp Ala Val Ser Ser Gly Ser His Lys Cys Val Ser  
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Gly Arg Tyr Thr Leu Leu Cys Ala Leu Arg  
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Gly Ala Gly Ile Val Glu Gln Gly Phe Leu Lys Val Gln Gln Cys His  
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Glu Gly Cys His Pro Asn Pro Cys Pro Glu Asp Cys Ile Cys Glu Pro  
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Ser Pro Val Thr Ser Tyr Lys Cys Asn Cys Arg Glu  
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Val Pro Thr Ser Ser Val Lys Pro  
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His Glu Lys Ser Ser Phe Ala Ala Pro  
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Val Trp Ala Ser Val Ala Ile Ile Ile Gly Ile Leu Ile Pro Ala Val  
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Ile Val Val Ile Leu Leu  
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6031421PCTseclist ST25

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Thr Ser Tyr Ile Val Thr Pro Val Lys Lys  
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Pro Leu Phe Ala Val Leu Phe Ala Val Phe Leu Val Ser Leu Ala Thr  
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Ala Val Ser Ala  
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Pro Asp Ala Asp Ile Cys Ala Ser Ala Gly Arg Leu Cys Gly Thr Val  
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Pro Cys Val Pro Leu Asn Gly  
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Gln Tyr Phe Thr Cys Leu Cys Glu Asn  
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&lt;400&gt; 316

Thr Ala Gln Arg Cys Tyr His Leu Asp Ser Cys Ser Glu Ile Leu Cys  
 1 5 10 15

Leu Pro Gly Lys  
 20

&lt;210&gt; 317

&lt;211&gt; 9

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 317

Asp Ala Ala Lys Cys Asp Cys Ser Gly  
 1 5

&lt;210&gt; 318

&lt;211&gt; 7

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 318

Phe Arg Asp Glu Cys Val Lys  
 1 5

&lt;210&gt; 319

&lt;211&gt; 9

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 319

Gly Leu Pro Leu Cys Val Cys Pro His  
 1 5

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&lt;211&gt; 22

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Asn Gly Arg Cys Val Ser Thr Ala Cys Leu Leu Pro Asp Phe Thr Cys  
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Ala Asp Ile Cys Asn Asn

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Glu Asp Ser Phe Cys Leu Pro  
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Asp Gly Ser Ile Cys Thr Asn Val Cys Ala Glu Asp Leu Leu Gly Ser  
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Val Cys Glu His Gly Cys  
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Asn Pro Tyr Tyr Lys Cys Asn  
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<220>

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&lt;400&gt; 325

Gly Gln Glu Cys Val Tyr Lys  
1 5

&lt;210&gt; 326

&lt;211&gt; 35

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 326

Gly Lys Ala Ser Cys Gln Cys Pro Ala Gly Ser Ala Leu Ile Asp Gly  
1 5 10 15Val Cys Ser Glu Glu Cys Ser Phe Lys Cys Gln Pro Leu Leu Ser Lys  
20 25 30Cys Val Ile  
35

&lt;210&gt; 327

&lt;211&gt; 10

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 327

Glu Glu Thr Cys Val Cys Glu Tyr Pro Leu  
1 5 10

&lt;210&gt; 328

&lt;211&gt; 15

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 328

Thr Lys Arg Gln Cys Ile Leu Asp Lys Gln Phe Val Tyr Ile Thr  
1 5 10 15

&lt;210&gt; 329

&lt;211&gt; 7

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 329

Lys Gln Asp Gln Val Ser Leu

1

5

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<400> 330

Arg Arg Cys Ala His Thr Glu Lys Leu Ile Gln  
 1 5 10

<210> 331  
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<220>  
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<400> 331

Met Ala Thr Arg Leu Leu Lys Cys  
 1 5

<210> 332  
 <211> 12  
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<220>  
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<400> 332

Pro Ala Pro Ala Leu Leu Asn Arg Ile His Leu Cys  
 1 5 10

<210> 333  
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 <212> PRT  
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<400> 333

Asp Gly Cys Phe Phe Ala Pro Ala Leu Tyr Ile Val Asn  
 1 5 10

<210> 334  
 <211> 10  
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<220>  
 <223> peptide

<400> 334

Gly Pro Arg Ala Val Asp Leu Cys Asp Ala  
 1 5 10

<210> 335  
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<400> 335

Asp Ala Val Ser Ser Gly Ser His Lys Cys Val Ser  
 1 5 10

<210> 336  
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<400> 336

Gly Arg Tyr Thr Leu Arg Cys Ala Leu Arg  
 1 5 10

<210> 337  
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<220>  
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<400> 337

Gly Ala Glu Ile Val His Gln Gly Phe Leu Lys Val Gln Arg Cys His  
 1 5 10 15

Glu

<210> 338  
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<220>  
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<400> 338

Arg Pro Asn Pro Tyr Pro Leu Asp Cys Ile Cys Glu Pro Asp Val Val  
 1 5 10 15

Thr Ser Tyr Lys Cys Asn Cys  
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<210> 339

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<211> 10  
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<220>  
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<400> 339

Thr Pro Gln Pro Pro His His His Lys Trp  
1 5 10

<210> 340  
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<400> 340

Leu Pro Thr Thr Pro Pro Val Ser Gln  
1 5

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<400> 341

Ser Arg Val Trp Ala Thr Val Ala Ile Val Ile Gly Ile Leu Met Pro  
1 5 10 15

Ala Val Ile Val Val Ile Leu Leu  
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Thr Thr Tyr Ile Val Thr Pro Val Lys Lys  
1 5 10

<210> 343  
<211> 20  
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<400> 343



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Pro Leu Phe Ala Val Leu Phe Ala Val Phe Leu Val Ser Leu Ala Thr  
1 5 10 15

Ala Val Ser Ala  
20

<210> 344  
<211> 23  
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<400> 344

Pro Asp Ala Asp Ile Cys Ala Ser Ala Gly Arg Leu Cys Gly Thr Val  
1 5 10 15

Pro Cys Val Pro Leu Asn Gly  
20

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<400> 345

Gln Tyr Phe Thr Cys Leu Cys Glu Asn  
1 5

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<400> 346

Thr Ala Gln Arg Cys Tyr His Leu Asp Ser Cys Ser Glu Ile Leu Cys  
1 5 10 15

Leu Pro Gly Lys  
20

<210> 347  
<211> 9  
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<220>  
<223> peptide

<400> 347

Asp Ala Ala Thr Cys Asp Cys Ser Gly

1

5

<210> 348  
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<400> 348

Phe Arg Asp Glu Cys Val Lys  
 1 5

<210> 349  
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Gly Leu Pro Leu Cys Val Cys Pro His  
 1 5

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Asn Asp Arg Cys Val Ser Ile Ala Cys Leu Leu Pro Asp Phe Thr Cys  
 1 5 10 15

Ala Asp Ile

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<400> 351

Glu Asp Ser Phe Cys Leu Pro  
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<210> 352  
 <211> 19  
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<220>

&lt;223&gt; peptide

&lt;400&gt; 352

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

His Gly Cys

&lt;210&gt; 353

&lt;211&gt; 8

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 353

Asn Pro Tyr Tyr Lys Cys Asn Cys  
 1 5

&lt;210&gt; 354

&lt;211&gt; 11

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 354

Asp Gly Arg Thr Cys Gln Ala Arg Val Glu Cys  
 1 5 10

&lt;210&gt; 355

&lt;211&gt; 35

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 355

Gly Lys Ala Ser Cys Gln Cys Pro Ala Gly Ser Ala Leu Ile Asp Gly  
 1 5 10 15

Val Cys Ser Glu Glu Cys Ser Phe Lys Cys His Pro Leu Leu Ser Lys  
 20 25 30

Cys Val Ile  
 35

&lt;210&gt; 356

&lt;211&gt; 8

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

<400> 356

Glu Glu Thr Cys Val Cys Glu His  
1 5

<210> 357

<211> 15

<212> PRT

<213> Artificial

<220>

<223> peptide

<400> 357

Ala Lys Arg Gln Cys Ile Leu Asp Lys Gln Phe Val Tyr Ile Thr  
1 5 10 15

<210> 358

<211> 7

<212> PRT

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<220>

<223> peptide

<400> 358

Lys Gln Asp Gln Val Phe Leu  
1 5

<210> 359

<211> 11

<212> PRT

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<400> 359

Arg Arg Cys Ala His Thr Glu Lys Leu Ile Gln  
1 5 10

<210> 360

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<400> 360

Met Ala Thr Arg Leu Leu Lys Cys  
1 5

<210> 361

<211> 12

<212> PRT

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<223> peptide

<400> 361

Pro Ala Pro Ala Leu Leu Asn Arg Ile His Leu Cys  
1 5 10

<210> 362

<211> 13

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<223> peptide

<400> 362

Asp Gly Cys Phe Phe Ala Pro Ala Leu Tyr Ile Val Asn  
1 5 10

<210> 363

<211> 10

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<220>

<223> peptide

<400> 363

Gly Pro Arg Ala Val Asp Leu Cys Asp Ala  
1 5 10

<210> 364

<211> 12

<212> PRT

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<220>

<223> peptide

<400> 364

Asp Ala Val Ser Ser Gly Ser His Lys Cys Val Ser  
1 5 10

<210> 365

<211> 10

<212> PRT

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<220>

<223> peptide

<400> 365

Gly Arg Tyr Thr Leu Arg Cys Ala Leu Arg  
1 5 10

<210> 366

<211> 25

<212> PRT

<213> Artificial

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&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 366

Gly Ala Glu Ile Val His Gln Gly Phe Leu Lys Val Gln Arg Cys His  
 1 5 10 15

Val Pro Thr Thr Pro Thr Val Ser Gln  
 20 25

&lt;210&gt; 367

&lt;211&gt; 24

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 367

Ser Arg Val Trp Ala Thr Val Ala Ile Val Ile Gly Ile Leu Met Pro  
 1 5 10 15

Ala Val Ile Val Val Ile Leu Leu  
 20

&lt;210&gt; 368

&lt;211&gt; 13

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 368

Thr Thr Tyr Ile Val Thr Pro Val Lys Lys Val Ser Ser  
 1 5 10

&lt;210&gt; 369

&lt;211&gt; 20

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 369

Pro Leu Phe Ala Val Leu Phe Ala Val Phe Leu Gly Ser Leu Ala Thr  
 1 5 10 15

Ala Val Ser Ala  
 20

&lt;210&gt; 370

&lt;211&gt; 23

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 370

Pro Asp Ala Asp Ile Cys Ala Ser Ala Gly Arg Leu Cys Gly Thr Val  
 1 5 10 15

Pro Cys Val Pro Leu Asn Gly  
 20

&lt;210&gt; 371

&lt;211&gt; 9

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 371

Gln Tyr Phe Thr Cys Leu Cys Glu Asn  
 1 5

&lt;210&gt; 372

&lt;211&gt; 20

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 372

Thr Ala Gln Arg Cys Tyr His Leu Asp Ser Cys Ser Glu Ile Leu Cys  
 1 5 10 15

Leu Pro Gly Lys  
 20

&lt;210&gt; 373

&lt;211&gt; 9

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 373

Asp Ala Ala Thr Cys Asp Cys Ser Gly  
 1 5

&lt;210&gt; 374

&lt;211&gt; 7

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 374

Lys Glu Cys Glu Val Asp Gln

1

5

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<400> 375

Phe Arg Asp Glu Cys Val Lys  
 1 5

<210> 376  
 <211> 10  
 <212> PRT  
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<220>  
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<400> 376

Gly Leu Pro Gln Cys Val Cys Pro Tyr Gly  
 1 5 10

<210> 377  
 <211> 20  
 <212> PRT  
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<220>  
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<400> 377

Glu Asn Asp Arg Cys Val Ser Ile Ala Cys Leu Leu Pro Asp Phe Thr  
 1 5 10 15

Cys Ala Asp Ile  
 20

<210> 378  
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 <212> PRT  
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<220>  
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<400> 378

Glu Glu Ser Phe Cys Pro Pro  
 1 5

<210> 379  
 <211> 19  
 <212> PRT  
 <213> Artificial

<220>



&lt;223&gt; peptide

&lt;400&gt; 379

Ile Cys Lys Asn Val Cys Ala Glu Asp Leu Leu Gly Ser Val Cys Glu  
 1 5 10 15

His Gly Cys

&lt;210&gt; 380

&lt;211&gt; 8

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 380

Asn Pro Tyr Tyr Lys Cys Asn Cys  
 1 5

&lt;210&gt; 381

&lt;211&gt; 9

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 381

Asp Gly Arg Thr Cys Gln Ala Arg Val  
 1 5

&lt;210&gt; 382

&lt;211&gt; 7

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 382

Gly Gln Glu Cys Val Tyr Lys  
 1 5

&lt;210&gt; 383

&lt;211&gt; 42

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 383

Pro Glu Pro Thr Ile Asp Glu Gly Lys Ala Ser Cys Gln Cys Pro Ala  
 1 5 10 15

Gly Ser Ala Leu Ile Gly Gly Val Cys Ser Glu Glu Cys Ser Phe Lys  
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Cys Gln Pro Leu Leu Ser Lys Cys Val Ile  
           35                  40

<210> 384  
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 <212> PRT  
 <213> Artificial

<220>  
 <223> peptide

<400> 384

Glu Glu Ile Cys Val Cys Glu Tyr Pro Leu Lys  
   1                  5                  10

<210> 385  
 <211> 15  
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 <213> Artificial

<220>  
 <223> peptide

<400> 385

Ala Lys Arg Gln Cys Thr Leu Asp Lys Gln Phe Val Tyr Ile Thr  
   1                  5                  10                  15

<210> 386  
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<220>  
 <223> peptide

<400> 386

Thr Gln Asp Gln Val Phe Leu  
   1                  5

<210> 387  
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 <213> Artificial

<220>  
 <223> peptide

<400> 387

Met Ala Thr Arg Leu Leu Lys Cys  
   1                  5

<210> 388  
 <211> 12  
 <212> PRT  
 <213> Artificial

<220>

<223> peptide

<400> 388

Pro Ala Pro Ala Leu Leu Asn Arg Ile His Leu Cys  
1 5 10

<210> 389

<211> 13

<212> PRT

<213> Artificial

<220>

<223> peptide

<400> 389

Ser Gly Cys Phe Phe Ala Pro Ala Leu Tyr Ile Val Asn  
1 5 10

<210> 390

<211> 10

<212> PRT

<213> Artificial

<220>

<223> peptide

<400> 390

Gly Pro Arg Ala Val Asp Leu Cys Asp Ala  
1 5 10

<210> 391

<211> 12

<212> PRT

<213> Artificial

<220>

<223> peptide

<400> 391

Asp Ala Val Ser Ser Ala Ser His Lys Cys Val Ser  
1 5 10

<210> 392

<211> 11

<212> PRT

<213> Artificial

<220>

<223> peptide

<400> 392

Gly Lys Tyr Thr Leu Arg Cys Ala Val Arg Ser  
1 5 10

<210> 393

<211> 32

<212> PRT

<213> Artificial

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&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 393

Gly Ala Asp Met Val Gln Gln Gly Phe Leu Lys Val Gln Arg Cys His  
 1 5 10 15

Glu Gly Cys His Pro Asn Leu Cys Pro Gln Asp Cys Ile Cys Ile Pro  
 20 25 30

&lt;210&gt; 394

&lt;211&gt; 7

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 394

Lys Pro Tyr Lys Cys Asp Cys  
 1 5

&lt;210&gt; 395

&lt;211&gt; 10

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 395

Thr Pro Gln Pro Pro His His His Lys Trp  
 1 5 10

&lt;210&gt; 396

&lt;211&gt; 9

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 396

Tyr Pro Thr Thr Pro Thr Val Ser Gln  
 1 5

&lt;210&gt; 397

&lt;211&gt; 24

&lt;212&gt; PRT

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; peptide

&lt;400&gt; 397

Ser Arg Val Trp Ala Thr Val Ala Ile Val Ile Gly Ile Leu Met Pro  
 1 5 10 15

Ala Val Ile Val Val Ile Leu Leu  
20

<210> 398  
<211> 10  
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<213> Artificial

<220>  
<223> peptide

<400> 398

Thr Thr Tyr Ile Ile Thr Pro Val Lys Lys  
1 5 10

<210> 399  
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<213> Rhipicephalus (Boophilus) microplus

<400> 399

Met Arg Gly Ile Ala Leu Phe Val Ala Ala Val Ser Leu Ile Val Glu  
1 5 10 15

Gly Thr Ala Glu Ser Ser Val Cys Ser Asp Phe Gly Asn Glu Phe Cys  
20 25 30

Arg Asn Ala Glu Cys Glu Val Val Pro Gly Ala Glu Asp Asp Phe Val  
35 40 45

Cys Lys Cys Pro Arg Asp Asn Met Tyr Phe Asn Ala Ala Glu Lys Gln  
50 55 60

Cys Glu Tyr Lys Asp Thr Cys Lys Thr Arg Glu Cys Ser Tyr Gly Arg  
65 70 75 80

Cys Val Glu Ser Asn Pro Ser Lys Ala Ser Cys Val Cys Glu Ala Ser  
85 90 95

Asp Asp Leu Thr Leu Gln Cys Lys Ile Lys Asn Glu Tyr Ala Thr Asp  
100 105 110

Cys Gln Asn Arg Gly Gly Thr Ala Lys Leu Arg Thr Asp Gly Phe Ile  
115 120 125

Gly Ala Thr Cys Asp Cys Gly Glu Trp Gly Ala Met Asn Lys Thr Thr  
130 135 140

Arg Asn Cys Val Pro Thr Thr Cys Leu Arg Pro Asp Leu Thr Cys Lys  
145 150 155 160

Asp Leu Cys Glu Lys Asn Leu Leu Gln Arg Asp Ser Arg Cys Cys Gln  
165 170 175

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Gly Trp Asn Thr Ala Asn Cys Ser Ala Ala Pro Pro Ala Asp Ser Tyr  
180 185 190

Cys Ser Pro Gly Ser Pro Lys Gly Pro Asp Arg Gln Cys Lys Asn Ala  
195 200 205

Cys Arg Thr Lys Glu Ala Gly Phe Val Cys Lys His Gly Cys Arg Ser  
210 215 220

Thr Asp Lys Ala Tyr Glu Cys Thr Cys Pro Ser Gly Ser Thr Val Ala  
225 230 235 240

Glu Asp Gly Ile Thr Cys Lys Ser Ile Ser His Thr Val Ser Cys Thr  
245 250 255

Ala Glu Gln Lys Gln Thr Cys Leu Pro Thr Glu Asp Cys Arg Val His  
260 265 270

Lys Gly Thr Val Leu Cys Glu Cys Pro Trp Asn Gln His Leu Val Gly  
275 280 285

Asp Thr Cys Ile Ser Asp Cys Val Asp Lys Lys Cys His Glu Glu Phe  
290 295 300

Met Asp Cys Gly Val Tyr Met Asn Arg Gln Ser Cys Tyr Cys Pro Trp  
305 310 315 320

Lys Ser Arg Lys Pro Gly Pro Asn Val Asn Ile Asn Gly Cys Leu Leu  
325 330 335

Asn Glu Tyr Tyr Thr Val Ser Phe Thr Pro Asn Ile Ser Phe Asp  
340 345 350

Ser Asp His Cys Lys Trp Tyr Glu Asp Arg Val Leu Glu Ala Val Arg  
355 360 365

Thr Ser Ile Gly Lys Glu Val Phe Lys Val Glu Ile Leu Asn Cys Thr  
370 375 380

Gln Asp Ile Lys Ala Arg Leu Ile Ala Glu Lys Pro Leu Ser Lys His  
385 390 395 400

Val Leu Arg Lys Leu Gln Ala Cys Glu His Pro Ile Gly Glu Trp Cys  
405 410 415

Met Met Tyr Pro Lys Leu Leu Ile Lys Lys Asn Ser Ala Thr Glu Ile  
420 425 430

Glu Glu Glu Asn Leu Cys Asp Ser Leu Leu Lys Asn Gln Glu Ala Ala  
435 440 445

Tyr Lys Gly Gln Asn Lys Cys Val Lys Val Asp Asn Leu Phe Trp Phe

450

455

460

Gln Cys Ala Asp Gly Tyr Thr Thr Thr Tyr Glu Met Thr Arg Gly Arg  
 465 470 475 480

Leu Arg Arg Ser Val Cys Lys Ala Gly Val Ser Cys Asn Glu Asn Glu  
 485 490 495

Gln Ser Glu Cys Ala Asn Lys Gly Gln Ile Cys Val Tyr Glu Asn Gly  
 500 505 510

Lys Ala Asn Cys Gln Cys Pro Pro Asp Thr Lys Pro Gly Glu Ile Gly  
 515 520 525

Cys Ile Glu Arg Thr Thr Cys Asn Pro Lys Glu Ile Gln Glu Cys Gln  
 530 535 540

Asp Lys Lys Leu Glu Cys Val Tyr Lys Asn His Lys Ala Glu Cys Lys  
 545 550 555 560

Cys Pro Asp Asp His Glu Cys Ser Arg Glu Pro Ala Lys Asp Ser Cys  
 565 570 575

Ser Glu Glu Asp Asn Gly Lys Cys Gln Ser Ser Gly Gln Arg Cys Val  
 580 585 590

Met Glu Asn Gly Asn Ala Val Cys Lys Glu Lys Ser Asp Ala Thr Thr  
 595 600 605

Ala Ser Thr Thr Thr Thr Lys Ala Lys Asp Lys Asp Pro Asp Pro Gly  
 610 615 620

Lys Ser Ser Ala Ala Ala Val Ser Ala Thr Gly Leu Leu Leu Leu Leu  
 625 630 635 640

Ala Ala Thr Ser Val Thr Ala Ala Ser Leu  
 645 650