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<140> (not yet known)
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35 40 45

Glu Gly Trp Arg Phe Val Val Leu Asp Asn Lys Pro Ile Lys Glu Glu
50 55 60

Ile Lys Pro Phe Ala Trp Gly Ala Gln Tyr Gln Leu Glu Thr Ala Ser
65 70 75 80

His Phe Ile Leu Leu Ile Ala Glu Lys His Ala Arg Tyr Asp Ser Pro
85 90 95

Ala Ile Lys Asn Ser Leu Leu Arg Arg Gly Ile Lys Glu Gly Asp Gly
100 105 110

Leu Asn Ser Arg Leu Lys Leu Tyr Glu Ser Phe Gln Lys Glu Asp Met
115 120 125

Asp Met Ala Asp Asn Pro Arg Ala Leu Phe Asp Trp Thr Ala Lys Gln
130 135 140

Thr Tyr Ile Ala Leu Gly Asn Met Met Met Thr Ala Ala Leu Leu Gly

145 150 155 160

Ile Asp Thr Cys Pro Ile Glu Gly Phe His Tyr Asp Lys Val Asn His
165 170 175

Ile Leu Ala Lys His Asn Val Ile Asp Leu Glu Lys Glu Gly Ile Ala
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Tyr Ser Phe Thr Thr Leu Tyr Glu Tyr Leu Lys Glu Tyr Arg Arg Phe
        35                  40                  45

Phe Glu Trp Leu Ile Asp Ser Gly Val Ser Asn Ala Asn Lys Leu Ala
    50                  55                  60

Asp Ile Pro Leu Glu Thr Leu Glu His Leu Ser Lys Lys Asp Met Glu
65                  70                  75                  80

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

Lys Arg Gln Gly Val Ser Gln Thr Thr Ile Asn Arg Thr Leu Ser Ala
            100                 105                 110

Leu Ser Ser Leu Tyr Lys Tyr Leu Thr Glu Glu Val Glu Asn Ala Asp
        115                 120                 125

Gly Glu Pro Tyr Phe Tyr Arg Asn Val Met Lys Lys Val Ser Thr Lys
    130                 135                 140

Lys Lys Lys Glu Thr Leu Ala Ala Arg Ala Glu Asn Ile Lys Gln Lys
145                 150                 155                 160

Leu Phe Leu Gly Asn Glu Thr Met Glu Phe Leu Glu Tyr Val Asp Cys
                165                 170                 175

Glu Tyr Glu Gln Lys Leu Ser Lys Arg Ala Leu Ser Ser Phe Arg Lys
            180                 185                 190

Asn Lys Glu Arg Asp Leu Ala Ile Ile Ala Leu Leu Leu Ala Ser Gly
        195                 200                 205

Val Arg Leu Ser Glu Ala Val Asn Leu Asp Leu Lys Asp Val Asn Leu
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Asn Met Met Ile Ile Glu Val Thr Arg Lys Gly Gly Lys His Asp Ser
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Val Asn Val Ala Gly Phe Ala Lys Pro Tyr Leu Glu Asn Tyr Ile Thr
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Ile Arg Arg Gly Arg Tyr Lys Ala Lys Lys Thr Asp Leu Ala Phe Phe
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Glu Lys Met Val Ala Lys Tyr Ser Gln Asp Phe Lys Ile Arg Val Thr
    290                 295                 300

Pro His Lys Leu Arg His Thr Leu Ala Thr Arg Leu Tyr Asp Ala Thr
305                 310                 315                 320

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

Cys Gly Leu Phe Lys Gln Val Phe Lys His Asn Glu Gln Glu Ala Glu
130 135 140

Pro Asn Phe Trp Ile Glu Asp Asp Ser Trp Leu Val Pro Thr Asp Ile
145 150 155 160

Ser Tyr Asp Val Pro Phe Lys Asn Phe Thr Leu Lys Ser Arg Leu Asp
165 170 175

Arg Ile Asp Val Leu Gly Tyr Lys Arg Asp Thr Lys Asn Tyr Leu Asn
180 185 190

Leu Phe Asp Ile Glu Gly Val Asp Tyr Gly Leu Ile Lys Asp Gly Ile
195 200 205

Ser Phe Asp Lys Thr Gln Ile Ala Lys Asn Leu Thr Leu Phe Leu Tyr
210 215 220

Pro Asp Asp Ser Asp Lys Asn Gly Glu Leu Leu Arg Ile Tyr Gln Gln
225 230 235 240

Tyr Phe Met Val Ser Asn Ala Ala Gln Leu Ile Ile Asp Glu Ala Ile
245 250 255

Glu Arg Gly Ser Asn Leu His Asp Leu Ala Asp Tyr Ala Tyr Val Gln
260 265 270

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

Leu Thr Glu Lys His Gly Phe Asp Phe Asp Glu Ala Val Ala Val Val
290 295 300

Lys Asn Met Val Gly Tyr Thr Asn His Thr Ile Leu Ala Glu Ala Leu
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Glu Lys Trp Pro Thr Ala Tyr Leu Asn Glu Val Val Pro His Leu Val
325 330 335

Thr Ile Ile Glu Lys Leu Asp Ala Leu Val Arg Ser Glu Val Ser Asp
340 345 350

Pro Ala Val Gln Ile Ile Asp Glu Ser Gly Arg Val His Met Ala His
355 360 365

Met Asp Ile His Phe Ala Thr Ser Val Asn Gly Val Ala Ala Leu His
370 375 380

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

Gly Asp Glu Tyr Leu Thr Asp Ala Thr Lys Leu Glu Lys Leu Met Ala
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Phe Ala Asp Asp Lys Ala Val His Ala Lys Leu Ala Glu Ile Lys Phe
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465 470 475 480

Glu Leu Asp Glu His Ser Ile Ile Asp Thr Gln Ile Lys Arg Phe His
485 490 495

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

Phe Gly Gly Lys Ala Ala Pro Ala Tyr Ile Ile Ala Gln Asp Ile Ile
530 535 540

His Leu Ile Leu Cys Leu Ser Glu Leu Ile Asn Asn Asp Pro Glu Val
545 550 555 560

Ser Pro Tyr Leu Asn Val His Leu Val Glu Asn Tyr Asn Val Thr Val
565 570 575

Ala Glu His Leu Ile Pro Ala Thr Asp Ile Ser Glu Gln Ile Ser Leu
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Ala Ser Lys Glu Ala Ser Gly Thr Gly Asn Met Lys Phe Met Leu Asn
595 600 605

Gly Ala Leu Thr Leu Gly Thr Met Asp Gly Ala Asn Val Glu Ile Ala
610 615 620

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Glu Leu Ala Gly Met Glu Asn Ile Tyr Thr Phe Gly Lys Asp Ser Asp
625                 630                 635                 640

Thr Ile Ile Asn Leu Tyr Ala Thr Ala Ser Tyr Val Ala Lys Asp Tyr
                645                 650                 655

Tyr Asp Asn His Pro Ala Ile Lys Ala Ala Val Asn Phe Ile Ile Ser
            660                 665                 670

Pro Glu Leu Leu Ala Phe Gly Asn Glu Glu Arg Leu Asp Arg Leu Tyr
        675                 680                 685

Lys Glu Leu Ile Ser Lys Asp Trp Phe Met Thr Leu Ile Asp Leu Glu
    690                 695                 700

Glu Tyr Ile Glu Val Lys Glu Lys Met Leu Ala Asp Tyr Glu Asp Gln
705                 710                 715                 720

Asp Leu Trp Met Thr Lys Val Val His Asn Ile Ala Lys Ala Gly Phe
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Ser Arg
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<212> DNA
<213> Streptococcus pyogenes

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Tyr Ser Gly His Gln Ile Leu Trp Ser Ile Ile Gly Phe Cys Leu Thr
35 40 45

Gly Val Ser Leu Pro Leu Leu Gly Val Ile Ala Val Ala Lys Ser Gly
50 55 60

Ser Gly Asp Val Glu Ser Leu Ala Arg Pro Ile Ser Lys Trp Tyr Ala
65 70 75 80

Ile Phe Tyr Ser Ser Ile Leu Tyr Leu Ser Ile Gly Pro Phe Phe Ala
85 90 95

Ile Pro Arg Thr Gly Ala Thr Ser Phe Ser Val Gly Ile Ala Pro Ile
100 105 110

Leu Gly Asp Asn Thr Thr Asn Lys Ala Ile Tyr Ala Ile Leu Phe Phe
115 120 125

Gly Leu Ser Tyr Phe Leu Ala Ile Lys Pro Ser Lys Leu Ala Glu Asn
130 135 140

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

Val Ile Ala Ser Phe Val His Pro Ala Gly Asn Tyr Gly Asp Ala Phe
165 170 175

Asn Ala Gly Val Gly Val Asn Asn Ala Phe Lys Asp Phe Pro Phe Ile
180 185 190

Ala Gly Leu Ile Gln Gly Tyr Gly Thr Met Asp Ala Leu Ala Ser Leu
195 200 205

Val Phe Ala Ile Leu Val Ile Glu Ala Thr Lys Gln Phe Gly Ala Lys
210 215 220

Thr Asp Lys Glu Met Thr Lys Ile Thr Leu Ile Ser Gly Ala Ile Ala
225 230 235 240

Ile Leu Leu Leu Ala Leu Val Tyr Ile Phe Val Gly Arg Ile Gly Ala
245 250 255

Thr Ser Gln Ser Leu Phe Pro Phe Ile Asp Gly Ser Phe Thr Leu His
260 265 270

Gly Asn Pro Val Asn Gly Gly Gln Ile Leu Ser His Ala Ser Arg Phe
275 280 285

Tyr Leu Gly Gly Ile Gly Gln Ala Phe Leu Ala Val Val Ile Phe Leu
290 295 300

Ala Cys Leu Thr Thr Ser Thr Gly Leu Ile Thr Ser Ser Ala Glu Tyr
305 310 315 320

Phe His Lys Leu Val Pro Ala Leu Ser His Ile Ala Trp Ala Thr Ile
325 330 335

Phe Thr Leu Leu Ser Ala Phe Phe Tyr Phe Gly Gly Leu Ser Val Ile
340 345 350

Ile Asn Trp Ser Ala Pro Val Leu Phe Leu Leu Tyr Pro Leu Thr Val
355 360 365

Asp Leu Ile Phe Leu Val Leu Ala Gln Lys Cys Phe Asn Asn Asp Pro
370 375 380

Ile Val Tyr Arg Thr Thr Ile Gly Leu Thr Phe Ile Pro Ala Ile Phe
385 390 395 400

Asp Ala Leu Leu Thr Leu Ser Gln Met Thr Gly Leu Phe His Leu Pro
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Glu Ala Val Val Thr Phe Phe Gln Lys Thr Val Pro Leu Gly Gln Phe
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<213> Streptococcus pyogenes

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            20                  25                  30

Asp Val Lys Leu Thr Asn Thr Gln Glu His Ile Leu Met Leu Leu Ser
        35                  40                  45

Gln Gln Arg Leu Thr Asn Thr Asp Leu Ala Lys Ala Leu Asn Ile Ser
    50                  55                  60

Gln Ala Ala Val Thr Lys Ala Ile Lys Ser Leu Val Lys Gln Asp Met
65                  70                  75                  80
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Leu Ala Gly Thr Lys Asp Thr Val Asp Ala Arg Val Thr Tyr Phe Glu
85 90 95

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

Lys Glu Leu Glu Ile Val Asp Lys Phe Val Thr Val Phe Ala Glu Glu
130 135 140

Leu Glu Gly
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<210> 11
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<212> DNA
<213> Streptococcus pyogenes

<400> 11
atgcttgata ttttattcta tgatttcatg caacgggcgg taatggcggt agttgccatt 60
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gataccctta gtcatgtttc tttggctggg gtagcgcttg gggtagtcct tggtatttca 180
ccaaccatca ctactattat tgttgtggtt ttagctgcta ttttgttaga atacctgcgt 240
gtagtttaca aacactacat ggagatttca acggcgattt tgatgtcact tggcttggcc 300
ctatctctga ttattatgag taagtcgcat agttcatcaa gcatgagttt agaacaatac 360
ctttttggat cgatcatcac gattagtatg gaacaagttg tcgccttgtt tgctattgct 420
gcgattattt taatcttgac cgttctcttc attagaccga tgtacattct gacctttgat 480
gaagatactg cttttgtaga tggtttgccc gttcgcttga tgtctgttct attcaatatc 540
gtcactgggg ttgctattgc tttgaccatt ccagcagcag gagcactttt ggtttctacc 600
attatggtct tgccagcaag tatcgcaatg agattgggta aaaactttaa aacagttatc 660
ttactgggaa ttgtcatcgg ttttagcggt atgttatctg gtattttctt atcttatttc 720
tttgaaacgc cagctagtgc cactattacc atgattttca ttagtatttt cctcttagtt 780
agtctaggtg gaatgcttaa aaaacggtta tttaa 815

<210> 12
<211> 239
<212> PRT
<213> Streptococcus pyogenes

<400> 12
Met Arg Tyr Ile Ser Val Lys Asn Leu Ser Phe Gln Tyr Glu Ser Glu
1 5 10 15

Pro Val Leu Glu Gly Ile Thr Tyr His Leu Asp Ser Gly Glu Phe Val
20 25 30

Thr Met Thr Gly Glu Asn Gly Ala Ala Lys Ser Thr Leu Ile Lys Ala
35 40 45

Thr Leu Gly Ile Leu Gln Pro Lys Ala Gly Arg Val Thr Ile Ala Lys
50 55 60

Lys Asn Lys Asp Gly Lys Gln Leu Arg Ile Ala Tyr Leu Pro Gln Gln
65 70 75 80

Val Ala Ser Phe Asn Ala Gly Phe Pro Ser Thr Val Tyr Glu Phe Val
85 90 95

Lys Ser Gly Arg Tyr Pro Arg Ser Gly Trp Phe Arg His Leu Asn Lys
100 105 110

His Asp Glu Glu His Val Gln Ala Ser Leu Glu Ala Val Gly Met Trp
115 120 125

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

Arg Val Val Ile Ala Arg Met Phe Ala Ser Asp Pro Asp Ile Phe Val
145 150 155 160

Leu Asp Glu Pro Thr Thr Gly Met Asp Ser Gly Thr Thr Asp Thr Phe
165 170 175

Tyr Glu Leu Met His His Ser Ala His Gln His Gly Lys Ser Val Leu
180 185 190

Met Ile Thr His Asp Pro Glu Glu Val Lys Ala Tyr Ala Asp Arg Asn
195 200 205

Ile His Leu Val Arg Asn Gln Lys Leu Pro Trp Arg Cys Phe Asn Ile
210 215 220

His Glu Ala Glu Thr Asp Asp Glu Lys Gly Gly His Gly His Ala
225 230 235

<210> 13
<211> 681
<212> DNA
<213> Streptococcus pyogenes

<400> 13
atgtattcta taaaatgtga tgataataaa gccatgccaa gagaacgttt gatgcgacta 60
ggagcagagt ctctaagtaa tcaagaatta ttagcaattt tattacgaac aggtaataaa 120
gaaaagcatg tcttagagct gtcatcctat cttttatcgc atttagacag tctggcagat 180
tttaaaaaga tgtctttgca agaattacaa catttggcag gtataggaaa agttaaagcg 240
attgaaatta aagctatgat tgagttggtt tcccgaattt tagcgacaga taagacatta 300
actgatagcg tattaaccag tgttcaggtc gctgaaaaaa tgatggcagc tttaggagat 360
aaaaaacaag agcatttagt cgtattgtat ttagataatc aaaatcgtat tattgaagaa 420
aaaactattt ttattgggac tgtccgacgt tcacttgcag aaccaagaga aattttatac 480
tatgcctgta aaaatatggc gactagtctc attgttattc ataatcatcc ttcaggaaat 540
attgaaccta gttctaacga ttattgcttt actgaaaaaa taaaacgatc atgtgaagat 600
ttaggcatta tctgtctaga tcacattatc gttagctata aagattatta tagttttcga 660
gaaaaatcaa ccctttttta a 681

<210> 14
<211> 226
<212> PRT
<213> Streptococcus pyogenes

<400> 14
Met Tyr Ser Ile Lys Cys Asp Asp Asn Lys Ala Met Pro Arg Glu Arg
1 5 10 15

Leu Met Arg Leu Gly Ala Glu Ser Leu Ser Asn Gln Glu Leu Leu Ala
20 25 30

Ile Leu Leu Arg Thr Gly Asn Lys Glu Lys His Val Leu Glu Leu Ser
35 40 45

Ser Tyr Leu Leu Ser His Leu Asp Ser Leu Ala Asp Phe Lys Lys Met
50 55 60

Ser Leu Gln Glu Leu Gln His Leu Ala Gly Ile Gly Lys Val Lys Ala
65 70 75 80

Ile Glu Ile Lys Ala Met Ile Glu Leu Val Ser Arg Ile Leu Ala Thr
85 90 95

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

Lys Met Met Ala Ala Leu Gly Asp Lys Lys Gln Glu His Leu Val Val
115 120 125

Leu Tyr Leu Asp Asn Gln Asn Arg Ile Ile Glu Glu Lys Thr Ile Phe
130 135 140

Ile Gly Thr Val Arg Arg Ser Leu Ala Glu Pro Arg Glu Ile Leu Tyr
145 150 155 160

Tyr Ala Cys Lys Asn Met Ala Thr Ser Leu Ile Val Ile His Asn His
165 170 175

Pro Ser Gly Asn Ile Glu Pro Ser Ser Asn Asp Tyr Cys Phe Thr Glu
180 185 190

Lys Ile Lys Arg Ser Cys Glu Asp Leu Gly Ile Ile Cys Leu Asp His
195 200 205

Ile Ile Val Ser Tyr Lys Asp Tyr Tyr Ser Phe Arg Glu Lys Ser Thr
210 215 220

Leu Phe
225

<210> 15
<211> 410
<212> DNA
<213> Streptococcus pyogenes

<400> 15
atgatgttac gaaaatttaa aattaccatt gacggtaaag agtatcttgt agaaatggaa 60
gaaatcggtg ctcctgccca agcagctgcc cccgctcaac caatatccac tccagtacct 120
gtccctactg aagcaagccc acaagtggag gaagcgcaag caccacagcc agtagctgca 180
gcgggagcgg atgccattcc atcaccaatg cctggaacca tcttaaaagt cttagtagca 240
gtgggagacc aagtaactga aaatcagcca ctattgattt tagaagccat gaagatggaa 300
aatgagattg tggcctcatc agcaggaacc attacagcta tccacgtcgg tccaggtcaa 360
gtggtcaatc ctggtgatgg tctcattaca attggttaat agtactataa 410

<210> 16
<211> 134
<212> PRT
<213> Streptococcus pyogenes

<400> 16
Met Met Leu Arg Lys Phe Lys Ile Thr Ile Asp Gly Lys Glu Tyr Leu
1 5 10 15

Val Glu Met Glu Glu Ile Gly Ala Pro Ala Gln Ala Ala Ala Pro Ala
20 25 30

Gln Pro Ile Ser Thr Pro Val Pro Val Pro Thr Glu Ala Ser Pro Gln
35 40 45

Val Glu Glu Ala Gln Ala Pro Gln Pro Val Ala Ala Ala Gly Ala Asp
50 55 60

Ala Ile Pro Ser Pro Met Pro Gly Thr Ile Leu Lys Val Leu Val Ala
65 70 75 80

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

Met Lys Met Glu Asn Glu Ile Val Ala Ser Ser Ala Gly Thr Ile Thr
100 105 110

Ala Ile His Val Gly Pro Gly Gln Val Val Asn Pro Gly Asp Gly Leu
115 120 125

Ile Thr Ile Gly Tyr Tyr
130

<210> 17
<211> 1533
<212> DNA
<213> Streptococcus pyogenes

<400> 17
atggtaacaa ataaactcgg tagagatatt cctcaaccat acgccgacca atacggtgtc 60
tttgaaggag aactcgcaaa tatcaaacag tatgacgaat caagtcgccg tattaaacca 120
gttaagcctg gagattctaa attactagga tctgttcgtg aagcgattga aaaaacaggt 180
ttaacagatg gcatgaccat ttctttccac caccatttcc gtgaagggga tttcattatg 240
aatatggtct tggaggaaat tgccaaaatg ggcattaaaa acctgtctat tgccccaagt 300
tccatcgcta atgtacatga gcctttgatt gatcacatca aaaatggtgt ggtcactaac 360
atcacttcat ctggtcttcg tgacaaagta ggggcagcca tctcagaagg actaatggaa 420
aatcctgtgg ttattcgctc ccatggtggt cgcgctcgtg ccattgctag tggggatatc 480
catattgatg ttgcctttct gggcgcccca agttcagatg cttacggaaa tgttaatggg 540
acaaaaggga aagcaacctg tggttctttg ggctatgcca tgattgatgc caaatatgcg 600
gatcaggtgg ttatcttgac agataatttg gttccttatc ctaatacccc aatcagcatt 660
cctcaaacag atgttgacta tgtggtaaca gtggatgcta tcggagatcc tcaaggaatc 720
gccaaagggg caactcgttt tacgaaaaat cctaaagaac tcttaattgc agaatacgcc 780
gctaaagtaa tcaccaactc tccttatttt aaagaaggat tctctttcca aactggaaca 840
ggtggcgctt ctttggcagt aacccgtttc atgcgtgaag ctatgattaa agaaaatatc 900
aaagctagct ttgctcttgg tggtattacc aatgctatgg tggagttgct cgaagaagaa 960
ctggttgaaa aaattcttga tgtccaagac tttgatcacc catcagctgt ttctcttggt 1020
aagcatgctg aacattatga aattgatgcc aacatgtatg cctcaccttt gagcaagggt 1080
gctgttatca atcaattaga cacttgtatt ttatcagccc ttgaagttga tactaacttc 1140

aatgttaatg tgatgacagg atctgacggc gtgattcgtg gcgcttctgg aggacactgc 1200
gacactgcct ttgcggctaa gatgagtttg gttatttcac cacttatccg cggacgcatc 1260
ccaacttttg tagatgaggt taatacggtc attacaccag gaacaagtgt cgatgtgatc 1320
gtcacagaag tgggaattgc cattaaccca aatcgtcaag acttagtaga ccatttcaaa 1380
tccctcaatg tgccacaatt tagtattgag gagctaaaag agaaggctta cgccatcgtt 1440
ggcacacctg agcgtattca atatggtgat aaggttgttg ctcttattga ataccgtgac 1500
ggtagcctca tggatgtggt ttacaatgtg taa 1533

<210> 18
<211> 510
<212> PRT
<213> Streptococcus pyogenes

<400> 18

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

Gln Tyr Gly Val Phe Glu Gly Glu Leu Ala Asn Ile Lys Gln Tyr Asp
20 25 30

Glu Ser Ser Arg Arg Ile Lys Pro Val Lys Pro Gly Asp Ser Lys Leu
35 40 45

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

Met Thr Ile Ser Phe His His His Phe Arg Glu Gly Asp Phe Ile Met
65 70 75 80

Asn Met Val Leu Glu Glu Ile Ala Lys Met Gly Ile Lys Asn Leu Ser
85 90 95

Ile Ala Pro Ser Ser Ile Ala Asn Val His Glu Pro Leu Ile Asp His
100 105 110

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

Lys Val Gly Ala Ala Ile Ser Glu Gly Leu Met Glu Asn Pro Val Val
130 135 140

Ile Arg Ser His Gly Gly Arg Ala Arg Ala Ile Ala Ser Gly Asp Ile
145 150 155 160

His Ile Asp Val Ala Phe Leu Gly Ala Pro Ser Ser Asp Ala Tyr Gly
165 170 175

```
Asn Val Asn Gly Thr Lys Gly Lys Ala Thr Cys Gly Ser Leu Gly Tyr
            180                 185                 190

Ala Met Ile Asp Ala Lys Tyr Ala Asp Gln Val Val Ile Leu Thr Asp
        195                 200                 205

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

Val Asp Tyr Val Val Thr Val Asp Ala Ile Gly Asp Pro Gln Gly Ile
225                 230                 235                 240

Ala Lys Gly Ala Thr Arg Phe Thr Lys Asn Pro Lys Glu Leu Leu Ile
                245                 250                 255

Ala Glu Tyr Ala Ala Lys Val Ile Thr Asn Ser Pro Tyr Phe Lys Glu
            260                 265                 270

Gly Phe Ser Phe Gln Thr Gly Thr Gly Gly Ala Ser Leu Ala Val Thr
        275                 280                 285

Arg Phe Met Arg Glu Ala Met Ile Lys Glu Asn Ile Lys Ala Ser Phe
    290                 295                 300

Ala Leu Gly Gly Ile Thr Asn Ala Met Val Glu Leu Leu Glu Glu Glu
305                 310                 315                 320

Leu Val Glu Lys Ile Leu Asp Val Gln Asp Phe Asp His Pro Ser Ala
                325                 330                 335

Val Ser Leu Gly Lys His Ala Glu His Tyr Glu Ile Asp Ala Asn Met
            340                 345                 350

Tyr Ala Ser Pro Leu Ser Lys Gly Ala Val Ile Asn Gln Leu Asp Thr
        355                 360                 365

Cys Ile Leu Ser Ala Leu Glu Val Asp Thr Asn Phe Asn Val Asn Val
    370                 375                 380

Met Thr Gly Ser Asp Gly Val Ile Arg Gly Ala Ser Gly Gly His Cys
385                 390                 395                 400

Asp Thr Ala Phe Ala Ala Lys Met Ser Leu Val Ile Ser Pro Leu Ile
                405                 410                 415

Arg Gly Arg Ile Pro Thr Phe Val Asp Glu Val Asn Thr Val Ile Thr
            420                 425                 430
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Pro Gly Thr Ser Val Asp Val Ile Val Thr Glu Val Gly Ile Ala Ile
        435                 440                 445

Asn Pro Asn Arg Gln Asp Leu Val Asp His Phe Lys Ser Leu Asn Val
    450                 455                 460

Pro Gln Phe Ser Ile Glu Glu Leu Lys Glu Lys Ala Tyr Ala Ile Val
465                 470                 475                 480

Gly Thr Pro Glu Arg Ile Gln Tyr Gly Asp Lys Val Val Ala Leu Ile
                485                 490                 495

Glu Tyr Arg Asp Gly Ser Leu Met Asp Val Val Tyr Asn Val
            500                 505                 510
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<210> 19
<211> 888
<212> DNA
<213> Streptococcus pyogenes

<400> 19
atggaacgtt taagaagaac aatgatgttt gtgcctggtg ccaatgcagc catgcttcga 60
gatgctcctt tatttggcgc tgattcaatc atgtttgact tggaagattc tgtttcactc 120
aaagaaaaag acacctctag agctctcgtt cattttgcgc ttaaaacttt tgattattca 180
agcgttgaaa cggttgttcg tgtgaatggt cttgattctt gtggggcttt agacatcgaa 240
gctgttgttt tggcaggtgt caacgtgatt cgtcttccaa aaacagagac tgctcaagat 300
attattgatg tggaggctgt tattgaacgt gtcgaacgcg agaacagcat tgaagttggt 360
cgcacacgta tgatggcagc cattgaatca gccgaaggtg tcctaaatgc tcgtgagatt 420
gccaaagctt ctaagcgctt gattggtatt gctcttggag cagaagacta tgtcacgaat 480
atgaaaacgc gtcgttaccc agatggtcaa gaattattct ttgctcgtag catgatttta 540
cacgctgctc gtgctgctgg aattgctgcc attgatactg tttattctga tgtcaataat 600
accgaagggt tccaaaacga agttcgcatg atcaaacagt taggatttga tggtaaatcg 660
gtcatcaacc ctcgccaaat tcctctggtc aatgagattt ataccccaac aaaaaaagaa 720
attgaccatg ccaaacaagt catctgggca attcgtgaag ctgaaagcaa aggctctggc 780
gttatttcct taaatggaaa aatggttgat aaaccaatcg ttgaacgtgc agaacgtgtg 840
attgccctag caacagcagc aggtgtttta tctgaggagg atatttaa 888

<210> 20
<211> 295
<212> PRT
<213> Streptococcus pyogenes

<400> 20
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Met Glu Arg Leu Arg Arg Thr Met Met Phe Val Pro Gly Ala Asn Ala
  1               5                  10                  15
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Ala Met Leu Arg Asp Ala Pro Leu Phe Gly Ala Asp Ser Ile Met Phe
20 25 30

Asp Leu Glu Asp Ser Val Ser Leu Lys Glu Lys Asp Thr Ser Arg Ala
35 40 45

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

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

Ala Val Val Leu Ala Gly Val Asn Val Ile Arg Leu Pro Lys Thr Glu
85 90 95

Thr Ala Gln Asp Ile Ile Asp Val Glu Ala Val Ile Glu Arg Val Glu
100 105 110

Arg Glu Asn Ser Ile Glu Val Gly Arg Thr Arg Met Met Ala Ala Ile
115 120 125

Glu Ser Ala Glu Gly Val Leu Asn Ala Arg Glu Ile Ala Lys Ala Ser
130 135 140

Lys Arg Leu Ile Gly Ile Ala Leu Gly Ala Glu Asp Tyr Val Thr Asn
145 150 155 160

Met Lys Thr Arg Arg Tyr Pro Asp Gly Gln Glu Leu Phe Phe Ala Arg
165 170 175

Ser Met Ile Leu His Ala Ala Arg Ala Ala Gly Ile Ala Ala Ile Asp
180 185 190

Thr Val Tyr Ser Asp Val Asn Asn Thr Glu Gly Phe Gln Asn Glu Val
195 200 205

Arg Met Ile Lys Gln Leu Gly Phe Asp Gly Lys Ser Val Ile Asn Pro
210 215 220

Arg Gln Ile Pro Leu Val Asn Glu Ile Tyr Thr Pro Thr Lys Lys Glu
225 230 235 240

Ile Asp His Ala Lys Gln Val Ile Trp Ala Ile Arg Glu Ala Glu Ser
245 250 255

Lys Gly Ser Gly Val Ile Ser Leu Asn Gly Lys Met Val Asp Lys Pro
260 265 270

Ile Val Glu Arg Ala Glu Arg Val Ile Ala Leu Ala Thr Ala Ala Gly
275 280 285

Val Leu Ser Glu Glu Asp Ile
290 295

<210> 21
<211> 309
<212> DNA
<213> Streptococcus pyogenes

<400> 21
atggatatta aacaaactgc cgttgctggt tcacttgaat caagtgacct aatgattaca 60
gtatccccta atgacgagca aaccattaca ataaccctag acagtagtgt tgaaaaacaa 120
tttggcaatc acattcgtca actcattcat caaaccctag tgaatttgaa ggtgacggct 180
gctaaagtag aggctgttga taaaggtgca ttagattgca ccattcaagc gagaaccatc 240
gcagctgttc atcgcgctgc tggtattgac caatacgatt ggaaggagat tgactcatgg 300
aacgtttaa 309

<210> 22
<211> 102
<212> PRT
<213> Streptococcus pyogenes

<400> 22
Met Asp Ile Lys Gln Thr Ala Val Ala Gly Ser Leu Glu Ser Ser Asp
1 5 10 15

Leu Met Ile Thr Val Ser Pro Asn Asp Glu Gln Thr Ile Thr Ile Thr
20 25 30

Leu Asp Ser Ser Val Glu Lys Gln Phe Gly Asn His Ile Arg Gln Leu
35 40 45

Ile His Gln Thr Leu Val Asn Leu Lys Val Thr Ala Ala Lys Val Glu
50 55 60

Ala Val Asp Lys Gly Ala Leu Asp Cys Thr Ile Gln Ala Arg Thr Ile
65 70 75 80

Ala Ala Val His Arg Ala Ala Gly Ile Asp Gln Tyr Asp Trp Lys Glu
85 90 95

Ile Asp Ser Trp Asn Val

100

<210> 23
<211> 1053
<212> DNA
<213> Streptococcus pyogenes

<400> 23
atgccttact acactatttc aaaagtcttt ccttcagata aaacgacaat ggctagtgta 60
aagaacctgc ttcatcaaga aggtattcgt ttggatgctc atttagatta tacttgtgcc 120
atcatgaatg cgcaaaatga tgtgattgct accggttctt actttggaaa tagcttgcgc 180
tgtctttgcg tatccagtgc ctatcaaggt gaaggacttc ttaataggat tgtgagtcat 240
ctcattgatg aagaatatgc ccttggcaac tatcatcttt ttgtttatac gaagacctct 300
tctgctgctt ttttcaaaga tcttggtttt actgaaattg tccatatcga caatcacatc 360
agtttcttgg aaaataaaaa aactggtttt caagattatc tgatgacact taataagcct 420
gagcaaacac ctggtaaagt cgctgctatt gttatcaacg ctaacccctt taccttaggg 480
catcaatttt tagtagagaa agctgcaaga gaaaatgatt gggttcatct gtttatggtc 540
agtgaagacc gcagtctaat tccttttttcg gtgagaaaga ggttgattca agaaggtcta 600
gctcatcttg ataatgtcat atatcatgaa acaggtcctt atttgattag ccaagcgact 660
ttcccagcct atttccaaaa agaagacaat gacgtgatta agagccaagc tttgctggat 720
actgctattt ttctaaagat tgctcaaacc ttacagatta caaaaagata cgttggagaa 780
gagccaacca gccgagtaac tgctatttac aatgaaatta tggcagagca gttgcagcaa 840
gctggtatcc tcctagatat tttgccaagg aaagctatca atcagcagca agatcctatc 900
agtgcctcaa cggctaggca ggcattgaaa gataatgatt gggaccttct ggcaaaactc 960
cttcccaaaa cgtctttaga ttatttttgt tcgctaaaag cccaacccat tattaaaaag 1020
atacaagcca cttcatctgt caaacattac taa 1053

<210> 24
<211> 350
<212> PRT
<213> Streptococcus pyogenes

<400> 24
Met Pro Tyr Tyr Thr Ile Ser Lys Val Phe Pro Ser Asp Lys Thr Thr
1 5 10 15

Met Ala Ser Val Lys Asn Leu Leu His Gln Glu Gly Ile Arg Leu Asp
20 25 30

Ala His Leu Asp Tyr Thr Cys Ala Ile Met Asn Ala Gln Asn Asp Val
35 40 45

Ile Ala Thr Gly Ser Tyr Phe Gly Asn Ser Leu Arg Cys Leu Cys Val
50 55 60

```
Ser Ser Ala Tyr Gln Gly Glu Gly Leu Leu Asn Arg Ile Val Ser His
 65                  70                  75                  80

Leu Ile Asp Glu Glu Tyr Ala Leu Gly Asn Tyr His Leu Phe Val Tyr
                85                  90                  95

Thr Lys Thr Ser Ser Ala Ala Phe Phe Lys Asp Leu Gly Phe Thr Glu
            100                 105                 110

Ile Val His Ile Asp Asn His Ile Ser Phe Leu Glu Asn Lys Lys Thr
        115                 120                 125

Gly Phe Gln Asp Tyr Leu Met Thr Leu Asn Lys Pro Glu Gln Thr Pro
    130                 135                 140

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

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

Leu Phe Met Val Ser Glu Asp Arg Ser Leu Ile Pro Phe Ser Val Arg
            180                 185                 190

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

His Glu Thr Gly Pro Tyr Leu Ile Ser Gln Ala Thr Phe Pro Ala Tyr
    210                 215                 220

Phe Gln Lys Glu Asp Asn Asp Val Ile Lys Ser Gln Ala Leu Leu Asp
225                 230                 235                 240

Thr Ala Ile Phe Leu Lys Ile Ala Gln Thr Leu Gln Ile Thr Lys Arg
                245                 250                 255

Tyr Val Gly Glu Glu Pro Thr Ser Arg Val Thr Ala Ile Tyr Asn Glu
            260                 265                 270

Ile Met Ala Glu Gln Leu Gln Gln Ala Gly Ile Leu Leu Asp Ile Leu
        275                 280                 285

Pro Arg Lys Ala Ile Asn Gln Gln Gln Asp Pro Ile Ser Ala Ser Thr
    290                 295                 300

Ala Arg Gln Ala Leu Lys Asp Asn Asp Trp Asp Leu Leu Ala Lys Leu
305                 310                 315                 320
```

Leu Pro Lys Thr Ser Leu Asp Tyr Phe Cys Ser Leu Lys Ala Gln Pro
325 330 335

Ile Ile Lys Lys Ile Gln Ala Thr Ser Ser Val Lys His Tyr
340 345 350

<210> 25
<211> 642
<212> DNA
<213> Streptococcus pyogenes

<400> 25
atggtgataa ggttgttgct cttattgaat accgtgacgg tagcctcatg gatgtggttt 60
acaatgtgta aagacactta tttttcaggc gaagctatcc aacttagtga tatgttaaga 120
gcccgcgaag aaagagctct gcgtcagctg catttattaa aggagtaccc agaaggtagc 180
ttattatcgg tcaccatgaa tatccctgga ccaattaaaa cctctcctaa acttcttgaa 240
gcttttgata tagtgattaa ggccattcaa actgccttag ctgacgataa gatttgttac 300
cagttgcgat tactgcctac aacgggttat gagtattacc tcatcacaag tctacctagc 360
cgcgacctga agttaaaaat gatagcctta gagacagagt tgccaatagg tcgtctcatg 420
gatttagatg tcttggtctt gcaaaatgat ctgcctcatt caattagcag aaccgtatta 480
ggaggctccc ctaggcaatg ttttatctgt tctaaagagg ccaaagtctg cggtcgccta 540
cgtaagcaca gtgtcgagga gatgcagact gctatttcaa aattactcca ttcatttttc 600
aataaagaca accaatcatc gtcatcagat aagacaggtt ga 642

<210> 26
<211> 213
<212> PRT
<213> Streptococcus pyogenes

<400> 26
Met Val Ile Arg Leu Leu Leu Leu Leu Asn Thr Val Thr Val Ala Ser
1 5 10 15

Trp Met Trp Phe Thr Met Cys Lys Asp Thr Tyr Phe Ser Gly Glu Ala
20 25 30

Ile Gln Leu Ser Asp Met Leu Arg Ala Arg Glu Glu Arg Ala Leu Arg
35 40 45

Gln Leu His Leu Leu Lys Glu Tyr Pro Glu Gly Ser Leu Leu Ser Val
50 55 60

Thr Met Asn Ile Pro Gly Pro Ile Lys Thr Ser Pro Lys Leu Leu Glu
65 70 75 80

```
Ala Phe Asp Ile Val Ile Lys Ala Ile Gln Thr Ala Leu Ala Asp Asp
                85                  90                  95

Lys Ile Cys Tyr Gln Leu Arg Leu Leu Pro Thr Thr Gly Tyr Glu Tyr
            100                 105                 110

Tyr Leu Ile Thr Ser Leu Pro Ser Arg Asp Leu Lys Leu Lys Met Ile
        115                 120                 125

Ala Leu Glu Thr Glu Leu Pro Ile Gly Arg Leu Met Asp Leu Asp Val
    130                 135                 140

Leu Val Leu Gln Asn Asp Leu Pro His Ser Ile Ser Arg Thr Val Leu
145                 150                 155                 160

Gly Gly Ser Pro Arg Gln Cys Phe Ile Cys Ser Lys Glu Ala Lys Val
                165                 170                 175

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

Ser Lys Leu Leu His Ser Phe Phe Asn Lys Asp Asn Gln Ser Ser Ser
        195                 200                 205

Ser Asp Lys Thr Gly
    210
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<210> 27
<211> 1395
<212> DNA
<213> Streptococcus pyogenes

<400> 27
atgacgaaaa tccgtataac ggaaacagtt ttacgtgatg gtcaacaaag tcagattgcc 60
acacgtatga caaccaagga aatgattcct attctcgaaa cgctagacaa tgctggttat 120
catgcccttg aaatgtgggg aggagcaacc tttgattcct gcctacgctt tttaaatgaa 180
gacccttggg aacggctaag agccatccgt aaagcagtga aaaagactaa acttcagatg 240
ctcttacgcg gacaaaacct tcttggatat cgcaattatg ctgacgatgt ggtcagatcc 300
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gacccacgca acttgcaaac agctgtttca gcgactaaaa aatttggagg gcatgctcaa 420
gttgccattt cttacacgac aagtccggta cataccattg actactttgt tgaattggcg 480
aaagcttacc aagctatcgg agcggactcc atttgtatca aagacatggc tggtgtctta 540
actcctgaaa taggttacca attggtcaaa tgtatcaagg agaatacaac tatccctctt 600
gaggttcata cccatgctac cagtggtatt tcagaaatga cttacttaaa agtagcagaa 660
gcaggagctg atattattga tacggcgatt tcctcttttt caggggaac cagtcagcct 720
gccacagagt caatggcgat tgccttgacg gatttaggct ttgacacagg cttggatatg 780

caagaggtgg ccaaagttgc agaatatttc aacactattc gtgaccacta tcgagaaata 840
gggattttaa atcctaaagt caaagatact gagccaaaaa cattgattta ccaagttcca 900
ggtggcatgc tatcaaacct attgagccaa ttaaccgagc aaggcctaac tgataaatac 960
gaagaagtct tagcagaagt acctaaagta agggctgatc ttgggtatcc gccactcgta 1020
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tacaaggtag ttccaaatga aatcaaagac tatgttcgag ggctatacgg tcaatcacca 1140
gcgccattag cagaaggtat caaagagaaa atcattggtg acgaagcagt tattacttgc 1200
agaccagccg acctaatcga gcctcaaatg atttatctac gtgacgagat tgctccatac 1260
gctcattcag aagaagacgt gttaagctat gcaagcttcc cgcaacaagc tagagatttc 1320
ttgggacgcc gtgaagatcc tttctatgat gttccggttc aagaagttac tgtacaactg 1380
gacattcaag actaa 1395

<210> 28
<211> 464
<212> PRT
<213> Streptococcus pyogenes

<400> 28
Met Thr Lys Ile Arg Ile Thr Glu Thr Val Leu Arg Asp Gly Gln Gln
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Ser Gln Ile Ala Thr Arg Met Thr Thr Lys Glu Met Ile Pro Ile Leu
20 25 30

Glu Thr Leu Asp Asn Ala Gly Tyr His Ala Leu Glu Met Trp Gly Gly
35 40 45

Ala Thr Phe Asp Ser Cys Leu Arg Phe Leu Asn Glu Asp Pro Trp Glu
50 55 60

Arg Leu Arg Ala Ile Arg Lys Ala Val Lys Lys Thr Lys Leu Gln Met
65 70 75 80

Leu Leu Arg Gly Gln Asn Leu Leu Gly Tyr Arg Asn Tyr Ala Asp Asp
85 90 95

Val Val Arg Ser Phe Ile Gln Lys Ser Ile Glu Asn Gly Ile Asp Ile
100 105 110

Val Arg Ile Phe Asp Ala Leu Asn Asp Pro Arg Asn Leu Gln Thr Ala
115 120 125

Val Ser Ala Thr Lys Lys Phe Gly Gly His Ala Gln Val Ala Ile Ser
130 135 140

Tyr Thr Thr Ser Pro Val His Thr Ile Asp Tyr Phe Val Glu Leu Ala
145 150 155 160

Lys Ala Tyr Gln Ala Ile Gly Ala Asp Ser Ile Cys Ile Lys Asp Met
165 170 175

Ala Gly Val Leu Thr Pro Glu Ile Gly Tyr Gln Leu Val Lys Cys Ile
180 185 190

Lys Glu Asn Thr Thr Ile Pro Leu Glu Val His Thr His Ala Thr Ser
195 200 205

Gly Ile Ser Glu Met Thr Tyr Leu Lys Val Ala Glu Ala Gly Ala Asp
210 215 220

Ile Ile Asp Thr Ala Ile Ser Ser Phe Ser Gly Gly Thr Ser Gln Pro
225 230 235 240

Ala Thr Glu Ser Met Ala Ile Ala Leu Thr Asp Leu Gly Phe Asp Thr
245 250 255

Gly Leu Asp Met Gln Glu Val Ala Lys Val Ala Glu Tyr Phe Asn Thr
260 265 270

Ile Arg Asp His Tyr Arg Glu Ile Gly Ile Leu Asn Pro Lys Val Lys
275 280 285

Asp Thr Glu Pro Lys Thr Leu Ile Tyr Gln Val Pro Gly Gly Met Leu
290 295 300

Ser Asn Leu Leu Ser Gln Leu Thr Glu Gln Gly Leu Thr Asp Lys Tyr
305 310 315 320

Glu Glu Val Leu Ala Glu Val Pro Lys Val Arg Ala Asp Leu Gly Tyr
325 330 335

Pro Pro Leu Val Thr Pro Leu Ser Gln Met Val Gly Thr Gln Ala Leu
340 345 350

Met Asn Ile Ile Ser Gly Glu Arg Tyr Lys Val Val Pro Asn Glu Ile
355 360 365

Lys Asp Tyr Val Arg Gly Leu Tyr Gly Gln Ser Pro Ala Pro Leu Ala
370 375 380

Glu Gly Ile Lys Glu Lys Ile Ile Gly Asp Glu Ala Val Ile Thr Cys
385 390 395 400

Arg Pro Ala Asp Leu Ile Glu Pro Gln Met Ile Tyr Leu Arg Asp Glu
405 410 415

Ile Ala Pro Tyr Ala His Ser Glu Glu Asp Val Leu Ser Tyr Ala Ser
420 425 430

Phe Pro Gln Gln Ala Arg Asp Phe Leu Gly Arg Arg Glu Asp Pro Phe
435 440 445

Tyr Asp Val Pro Val Gln Glu Val Thr Val Gln Leu Asp Ile Gln Asp
450 455 460

<210> 29
<211> 1224
<212> DNA
<213> Streptococcus pyogenes

<400> 29
atgacgaatt taacgtttta tgcaaaaatc ggtatttcag aagaagagca tgactctttt 60
gttaaagaac atcagcaaat tagcgtttta caaggtagtg attgggcaaa aatcaaaaat 120
caatggcaga atgagcgaat tggtatctat aaagaggaaa agcaggttgc ctctttatca 180
cttttgatta agctattgcc acttggaaga agcattattt atattccaag agggccagtc 240
atggattatc ttgaccgtga tttggtggca tttaccatga aaacactaaa ggattatggt 300
aaaactaaaa aggccctctt tatcaaatat gatccagcta tcctgttaaa acaatacgca 360
ctgggacagg aagaagaaga aaaaccttta gctttagcag ctattaagaa tctccaagaa 420
gctggtgttc attggactgg tttaacaatg gagattgcag atagtatcca acctcgtttc 480
caagctaata tttacactca agaaaacctt gagatgcaat ttcctaagca taccagacgt 540
ttaataaaag atgctaagca gcgtggtgta aaaacatatc gtgtcagtca atcagaactt 600
cacaaatttt ccaagattgt ctccttaaca gaaaaacgta aaaatatttc tttgcgtaac 660
gaagcttact ttcaaaagtt gatgactact tatggggata aggcctactt acatctagca 720
aaagtgaata ttcctcaaaa actagatcaa taccgccagc aattaattct tattaaccaa 780
gatattactc gcacccaagc tcatcaaaag aagcgtttaa aaaaattaga agatcaaaaa 840
gcttctttag aacgttatat aactgaattt gaaggcttta cagaccaata tcctgaggaa 900
gttgttgtag caggtatatt atctatttct tatggaaatg ttatggaaat gctttatgct 960
gggatgaatg atgattttaa gaagttttat cctcagtatc tgctgtatcc taatgttttt 1020
caggatgctt atcaagatgg tattatttgg gctaacatgg gaggagtaga aggctcgctt 1080
gatgatggac ttaccaaatt taaggccaac tttgctccga caatagaaga atttatagga 1140
gaatttaatc tccctgtcag cccactttat catattgcta ataccatgta caaaatacga 1200
aaacagttaa agaataaaca ttaa 1224

<210> 30
<211> 407
<212> PRT
<213> Streptococcus pyogenes

<400> 30

Met Thr Asn Leu Thr Phe Tyr Ala Lys Ile Gly Ile Ser Glu Glu Glu
1 5 10 15

His Asp Ser Phe Val Lys Glu His Gln Gln Ile Ser Val Leu Gln Gly
20 25 30

Ser Asp Trp Ala Lys Ile Lys Asn Gln Trp Gln Asn Glu Arg Ile Gly
35 40 45

Ile Tyr Lys Glu Glu Lys Gln Val Ala Ser Leu Ser Leu Leu Ile Lys
50 55 60

Leu Leu Pro Leu Gly Arg Ser Ile Ile Tyr Ile Pro Arg Gly Pro Val
65 70 75 80

Met Asp Tyr Leu Asp Arg Asp Leu Val Ala Phe Thr Met Lys Thr Leu
85 90 95

Lys Asp Tyr Gly Lys Thr Lys Lys Ala Leu Phe Ile Lys Tyr Asp Pro
100 105 110

Ala Ile Leu Leu Lys Gln Tyr Ala Leu Gly Gln Glu Glu Glu Glu Lys
115 120 125

Pro Leu Ala Leu Ala Ala Ile Lys Asn Leu Gln Glu Ala Gly Val His
130 135 140

Trp Thr Gly Leu Thr Met Glu Ile Ala Asp Ser Ile Gln Pro Arg Phe
145 150 155 160

Gln Ala Asn Ile Tyr Thr Gln Glu Asn Leu Glu Met Gln Phe Pro Lys
165 170 175

His Thr Arg Arg Leu Ile Lys Asp Ala Lys Gln Arg Gly Val Lys Thr
180 185 190

Tyr Arg Val Ser Gln Ser Glu Leu His Lys Phe Ser Lys Ile Val Ser
195 200 205

Leu Thr Glu Lys Arg Lys Asn Ile Ser Leu Arg Asn Glu Ala Tyr Phe
210 215 220

Gln Lys Leu Met Thr Thr Tyr Gly Asp Lys Ala Tyr Leu His Leu Ala
225 230 235 240

Lys Val Asn Ile Pro Gln Lys Leu Asp Gln Tyr Arg Gln Gln Leu Ile

245 250 255

Leu Ile Asn Gln Asp Ile Thr Arg Thr Gln Ala His Gln Lys Lys Arg
260 265 270

Leu Lys Lys Leu Glu Asp Gln Lys Ala Ser Leu Glu Arg Tyr Ile Thr
275 280 285

Glu Phe Glu Gly Phe Thr Asp Gln Tyr Pro Glu Glu Val Val Val Ala
290 295 300

Gly Ile Leu Ser Ile Ser Tyr Gly Asn Val Met Glu Met Leu Tyr Ala
305 310 315 320

Gly Met Asn Asp Asp Phe Lys Lys Phe Tyr Pro Gln Tyr Leu Leu Tyr
325 330 335

Pro Asn Val Phe Gln Asp Ala Tyr Gln Asp Gly Ile Ile Trp Ala Asn
340 345 350

Met Gly Gly Val Glu Gly Ser Leu Asp Asp Gly Leu Thr Lys Phe Lys
355 360 365

Ala Asn Phe Ala Pro Thr Ile Glu Glu Phe Ile Gly Glu Phe Asn Leu
370 375 380

Pro Val Ser Pro Leu Tyr His Ile Ala Asn Thr Met Tyr Lys Ile Arg
385 390 395 400

Lys Gln Leu Lys Asn Lys His
405

<210> 31
<211> 483
<212> DNA
<213> Streptococcus pyogenes

<400> 31
atgccaaaga gaataagaaa agctctagga gtagttggga aactgatgtc aattgttcct 60
gacactactg aaattattgg aaaaacgatt gataacagtc gaccaattat cgaaaaacgt 120
atggaacaaa aacatgaaaa agagatgcaa ttacgcacga taaatgatgt gattaatctt 180
cctgttgatc aggcacaagc tcatttggaa caacttggct ttgtagtagc cactatacct 240
gctaagcctc ataaaaaatg gcttcatagt aatctcaatg aagtggttgc tatgtctcca 300
aaatctggta aatataagat aggaagcctg atcaaactct actacattac tgttgatgtt 360
ttggaaaaaa gtcaagactt attagaccaa gaaaacttgc ggactgtgga acgcaatcaa 420
aaaatcgctg atacttttga gtctgtcaaa cacattcgat ttccttttaa aaaatggcgt 480

taa

<210> 32
<211> 160
<212> PRT
<213> Streptococcus pyogenes

<400> 32
Met Pro Lys Arg Ile Arg Lys Ala Leu Gly Val Val Gly Lys Leu Met
1 5 10 15

Ser Ile Val Pro Asp Thr Thr Glu Ile Ile Gly Lys Thr Ile Asp Asn
20 25 30

Ser Arg Pro Ile Ile Glu Lys Arg Met Glu Gln Lys His Glu Lys Glu
35 40 45

Met Gln Leu Arg Thr Ile Asn Asp Val Ile Asn Leu Pro Val Asp Gln
50 55 60

Ala Gln Ala His Leu Glu Gln Leu Gly Phe Val Val Ala Thr Ile Pro
65 70 75 80

Ala Lys Pro His Lys Lys Trp Leu His Ser Asn Leu Asn Glu Val Val
85 90 95

Ala Met Ser Pro Lys Ser Gly Lys Tyr Lys Ile Gly Ser Leu Ile Lys
100 105 110

Leu Tyr Tyr Ile Thr Val Asp Val Leu Glu Lys Ser Gln Asp Leu Leu
115 120 125

Asp Gln Glu Asn Leu Arg Thr Val Glu Arg Asn Gln Lys Ile Ala Asp
130 135 140

Thr Phe Glu Ser Val Lys His Ile Arg Phe Pro Phe Lys Lys Trp Arg
145 150 155 160

<210> 33
<211> 1345
<212> DNA
<213> Streptococcus pyogenes

<400> 33
atgatgttaa cgaaggggca acttccctat agtgctgctt ttacaacagg agggctcttt 60
tactttgtta tcattgcatt aagttattat ttgggatcga cactttggct agtctttgtt 120
caggtgtttt gtttttactt atctggttta tatctttata aactcattaa ttatatgaca 180
ggctttcaaa aagtggcttt aacttttca attagctact atttattatc tgttagtctt 240
ggttttgggg gattgtatcc tactcaactg gctatgccat ttatattaat atcggcttgg 300
tttttaacta agtattttgc ctgtttagtg aaagatgagg catttattct ttttggcttt 360
gtaggtgctc ttgcaatgct aattgacccg agtaccctta tcttttggtc ttttgcttgt 420
gtgacagttt tttcttataa tataagccaa aagcatcttg caagaggttt ttatcaactg 480
ctagcttcga tttttggaat gattttagtt ttttacacag caggatattt cattttgaac 540
ttacaagtgc taaatcctta tttatcacaa acgatgattt atccttttac tttttttaaa 600
tcaggaaact tatcgttgct ttttggactg gctattcagt tgttcttcgc tttggggctt 660
ggtcttttga cgggaatgga gaatgtcatt aggcgattta aaaacaattc tgatagggtc 720
gtcaagtggc tatttgtcat ggtcattcta gaatctatac ttgtggctat attttcacaa 780
gactatcgcc cctatcatct tttacctctt ttacctttg gattaatttt gactgctatt 840
cctgttggct atcagtatgg tataggatta ggtcagagta gtcatcgcag acgtcatggt 900
aaaaatggtg ttggtcgagt aatgatgatt tatcttaaga gacactttta tttgccaatt 960
ttaattgtag ggacaatact aatctgttct acttattgtt tcattagtag tattcctctt 1020
aatcaggagc gtgatcatat tgctagttat ttagaacaga aactaaataa aactcaatct 1080
atttatgttt gggatgatac ttctaaaatt tatttggaca gtaaagctaa atctgtttct 1140
caatttagtt ctcctgacat caatacgcaa aaagagagtc atcgaaaaat attagaagat 1200
gaactattag aaaataaggc tgcttatatc gttgttaatc gctataaaaa cctgcctaaa 1260
atcattcaaa aagtattatc tactaattac aaagtagata aacagataac gacaaaaagt 1320
tttattgttt atcagaaaaa gtaat 1345

<210> 34
<211> 447
<212> PRT
<213> Streptococcus pyogenes

<400> 34
Met Met Leu Thr Lys Gly Gln Leu Pro Tyr Ser Ala Ala Phe Thr Thr
1 5 10 15

Gly Gly Leu Phe Tyr Phe Val Ile Ile Ala Leu Ser Tyr Tyr Leu Gly
20 25 30

Ser Thr Leu Trp Leu Val Phe Val Gln Val Phe Cys Phe Tyr Leu Ser
35 40 45

Gly Leu Tyr Leu Tyr Lys Leu Ile Asn Tyr Met Thr Gly Phe Gln Lys
50 55 60

Val Ala Leu Thr Phe Ser Ile Ser Tyr Tyr Leu Leu Ser Val Ser Leu
65 70 75 80

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Gly Phe Gly Gly Leu Tyr Pro Thr Gln Leu Ala Met Pro Phe Ile Leu
                85                  90                  95

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

Glu Ala Phe Ile Leu Phe Gly Phe Val Gly Ala Leu Ala Met Leu Ile
        115                 120                 125

Asp Pro Ser Thr Leu Ile Phe Trp Ser Phe Ala Cys Val Thr Val Phe
    130                 135                 140

Ser Tyr Asn Ile Ser Gln Lys His Leu Ala Arg Gly Phe Tyr Gln Leu
145                 150                 155                 160

Leu Ala Ser Ile Phe Gly Met Ile Leu Val Phe Tyr Thr Ala Gly Tyr
                165                 170                 175

Phe Ile Leu Asn Leu Gln Val Leu Asn Pro Tyr Leu Ser Gln Thr Met
            180                 185                 190

Ile Tyr Pro Phe Thr Phe Phe Lys Ser Gly Asn Leu Ser Leu Leu Phe
        195                 200                 205

Gly Leu Ala Ile Gln Leu Phe Phe Ala Leu Gly Leu Gly Leu Leu Thr
    210                 215                 220

Gly Met Glu Asn Val Ile Arg Arg Phe Lys Asn Asn Ser Asp Arg Val
225                 230                 235                 240

Val Lys Trp Leu Phe Val Met Val Ile Leu Glu Ser Ile Leu Val Ala
                245                 250                 255

Ile Phe Ser Gln Asp Tyr Arg Pro Tyr His Leu Leu Pro Leu Leu Pro
            260                 265                 270

Phe Gly Leu Ile Leu Thr Ala Ile Pro Val Gly Tyr Gln Tyr Gly Ile
        275                 280                 285

Gly Leu Gly Gln Ser Ser His Arg Arg Arg His Gly Lys Asn Gly Val
    290                 295                 300

Gly Arg Val Met Met Ile Tyr Leu Lys Arg His Phe Tyr Leu Pro Ile
305                 310                 315                 320

Leu Ile Val Gly Thr Ile Leu Ile Cys Ser Thr Tyr Cys Phe Ile Ser
                325                 330                 335
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Ser Ile Pro Leu Asn Gln Glu Arg Asp His Ile Ala Ser Tyr Leu Glu
340 345 350

Gln Lys Leu Asn Lys Thr Gln Ser Ile Tyr Val Trp Asp Asp Thr Ser
355 360 365

Lys Ile Tyr Leu Asp Ser Lys Ala Lys Ser Val Ser Gln Phe Ser Ser
370 375 380

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

Glu Leu Leu Glu Asn Lys Ala Ala Tyr Ile Val Val Asn Arg Tyr Lys
405 410 415

Asn Leu Pro Lys Ile Ile Gln Lys Val Leu Ser Thr Asn Tyr Lys Val
420 425 430

Asp Lys Gln Ile Thr Thr Lys Ser Phe Ile Val Tyr Gln Lys Lys
435 440 445

<210> 35
<211> 618
<212> DNA
<213> Streptococcus pyogenes

<400> 35
atgattaaag ctcagctaaa gaatctaata aaaacaattc atctcgtaaa agaggctggt 60
ttctccctaa atggttcatt gtacatggag ttattgcatg attttacgca tgatgagtta 120
gtacataacc ctataatcga aagtacggtt gatacaattc agtcagttga atttgaaagg 180
gtttcttttt catataatgg taaggataat gtaataaacg atataagttt ttcaattaaa 240
gcaggagaga ggttagcaat tgttggtgga aatggttctg gaaaaagtac gattttcaaa 300
ttagcctgcg gtctttacga taattatgaa ggcaatatat atataaatgg tattaatctt 360
tgttcaatac agaaaaagtc atactacaag agaatatccg cattgttcca agatttttta 420
aagtatgaat tgacactgcg tgaaaatgtt ggattgggtg aattatcaaa gttatatagt 480
gatgagtctt ataatacttc atttttttacc acatcatggg attcagagaa tgaactgcga 540
ttggaggata tttatataag atatagtgat ggtaagtttc attttacaac tatcgatgaa 600
tcgattaaac gggattaa 618

<210> 36
<211> 205
<212> PRT
<213> Streptococcus pyogenes

<400> 36

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Met Ile Lys Ala Gln Leu Lys Asn Leu Ile Lys Thr Ile His Leu Val
 1               5                  10                  15

Lys Glu Ala Gly Phe Ser Leu Asn Gly Ser Leu Tyr Met Glu Leu Leu
            20                  25                  30

His Asp Phe Thr His Asp Glu Leu Val His Asn Pro Ile Ile Glu Ser
        35                  40                  45

Thr Val Asp Thr Ile Gln Ser Val Glu Phe Glu Arg Val Ser Phe Ser
    50                  55                  60

Tyr Asn Gly Lys Asp Asn Val Ile Asn Asp Ile Ser Phe Ser Ile Lys
65                  70                  75                  80

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

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

Ile Tyr Ile Asn Gly Ile Asn Leu Cys Ser Ile Gln Lys Lys Ser Tyr
        115                 120                 125

Tyr Lys Arg Ile Ser Ala Leu Phe Gln Asp Phe Leu Lys Tyr Glu Leu
    130                 135                 140

Thr Leu Arg Glu Asn Val Gly Leu Gly Glu Leu Ser Lys Leu Tyr Ser
145                 150                 155                 160

Asp Glu Ser Tyr Asn Thr Ser Phe Phe Thr Thr Ser Trp Asp Ser Glu
                165                 170                 175

Asn Glu Leu Arg Leu Glu Asp Ile Tyr Ile Arg Tyr Ser Asp Gly Lys
            180                 185                 190

Phe His Phe Thr Thr Ile Asp Glu Ser Ile Lys Arg Asp
        195                 200                 205
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<210> 37
<211> 1434
<212> DNA
<213> Streptococcus pyogenes

<400> 37
atgctaagaa aaaagagaat tttgggttta tttcgacttg ttgaattaat tttcctagga 60

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ttattgttga gtttagttgt ttcgtacctt gcgtggacca atagttttgc aacacttcat 120
aatatattag caactgtcgg aatagtggaa cgaagcaaag atcaacagcc tcgctatcac 180
attggacaag ctattcaagt acaaaaaagt ggtccatatc atcaatggat tggaactatt 240
aataaacagg tagaagatat agccgaaaat taccgagtga gttatcatta tgaagtggta 300
tttccaatag gaaaagtcac tgtttctttg ccagaacata acctgaaaga gcctgataaa 360
ccgaggttta aaaaaggaga tatcgttaaa ttatcttcat taactaaaaa gccacatata 420
aaagtatatc aaggtcaatt agcgactatt aaacaagtta aaaaatgcta tgactattcg 480
ttaggaggat atcagtacga tattaatctg aaagataatc taagattaga tggaatttca 540
gagcaagatt ttgttaaacc ttattatatt aggttcaata aaggaaattc ccctgagcaa 600
aacaatcgtc ttttgcgaaa agctttcgct tatgcaaagc agcatccaaa tagcgttata 660
tcttttccaa aggggcaatt tcacattggc tctttgcctt cacaaaaaga ttattttgag 720
cttccatctg atacagctat tattggtcat cagacagagt tcattattca cggtaaaatg 780
ttgtggtttg gattccctac aggaccaaag gctgaacaag gtgttcgtaa tctcgtgttg 840
actggagtgc atttcaaagc aaatgatttg aaaaaaggag accactttat gattatggct 900
gatcatggta ctgattggca tatttacgat aacaaattta ctatggttca taagcgtaat 960
agtcatattt ttgatttagg atctctacaa aattcattgt ttgagaaaaa ccaatttatt 1020
ggctatgcgc cagaattagt acaagaccaa cagctgctat caaaggctca agggcatgat 1080
ttttttttcag aagtcattca gtttgatgct gctgttcatc attttgcatg ggatggaggt 1140
ctacttagta atattgctcc aaactatgaa gcatttaacc aaactcgaca tctatgtcac 1200
aatattactg taagccaaaa tcaattttta ccttatatag atccgactgg ttgcctgaga 1260
gcctatagtg gttctattgg tcagcattcc tcaaaagtag gagttattag ggttttaaat 1320
aatgttttta cctcatccat tgttactaaa gcgaagctca ctagttggtt tatggaacct 1380
attcattttc caccaaattc accggttatt gtcgcaggta atatcattaa ttga       1434
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<210> 38
<211> 477
<212> PRT
<213> Streptococcus pyogenes

<400> 38

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

Ile Phe Leu Gly Leu Leu Leu Ser Leu Val Val Ser Tyr Leu Ala Trp
             20                  25                  30

Thr Asn Ser Phe Ala Thr Leu His Asn Ile Leu Ala Thr Val Gly Ile
         35                  40                  45

Val Glu Arg Ser Lys Asp Gln Gln Pro Arg Tyr His Ile Gly Gln Ala
     50                  55                  60

Ile Gln Val Gln Lys Ser Gly Pro Tyr His Gln Trp Ile Gly Thr Ile
 65                  70                  75                  80

Asn Lys Gln Val Glu Asp Ile Ala Glu Asn Tyr Arg Val Ser Tyr His
                 85                  90                  95
```

```
Tyr Glu Val Val Phe Pro Ile Gly Lys Val Thr Val Ser Leu Pro Glu
            100                 105                 110

His Asn Leu Lys Glu Pro Asp Lys Pro Arg Phe Lys Lys Gly Asp Ile
        115                 120                 125

Val Lys Leu Ser Ser Leu Thr Lys Lys Pro His Ile Lys Val Tyr Gln
    130                 135                 140

Gly Gln Leu Ala Thr Ile Lys Gln Val Lys Lys Cys Tyr Asp Tyr Ser
145                 150                 155                 160

Leu Gly Gly Tyr Gln Tyr Asp Ile Asn Leu Lys Asp Asn Leu Arg Leu
                165                 170                 175

Asp Gly Ile Ser Glu Gln Asp Phe Val Lys Pro Tyr Tyr Ile Arg Phe
            180                 185                 190

Asn Lys Gly Asn Ser Pro Glu Gln Asn Asn Arg Leu Leu Arg Lys Ala
        195                 200                 205

Phe Ala Tyr Ala Lys Gln His Pro Asn Ser Val Ile Ser Phe Pro Lys
    210                 215                 220

Gly Gln Phe His Ile Gly Ser Leu Pro Ser Gln Lys Asp Tyr Phe Glu
225                 230                 235                 240

Leu Pro Ser Asp Thr Ala Ile Ile Gly His Gln Thr Glu Phe Ile Ile
                245                 250                 255

His Gly Lys Met Leu Trp Phe Gly Phe Pro Thr Gly Pro Lys Ala Glu
            260                 265                 270

Gln Gly Val Arg Asn Leu Val Leu Thr Gly Val His Phe Lys Ala Asn
        275                 280                 285

Asp Leu Lys Lys Gly Asp His Phe Met Ile Met Ala Asp His Gly Thr
    290                 295                 300

Asp Trp His Ile Tyr Asp Asn Lys Phe Thr Met Val His Lys Arg Asn
305                 310                 315                 320

Ser His Ile Phe Asp Leu Gly Ser Leu Gln Asn Ser Leu Phe Glu Lys
                325                 330                 335

Asn Gln Phe Ile Gly Tyr Ala Pro Glu Leu Val Gln Asp Gln Gln Leu
            340                 345                 350
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Leu Ser Lys Ala Gln Gly His Asp Phe Phe Ser Glu Val Ile Gln Phe
355 360 365

Asp Ala Ala Val His His Phe Ala Trp Asp Gly Gly Leu Leu Ser Asn
370 375 380

Ile Ala Pro Asn Tyr Glu Ala Phe Asn Gln Thr Arg His Leu Cys His
385 390 395 400

Asn Ile Thr Val Ser Gln Asn Gln Phe Leu Pro Tyr Ile Asp Pro Thr
405 410 415

Gly Cys Leu Arg Ala Tyr Ser Gly Ser Ile Gly Gln His Ser Ser Lys
420 425 430

Val Gly Val Ile Arg Val Leu Asn Asn Val Phe Thr Ser Ser Ile Val
435 440 445

Thr Lys Ala Lys Leu Thr Ser Trp Phe Met Glu Pro Ile His Phe Pro
450 455 460

Pro Asn Ser Pro Val Ile Val Ala Gly Asn Ile Ile Asn
465 470 475

<210> 39
<211> 1020
<212> DNA
<213> Streptococcus pyogenes

<400> 39
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<210> 40
<211> 339
<212> PRT
<213> Streptococcus pyogenes

<400> 40

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

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Leu Asp Gly Ala Thr Ile Val Lys Leu Thr Arg Thr Leu Ala Ile Leu
    210                 215                 220

Pro Ile Thr Leu Gly Leu Ser Leu Tyr Arg Ala Lys Lys Glu His Asp
225                 230                 235                 240

Ile Val Thr Glu Glu Asn Phe Ser Leu Arg Lys Ser Phe Pro Arg Phe
                245                 250                 255

Ile Leu Phe Phe Leu Leu Ala Ser Leu Ile Thr Thr Leu Met Thr Ser
            260                 265                 270

Leu Gly Val Ser Ala Asp Ser Phe His Tyr Leu Lys Thr Leu Ser Lys
        275                 280                 285

Phe Phe Ile Val Met Ala Met Ala Ala Ile Gly Leu Asn Thr Asn Leu
    290                 295                 300

Val Lys Leu Ile Lys Thr Gly Gly Gln Ala Ile Leu Leu Gly Ala Ile
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Cys Trp Val Ala Ile Thr Leu Val Ser Leu Ala Met Gln Leu Ser Leu
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Gly Ile Trp
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<211> 2637
<212> DNA
<213> Streptococcus pyogenes

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<210> 42
<211> 878
<212> PRT
<213> Streptococcus pyogenes

<400> 42
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Ser Lys Gly Arg Phe Ile Ser Leu Phe Phe Leu Met Ala Leu Gly Ser
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Phe Ala Leu Val Gly Leu Lys Val Thr Gly Pro Asp Met Glu Arg Thr
35 40 45

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Ala Ser Arg Tyr Leu Glu Arg His Gln Val Met Asp Leu Thr Val Leu
     50                  55                  60

Ala Ser His Gln Phe Ser Gln Ala Asp Lys Gln Glu Leu Asp Thr Leu
 65                  70                  75                  80

Lys Gly Ala His Leu Glu Tyr Gly His Leu Leu Asp Val Ser Leu Thr
                 85                  90                  95

Ser Asn Gln Lys Ser Leu Arg Leu Tyr Ser Val Pro Lys Lys Val Ser
            100                 105                 110

Lys Pro Val Leu Val Lys Gly Ser Trp Pro Lys Arg Glu Thr Asp Leu
        115                 120                 125

Val Leu Ser Ser Ser Leu Ala Lys Asn Tyr Gln Ile Gly Asp Glu Leu
    130                 135                 140

Ala Val Thr Ser Pro Met Glu Gly Leu Leu Thr Thr Thr His Phe Gln
145                 150                 155                 160

Val Val Gly Phe Ala Asn Ser Ser Glu Val Trp Ser Lys Ser Asn Leu
                165                 170                 175

Gly Ser Ser Ser Thr Gly Asp Gly Ser Leu Tyr Ala Tyr Ala Phe Val
            180                 185                 190

Asn Pro Asn Val Phe Lys Ser Ala Phe Asn Leu Leu Arg Ile Arg Phe
        195                 200                 205

Ser His Leu Arg Leu Thr Asn Ala Phe Ser Lys Asp Tyr Gln Lys Arg
    210                 215                 220

Val Thr Gln Asn Gln Ala His Leu Asp Asn Leu Leu Lys Asp Asn Gly
225                 230                 235                 240

Gln Lys Arg Tyr Asp Asp Leu Gln Asn Gln Tyr Asp Leu Ala Leu Lys
                245                 250                 255

Asn Gly Arg Ala Ala Leu Ala Lys Glu Thr Val Lys Leu Ala Ala Ser
            260                 265                 270

Glu Glu Asn Leu Thr Phe Leu Glu Gly Ser Ala Leu Gln Glu Ala Lys
        275                 280                 285

His Gln Ile Glu Gln Gly Lys Gln Ala Leu Ala Lys Glu Glu Lys Gln
    290                 295                 300
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Leu Glu Gln Val Gln Ala Thr Lys Asp Lys Leu Glu Lys Pro Ser Tyr
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Leu Thr Tyr Asn Arg Ser Thr Leu Pro Gly Gly Glu Gly Tyr His Thr
325 330 335

Tyr Ala Thr Ser Thr Thr Ser Ile Ser Asn Val Gly Asn Ile Phe Pro
340 345 350

Val Val Leu Tyr Leu Val Ala Ala Leu Val Ala Phe Thr Thr Met Thr
355 360 365

Arg Tyr Val Asp Glu Glu Arg Thr Ser Ser Gly Leu Leu Lys Ala Ile
370 375 380

Gly Tyr Ser Asn Lys Asp Ile Ser Leu Lys Phe Leu Ile Tyr Gly Leu
385 390 395 400

Leu Ala Ser Phe Leu Gly Thr Thr Leu Gly Ile Ile Gly Gly Thr Tyr
405 410 415

Leu Leu Ser Thr Leu Ile Ser Glu Ile Leu Thr Gly Ala Leu Thr Ile
420 425 430

Gly Lys Thr His Leu Tyr Ser Tyr Trp Phe Tyr Asn Gly Ile Ala Tyr
435 440 445

Leu Leu Ala Met Leu Ser Ala Val Leu Pro Ala Tyr Leu Ile Val Lys
450 455 460

Lys Glu Leu Phe Leu Asn Ala Ala Gln Leu Leu Leu Pro Lys Pro Pro
465 470 475 480

Ser Lys Gly Ala Lys Ile Trp Leu Glu His Leu Thr Phe Val Trp Lys
485 490 495

Ala Leu Ser Phe Thr His Lys Val Thr Ile Arg Asn Ile Phe Arg Tyr
500 505 510

Lys Gln Arg Met Leu Met Thr Ile Val Gly Val Ala Gly Ser Val Ala
515 520 525

Leu Leu Phe Ala Gly Leu Gly Ile Gln Ser Ser Leu Ala Lys Val Val
530 535 540

Glu His Gln Phe Gly Asp Leu Thr Thr Tyr Asp Ile Leu Ala Val Gly
545 550 555 560

Ser Ala Lys Ala Thr Ala Thr Glu Gln Thr Asp Leu Ala Ser Tyr Leu
565 570 575

Lys Gln Glu Pro Ile Thr Gly Tyr Gln Lys Val Ser Tyr Ala Ser Leu
580 585 590

Thr Leu Pro Val Lys Gly Leu Pro Asp Lys Gln Ser Ile Ser Ile Leu
595 600 605

Ser Ser Ser Ala Thr Ser Leu Ser Pro Tyr Phe Asn Leu Leu Asp Ser
610 615 620

Gln Glu Gln Lys Lys Val Pro Ile Pro Thr Ser Gly Val Leu Ile Ser
625 630 635 640

Glu Lys Leu Ala Ser Tyr Tyr Lys Val Lys Pro Gly Asp Gln Leu Val
645 650 655

Leu Thr Asp Arg Lys Gly Gln Ser Tyr Lys Val Thr Ile Lys Gln Val
660 665 670

Ile Asp Met Thr Val Gly His Tyr Leu Ile Met Ser Asp Thr Tyr Phe
675 680 685

Lys Asn His Phe Lys Gly Leu Glu Ala Ala Pro Ala Tyr Leu Ile Lys
690 695 700

Val Lys Asp Lys Asp Ser Lys His Ile Lys Glu Thr Ala Ser Asp Leu
705 710 715 720

Leu Thr Leu Lys Ala Ile Arg Ala Val Ser Gln Asn Val Asn His Ile
725 730 735

Lys Ser Val Gln Leu Val Val Thr Ser Leu Asn Gln Val Met Thr Leu
740 745 750

Leu Val Phe Leu Ser Ile Leu Leu Ala Ile Val Ile Leu Tyr Asn Leu
755 760 765

Thr Thr Ile Asn Ile Ala Glu Arg Ile Arg Glu Leu Ser Thr Ile Lys
770 775 780

Val Leu Gly Phe Tyr Asp Gln Glu Val Thr Leu Tyr Ile Tyr Arg Glu
785 790 795 800

Thr Ile Ser Leu Ser Leu Val Gly Ile Leu Leu Gly Ile Tyr Leu Gly
805 810 815

Lys Gly Leu His Thr Tyr Ile Met Thr Met Ile Ser Thr Gly Asp Ile
820 825 830

Gln Phe Gly Val Lys Val Asp Ala Tyr Val Tyr Leu Val Pro Ile Leu
835 840 845

Val Ile Leu Ser Leu Leu Ala Val Leu Gly Ile Trp Val Asn Arg His
850 855 860

Leu Lys Lys Val Asp Met Leu Glu Ala Leu Lys Ser Ile Asp
865 870 875

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<211> 1344
<212> DNA
<213> Streptococcus pyogenes

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<210> 44
<211> 447

<212> PRT
<213> Streptococcus pyogenes

<400> 44

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Gly Gly Leu Phe Tyr Phe Val Ile Ile Ala Leu Ser Tyr Tyr Leu Gly
            20                  25                  30

Ser Thr Leu Trp Leu Val Phe Val Gln Val Phe Cys Phe Tyr Leu Ser
        35                  40                  45

Gly Leu Tyr Leu Tyr Lys Leu Ile Asn Tyr Met Thr Gly Phe Gln Lys
    50                  55                  60

Val Ala Leu Thr Phe Ser Ile Ser Tyr Tyr Leu Leu Ser Val Ser Leu
65                  70                  75                  80

Gly Phe Gly Gly Leu Tyr Pro Thr Gln Leu Ala Met Pro Phe Ile Leu
                85                  90                  95

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

Glu Ala Phe Ile Leu Phe Gly Phe Val Gly Ala Leu Ala Met Leu Ile
        115                 120                 125

Asp Pro Ser Thr Leu Ile Phe Trp Ser Phe Ala Cys Val Thr Val Phe
    130                 135                 140

Ser Tyr Asn Ile Ser Gln Lys His Leu Ala Arg Gly Phe Tyr Gln Leu
145                 150                 155                 160

Leu Ala Ser Ile Phe Gly Met Ile Leu Val Phe Tyr Thr Ala Gly Tyr
                165                 170                 175

Phe Ile Leu Asn Leu Gln Val Leu Asn Pro Tyr Leu Ser Gln Thr Met
            180                 185                 190

Ile Tyr Pro Phe Thr Phe Phe Lys Ser Gly Asn Leu Ser Leu Leu Phe
        195                 200                 205

Gly Leu Ala Ile Gln Leu Phe Phe Ala Leu Gly Leu Gly Leu Leu Thr
    210                 215                 220

Gly Met Glu Asn Val Ile Arg Arg Phe Lys Asn Asn Ser Asp Arg Val
225                 230                 235                 240
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Val Lys Trp Leu Phe Val Met Val Ile Leu Glu Ser Ile Leu Val Ala
                245                 250                 255

Ile Phe Ser Gln Asp Tyr Arg Pro Tyr His Leu Leu Pro Leu Leu Pro
            260                 265                 270

Phe Gly Leu Ile Leu Thr Ala Ile Pro Val Gly Tyr Gln Tyr Gly Ile
        275                 280                 285

Gly Leu Gly Gln Ser Ser His Arg Arg Arg His Gly Lys Asn Gly Val
    290                 295                 300

Gly Arg Val Met Met Ile Tyr Leu Lys Arg His Phe Tyr Leu Pro Ile
305                 310                 315                 320

Leu Ile Val Gly Thr Ile Leu Ile Cys Ser Thr Tyr Cys Phe Ile Ser
                325                 330                 335

Ser Ile Pro Leu Asn Gln Glu Arg Asp His Ile Ala Ser Tyr Leu Glu
            340                 345                 350

Gln Lys Leu Asn Lys Thr Gln Ser Ile Tyr Val Trp Asp Asp Thr Ser
        355                 360                 365

Lys Ile Tyr Leu Asp Ser Lys Ala Lys Ser Val Ser Gln Phe Ser Ser
    370                 375                 380

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

Glu Leu Leu Glu Asn Lys Ala Ala Tyr Ile Val Val Asn Arg Tyr Lys
                405                 410                 415

Asn Leu Pro Lys Ile Ile Gln Lys Val Leu Ser Thr Asn Tyr Lys Val
            420                 425                 430

Asp Lys Gln Ile Thr Thr Lys Ser Phe Ile Val Tyr Gln Lys Lys
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<210> 45
<211> 324
<212> DNA
<213> Streptococcus pyogenes

<400> 45

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<210> 46
<211> 107
<212> PRT
<213> Streptococcus pyogenes

<400> 46
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Lys Glu Ser Ser Pro Leu Ser Thr Glu Ile Glu Pro Ser Glu Asn Trp
20 25 30

Glu Lys Ile Pro Ala Tyr Ile Pro Ala Asp Lys Ser Asp Tyr Lys Lys
35 40 45

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

Gln Phe Lys Val Lys Arg Ile Leu Lys Arg Asn Pro Glu Ala Ile Thr
65 70 75 80

Val Ser Leu Ile Ala Ser Ser Ile Ala Ala Gly Val Tyr Pro Glu Ser
85 90 95

Gln Phe Arg Val Thr Ser Ile Tyr Cys Lys Arg
100 105

<210> 47
<211> 288
<212> DNA
<213> Streptococcus pyogenes

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aacgatagta atgctcttaa agacttagtg cagcgctata gattatgggg gccgtttgtt 180
tttattgtcg tgcagatcat acagattgtt tttcctgtga ttcctggagg ccttacgaca 240
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<210> 48
<211> 95
<212> PRT
<213> Streptococcus pyogenes

<400> 48
Met Thr Lys Arg Asn Ser Lys Ala Tyr Ile Leu Trp Gln Lys Ile Ile
1 5 10 15

Lys Ile Leu Gly Ile Ile Ala Leu Ile Gly Thr Phe Phe Leu Ala Phe
20 25 30

Trp Leu Tyr Arg Leu Gly Ile Leu Asn Asp Ser Asn Ala Leu Lys Asp
35 40 45

Leu Val Gln Arg Tyr Arg Leu Trp Gly Pro Phe Val Phe Ile Val Val
50 55 60

Gln Ile Ile Gln Ile Val Phe Pro Val Ile Pro Gly Gly Leu Thr Thr
65 70 75 80

Val Ala Gly Phe Leu Ile Phe Gly Pro Cys Asn Arg Phe Tyr Leu
85 90 95

<210> 49
<211> 1311
<212> DNA
<213> Streptococcus pyogenes

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caaaattttc atttagataa acgccggttg gggagtattg aaaccaccag tttaatgaat 420
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aagaaaaaga tttttgatcg tttttatcga gttgacaaag ctagaacacg gcaaacaggt 1200
ggatttggct tggggttggc tttagctcag caaatcgtga tgtctttaaa aggaaatatt 1260
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<210> 50
<211> 436
<212> PRT
<213> Streptococcus pyogenes

<400> 50

Met Asn Lys Leu Lys Lys Glu Ile Leu Ser Asp Asn Tyr Asn His Phe
1 5 10 15

Phe His Phe Phe Ala Val Phe Thr Gly Ile Phe Val Ile Met Thr Ile
20 25 30

Ile Ile Leu Gln Ile Met Arg Phe Gly Val Tyr Ser Ser Val Asp Ser
35 40 45

Ser Leu Val Ser Val Ser Asn Asn Ala Ser Ser Tyr Ala Asn Arg Thr
50 55 60

Met Ala Arg Ile Ser Ser Phe Tyr Phe Asp Thr Glu Asn Asn Ile Ile
65 70 75 80

Lys Ala Leu Pro Asp Ser Asp Ser Ser Lys Leu Leu Gly Thr Pro Ala
85 90 95

Ala Asn Thr Asp Ile Ile Leu Phe Ser Ala Asn Gly Thr Ile Leu Asn
100 105 110

Ala Phe Asp Ala Phe Ser Asn Tyr Gln Asn Phe His Leu Asp Lys Arg
115 120 125

Arg Leu Gly Ser Ile Glu Thr Thr Ser Leu Met Asn Phe Tyr Gly Gln
130 135 140

Glu Glu Lys Tyr His Thr Ile Thr Val Gly Val His Ile Lys Asn Tyr
145 150 155 160

Pro Ala Val Ala Tyr Met Met Ala Val Val Asn Val Glu Gln Leu Asp
165 170 175

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Arg Ala Asn Glu Arg Tyr Glu Arg Ile Ile Ile Ile Val Met Ser Val
            180                 185                 190

Phe Trp Leu Ile Ser Ile Leu Ala Ser Ile Tyr Leu Ala Lys Trp Ser
        195                 200                 205

Arg Lys Pro Ile Leu Glu Ser Tyr Glu Lys Gln Lys Met Phe Val Glu
    210                 215                 220

Asn Ala Ser His Glu Leu Arg Thr Pro Leu Ala Val Leu Gln Asn Arg
225                 230                 235                 240

Leu Glu Ser Leu Phe Arg Lys Pro Asn Glu Thr Ile Leu Glu Asn Ser
                245                 250                 255

Glu His Leu Ala Ser Ser Leu Asp Glu Val Arg Asn Met Arg Ile Leu
            260                 265                 270

Thr Thr Asn Leu Leu Asn Leu Ala Arg Arg Asp Asp Gly Ile Asn Pro
        275                 280                 285

Gln Trp Thr His Leu Asp Thr Asp Phe Phe Asn Ala Ile Phe Glu Asn
    290                 295                 300

Tyr Glu Leu Val Ala Lys Glu Tyr Gly Lys Ile Phe Tyr Phe Gln Asn
305                 310                 315                 320

Gln Val Asn Arg Ser Leu Arg Met Asp Lys Ala Leu Leu Lys Gln Leu
                325                 330                 335

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

Ile Ile Glu Ile Ile Val Lys Thr Thr Asp Lys Asn Leu Leu Ile Ser
        355                 360                 365

Val Ile Asp Asn Gly Pro Gly Ile Thr Asp Glu Glu Lys Lys Lys Ile
    370                 375                 380

Phe Asp Arg Phe Tyr Arg Val Asp Lys Ala Arg Thr Arg Gln Thr Gly
385                 390                 395                 400

Gly Phe Gly Leu Gly Leu Ala Leu Ala Gln Gln Ile Val Met Ser Leu
                405                 410                 415

Lys Gly Asn Ile Thr Val Lys Asp Asn Asp Pro Lys Gly Ser Ile Phe
            420                 425                 430
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Glu Val Lys Leu
435

<210> 51
<211> 699
<212> DNA
<213> Streptococcus pyogenes

<400> 51
atgttttctg gacatcaact aaaaacagca cgattatcaa agggaataac tcaatcagaa 60
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ataccaaatg aaaaacattt aaatgcctta ttgcatctat tcaatgtgac atctgattat 180
ttcgacccaa actatagatt gctaacgcct tataaccagc tgacaatatc taataaagaa 240
aaagtaattg gctattcaga gcgattgtta aatcatcaaa tagacaaaaa atctaaagat 300
ctcatagata aaccatcaca attatatgct tatcgggtct atgaaagttt atctgctggt 360
actggttact cctattttgg tgatggtaac tttgatgttg tcttttacga tgaacaatta 420
gaatacgatt ttgcgtcttg ggtttttgga gattctatgg agccaactta tttaaatggt 480
gaagttgttc ttataaaaca aaatagtttt gattacgatg gagcaattta tgcagtcgaa 540
tgggatgggc aaacatatat caaaaaggta tttcgtgaag atgagggatt acgtctagtg 600
tccttaaata aaaaatattc tgataagttt gctccctata gcgaagaacc tcgcattatt 660
ggcaaaatta tcgctaattt taggcccta gaaatttaa 699

<210> 52
<211> 232
<212> PRT
<213> Streptococcus pyogenes

<400> 52
Met Phe Ser Gly His Gln Leu Lys Thr Ala Arg Leu Ser Lys Gly Ile
1 5 10 15

Thr Gln Ser Glu Leu Gly Arg Leu Leu His Val Asn Lys Met Thr Ile
20 25 30

Ser Asn Trp Glu Lys Gly Lys Asn Ile Pro Asn Glu Lys His Leu Asn
35 40 45

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

Tyr Arg Leu Leu Thr Pro Tyr Asn Gln Leu Thr Ile Ser Asn Lys Glu
65 70 75 80

Lys Val Ile Gly Tyr Ser Glu Arg Leu Leu Asn His Gln Ile Asp Lys

85 90 95

Lys Ser Lys Asp Leu Ile Asp Lys Pro Ser Gln Leu Tyr Ala Tyr Arg
100 105 110

Val Tyr Glu Ser Leu Ser Ala Gly Thr Gly Tyr Ser Tyr Phe Gly Asp
115 120 125

Gly Asn Phe Asp Val Val Phe Tyr Asp Glu Gln Leu Glu Tyr Asp Phe
130 135 140

Ala Ser Trp Val Phe Gly Asp Ser Met Glu Pro Thr Tyr Leu Asn Gly
145 150 155 160

Glu Val Val Leu Ile Lys Gln Asn Ser Phe Asp Tyr Asp Gly Ala Ile
165 170 175

Tyr Ala Val Glu Trp Asp Gly Gln Thr Tyr Ile Lys Lys Val Phe Arg
180 185 190

Glu Asp Glu Gly Leu Arg Leu Val Ser Leu Asn Lys Lys Tyr Ser Asp
195 200 205

Lys Phe Ala Pro Tyr Ser Glu Glu Pro Arg Ile Ile Gly Lys Ile Ile
210 215 220

Ala Asn Phe Arg Pro Leu Glu Ile
225 230

<210> 53
<211> 1497
<212> DNA
<213> Streptococcus pyogenes

<400> 53
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agatgtcatt cccgaagagg tattagtgac ttgtctcaat caactgcaac ttatattaat 180
gttattggag ctgggctagc tggttctgaa gctgcctatc agattgctaa gcgcggtatc 240
cccgttaaat tgtatgaaat gcgtggtgtc aaagcaacac cgcaacataa aaccactaat 300
tttgccgaat tggtctgttc caactcattt cgtggtgata gcttaaccaa tgcagtcggt 360
cttctcaaag aagaaatgcg gcgattagac tccattatta tgcgtaatgg tgaagctaac 420
cgcgtacctg ctgggggagc aatggctgtt gaccgtgagg ggtatgcaga gagtgtcact 480
gcagagttgg aaaatcatcc tctcattgag gtcattcgtg gtgaaattac agaaatccct 540
gacgatgcta tcacggttat cgcgacggga ccgctgactt cggatgccct ggcagaaaaa 600
attcacgcgc taaatggtgg cgacggattc tatttttacg atgcagcagc gcctatcatt 660

gataaatcta ccattgatat gagcaaggtt taccttaaat ctcgctacga taaaggcgaa 720
gctgcttacc tcaactgccc tatgaccaaa gaagaattca tggctttcca tgaagctctg 780
acaaccgcag aagaagcccc gctgaatgcc tttgaaaaag aaaagtattt tgaaggctgt 840
atgccgattg aagttatggc taaacgtggc attaaaacca tgctttatgg acctatgaaa 900
cccgttggat tggaatatcc agatgactat acaggtcctc gcgatggaga atttaaaacg 960
ccatatgccg tcgtgcaatt gcgtcaagat aatgcagctg gaagccttta taatatcgtt 1020
ggtttccaaa cccatctcaa atggggtgag caaaaacgcg ttttccaaat gattccaggg 1080
cttgaaaatg ctgagtttgt ccgctacggc gtcatgcatc gcaattccta tatggattca 1140
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cagatgactg gagttgaagg ttatgtcgaa tcagctgctt caggtttagt agcaggaatc 1260
aatgctgctc gtttgttcaa aagagaagaa gcacttattt ttcctcagac aacagctatt 1320
gggagtttgc ctcattatgt gactcatgcc gacagtaagc atttccaacc aatgaacgtc 1380
aactttggca tcatcaaaga gttagaaggc ccacgcattc gtgacaaaaa agaacgttat 1440
gaagctattg ctagtcgtgc tttggcagat ttagacacct gcttagcgtc gctttaa 1497

<210> 54
<211> 498
<212> PRT
<213> Streptococcus pyogenes

<400> 54

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

Phe Phe Leu Leu Ile Ser Val Ile Ile Ser Gln Val Thr Thr Leu Glu
20 25 30

Arg Phe Val Gly Leu Ser Ser Lys Arg Cys His Ser Arg Arg Gly Ile
35 40 45

Ser Asp Leu Ser Gln Ser Thr Ala Thr Tyr Ile Asn Val Ile Gly Ala
50 55 60

Gly Leu Ala Gly Ser Glu Ala Ala Tyr Gln Asn Ala Lys Arg Gly Ile
65 70 75 80

Pro Val Lys Leu Tyr Glu Met Arg Gly Val Lys Ala Thr Pro Gln His
85 90 95

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

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

Leu Asp Ser Ile Ile Met Arg Asn Gly Glu Ala Asn Arg Val Pro Ala
130 135 140

Gly Gly Ala Met Ala Val Asp Arg Glu Gly Tyr Ala Glu Ser Val Thr
145 150 155 160

Ala Glu Leu Glu Asn His Pro Leu Ile Glu Val Ile Arg Gly Glu Ile
165 170 175

Thr Glu Ile Pro Asp Asp Ala Ile Thr Val Ile Ala Thr Gly Pro Leu
180 185 190

Thr Ser Asp Ala Leu Ala Glu Lys Ile His Ala Leu Asn Gly Gly Asp
195 200 205

Gly Phe Tyr Phe Tyr Asp Ala Ala Ala Pro Ile Ile Asp Lys Ser Thr
210 215 220

Ile Asp Met Ser Lys Val Tyr Leu Lys Ser Arg Tyr Asp Lys Gly Glu
225 230 235 240

Ala Ala Tyr Leu Asn Cys Pro Met Thr Lys Glu Glu Phe Met Ala Phe
245 250 255

His Glu Ala Leu Thr Thr Ala Glu Glu Ala Pro Leu Asn Ala Phe Glu
260 265 270

Lys Glu Lys Tyr Phe Glu Gly Cys Met Pro Ile Glu Val Met Ala Lys
275 280 285

Arg Gly Ile Lys Thr Met Leu Tyr Gly Pro Met Lys Pro Val Gly Leu
290 295 300

Glu Tyr Pro Asp Asp Tyr Thr Gly Pro Arg Asp Gly Glu Phe Lys Thr
305 310 315 320

Pro Tyr Ala Val Val Gln Leu Arg Gln Asp Asn Ala Ala Gly Ser Leu
325 330 335

Tyr Asn Ile Val Gly Phe Gln Thr His Leu Lys Trp Gly Glu Gln Lys
340 345 350

Arg Val Phe Gln Met Ile Pro Gly Leu Glu Asn Ala Glu Phe Val Arg
355 360 365

Tyr Gly Val Met His Arg Asn Ser Tyr Met Asp Ser Pro Asn Leu Leu
370 375 380

Thr Glu Thr Phe Gln Ser Arg Ser Asn Pro Asn Leu Phe Phe Ala Gly
385 390 395 400

Gln Met Thr Gly Val Glu Gly Tyr Val Glu Ser Ala Ala Ser Gly Leu
405 410 415

Val Ala Gly Ile Asn Ala Ala Arg Leu Phe Lys Arg Glu Glu Ala Leu
420 425 430

Ile Phe Pro Gln Thr Thr Ala Ile Gly Ser Leu Pro His Tyr Val Thr
435 440 445

His Ala Asp Ser Lys His Phe Gln Pro Met Asn Val Asn Phe Gly Ile
450 455 460

Ile Lys Glu Leu Glu Gly Pro Arg Ile Arg Asp Lys Lys Glu Arg Tyr
465 470 475 480

Glu Ala Ile Ala Ser Arg Ala Leu Ala Asp Leu Asp Thr Cys Leu Ala
485 490 495

Ser Leu

<210> 55
<211> 1539
<212> DNA
<213> Streptococcus pyogenes

<400> 55
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gtttatgatt gtttagggga acgccgcact tacggacaac tcaaaagaga ttctgatagc 120
attgctgcat ttatagatag cttagcttta ctggcaaaat ctccagtttt ggtttttggg 180
gcgcaaactt atgatatgtt agctactttt gtagctttaa ccaaatctgg tcatgcctat 240
atcccagtag atgtgcattc agcaccagaa cgtattttag cgattattga gattgcaaag 300
cccagtttaa tcattgctat tgaggaattc cctcttacta ttgaagggat ttcccttgtc 360
tcactatcag agattgagtc agcaaaatta gcagaaatgc cctatgagcg aacacattct 420
gttaaaggag atgataatta ttacattatt ttcacctctg gaacaacggg ccaaccaaaa 480
ggggtgcaaa tttcacatga caatcttttg agctttacca actggatgat cgaagatgca 540
gcatttgatg tacctaaaca gccacaaatg ctggcgcagc caccctattc ctttgacctt 600
tctgtcatgt actgggcacc taccttggct ttaggtggaa ccttatttgc acttccaaaa 660
gaattggtgg cagactttaa acagttattt acaacgattg cgcaacttcc agttggcatt 720
tggacatcga ctccttcatt tgctgatatg gccatgctta gcgatgattt ttgccaggct 780
aagatgccag ctttaacgca tttttatttt gatggcgaag aattaaccgt ttctacggct 840
cgaaaactct ttgaacgttt cccgagtgcc aagattatca atgcctatgg accaacagaa 900
gcgactgtag ccttatccgc tattgaaatt accagagaaa tggtggataa ttatacccgc 960
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gagttatctt caggggagca gggtgaaatt attgttacag ggcctgctgt gtcaaaaggt 1080

tacctcaaca atcctgagaa aaccgcagaa gctttcttta cttttaaagg acagcctgct 1140
tatcatacag gggacattgg ctcactgaca gaagataata ttttgttgta tggtgggcgt 1200
ttggattttc agattaaata tgctggttat cgtattgaac tagaagatgt ttcccaacag 1260
ttgaatcaat caccaatggt agcatcggct gtggctgttc caaggtacaa taaagaacat 1320
aaggttcaaa atctcttggc ctatatcgtt gtcaaagatg gggttaaaga gcgttttgat 1380
agggaattgg agttaaccaa agctatcaaa gcctctgtta aggatcatat gatgagttat 1440
atgatgcctt ctaagtttct ttatcgagat agtctaccat taactccaaa tggtaagata 1500
gatattaaaa ctttgattaa tgaggtcaat aaccgataa 1539

<210> 56
<211> 512
<212> PRT
<213> Streptococcus pyogenes

<400> 56

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

Ala Asp Phe Pro Val Tyr Asp Cys Leu Gly Glu Arg Arg Thr Tyr Gly
20 25 30

Gln Leu Lys Arg Asp Ser Asp Ser Ile Ala Ala Phe Ile Asp Ser Leu
35 40 45

Ala Leu Leu Ala Lys Ser Pro Val Leu Val Phe Gly Ala Gln Thr Tyr
50 55 60

Asp Met Leu Ala Thr Phe Val Ala Leu Thr Lys Ser Gly His Ala Tyr
65 70 75 80

Ile Pro Val Asp Val His Ser Ala Pro Glu Arg Ile Leu Ala Ile Ile
85 90 95

Glu Ile Ala Lys Pro Ser Leu Ile Ile Ala Ile Glu Glu Phe Pro Leu
100 105 110

Thr Ile Glu Gly Ile Ser Leu Val Ser Leu Ser Glu Ile Glu Ser Ala
115 120 125

Lys Leu Ala Glu Met Pro Tyr Glu Arg Thr His Ser Val Lys Gly Asp
130 135 140

Asp Asn Tyr Tyr Ile Ile Phe Thr Ser Gly Thr Thr Gly Gln Pro Lys
145 150 155 160

Gly Val Gln Ile Ser His Asp Asn Leu Leu Ser Phe Thr Asn Trp Met
165 170 175

Ile Glu Asp Ala Ala Phe Asp Val Pro Lys Gln Pro Gln Met Leu Ala
180 185 190

Gln Pro Pro Tyr Ser Phe Asp Leu Ser Val Met Tyr Trp Ala Pro Thr
195 200 205

Leu Ala Leu Gly Gly Thr Leu Phe Ala Leu Pro Lys Glu Leu Val Ala
210 215 220

Asp Phe Lys Gln Leu Phe Thr Thr Ile Ala Gln Leu Pro Val Gly Ile
225 230 235 240

Trp Thr Ser Thr Pro Ser Phe Ala Asp Met Ala Met Leu Ser Asp Asp
245 250 255

Phe Cys Gln Ala Lys Met Pro Ala Leu Thr His Phe Tyr Phe Asp Gly
260 265 270

Glu Glu Leu Thr Val Ser Thr Ala Arg Lys Leu Phe Glu Arg Phe Pro
275 280 285

Ser Ala Lys Ile Ile Asn Ala Tyr Gly Pro Thr Glu Ala Thr Val Ala
290 295 300

Leu Ser Ala Ile Glu Ile Thr Arg Glu Met Val Asp Asn Tyr Thr Arg
305 310 315 320

Leu Pro Ile Gly Tyr Pro Lys Pro Asp Ser Pro Thr Tyr Ile Ile Asp
325 330 335

Glu Asp Gly Lys Glu Leu Ser Ser Gly Glu Gln Gly Glu Ile Ile Val
340 345 350

Thr Gly Pro Ala Val Ser Lys Gly Tyr Leu Asn Asn Pro Glu Lys Thr
355 360 365

Ala Glu Ala Phe Phe Thr Phe Lys Gly Gln Pro Ala Tyr His Thr Gly
370 375 380

Asp Ile Gly Ser Leu Thr Glu Asp Asn Ile Leu Leu Tyr Gly Gly Arg
385 390 395 400

Leu Asp Phe Gln Ile Lys Tyr Ala Gly Tyr Arg Ile Glu Leu Glu Asp
405 410 415

Val Ser Gln Gln Leu Asn Gln Ser Pro Met Val Ala Ser Ala Val Ala
420 425 430

Val Pro Arg Tyr Asn Lys Glu His Lys Val Gln Asn Leu Leu Ala Tyr
435 440 445

Ile Val Val Lys Asp Gly Val Lys Glu Arg Phe Asp Arg Glu Leu Glu
450 455 460

Leu Thr Lys Ala Ile Lys Ala Ser Val Lys Asp His Met Met Ser Tyr
465 470 475 480

Met Met Pro Ser Lys Phe Leu Tyr Arg Asp Ser Leu Pro Leu Thr Pro
485 490 495

Asn Gly Lys Ile Asp Ile Lys Thr Leu Ile Asn Glu Val Asn Asn Arg
500 505 510

<210> 57
<211> 1278
<212> DNA
<213> Streptococcus pyogenes

<400> 57
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caacttatcg aaaaatttaa actacttaat gctgaaaact taaatcaact caaaacagac 120
gttcttttgc ctatccaaac agctaatcaa atgactgaaa atgtcttagg acgattggct 180
ttgcccttta gcatagctcc tgattttctt gtcaacggtt caacttatca gatgcctttt 240
gtcacggaag aaccttctgt tgttgctgca gcatctttcg cagcaaaact aatcaaacgc 300
tcaggtggtt ttaaagctca aaccctaaac cgacaaatga ttggtcaaat tgttctttac 360
gatatcgacc aaatagataa cgctaaagcc gccatccttc ataaaacaaa aaagctaatt 420
gcattggcaa ataaagctta tccttccatt gttaaaagag gtggaggcgc tagaaccatt 480
catttggaag aaaaaggaga atttttgatt ttctatctga ctgttgatac ccaagaagct 540
atgggagcaa atatggtcaa tactatgatg gaagctcttg ttcctgattt aacaagactg 600
tctaaggggc attgtctaat ggcgatttta tctaattacg caacagagtc gcttgttact 660
actagttgtg agattcccgt gcgcctttta gatcacgata aaacaaaatc cctacagtta 720
gctcaaaaaa tagagctagc cagccgacta gctcaagtag atccttaccg ggctactact 780
cataataaag gtatttttaa tggcattgat gcagtggtaa tagccacagg aaatgactgg 840
cgtgctattg aagcaggggc ccatgcttat gcctcaagaa atggtagcta tcaaggactt 900
agtcagtggc attttgacca agataaacaa gttctgcttg gccaaatgac cctccctatg 960
cctattgcta gtaaggggggg atctatcggg cttaacccta ctgtttctat cgcacatgat 1020
cttcttaatc aacctgatgc caaaacatta gcccaattga ttgcatctgt ggggttagct 1080
caaaactttg ctgcactaaa agctctgacc tcatctggca tccaagctgg tcacatgaaa 1140
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gttaatgctt tactagctga taaaccaata aatctagaaa aagcacattt ttacttatcc 1260

cagctaagac agtcttaa

<210> 58
<211> 425
<212> PRT
<213> Streptococcus pyogenes

<400> 58

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Met Thr Lys Thr Asn Leu Asn Trp Ser Gly Phe Ser Lys Lys Thr Phe
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Glu Glu Arg Leu Gln Leu Ile Glu Lys Phe Lys Leu Leu Asn Ala Glu
            20                  25                  30

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

Asn Gln Met Thr Glu Asn Val Leu Gly Arg Leu Ala Leu Pro Phe Ser
    50                  55                  60

Ile Ala Pro Asp Phe Leu Val Asn Gly Ser Thr Tyr Gln Met Pro Phe
65                  70                  75                  80

Val Thr Glu Glu Pro Ser Val Val Ala Ala Ala Ser Phe Ala Ala Lys
                85                  90                  95

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

Met Ile Gly Gln Ile Val Leu Tyr Asp Ile Asp Gln Ile Asp Asn Ala
        115                 120                 125

Lys Ala Ala Ile Leu His Lys Thr Lys Lys Leu Ile Ala Leu Ala Asn
    130                 135                 140

Lys Ala Tyr Pro Ser Ile Val Lys Arg Gly Gly Gly Ala Arg Thr Ile
145                 150                 155                 160

His Leu Glu Glu Lys Gly Glu Phe Leu Ile Phe Tyr Leu Thr Val Asp
                165                 170                 175

Thr Gln Glu Ala Met Gly Ala Asn Met Val Asn Thr Met Met Glu Ala
            180                 185                 190

Leu Val Pro Asp Leu Thr Arg Leu Ser Lys Gly His Cys Leu Met Ala
        195                 200                 205
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Ile Leu Ser Asn Tyr Ala Thr Glu Ser Leu Val Thr Thr Ser Cys Glu
    210                 215                 220

Ile Pro Val Arg Leu Leu Asp His Asp Lys Thr Lys Ser Leu Gln Leu
225                 230                 235                 240

Ala Gln Lys Ile Glu Leu Ala Ser Arg Leu Ala Gln Val Asp Pro Tyr
                245                 250                 255

Arg Ala Thr Thr His Asn Lys Gly Ile Phe Asn Gly Ile Asp Ala Val
            260                 265                 270

Val Ile Ala Thr Gly Asn Asp Trp Arg Ala Ile Glu Ala Gly Ala His
        275                 280                 285

Ala Tyr Ala Ser Arg Asn Gly Ser Tyr Gln Gly Leu Ser Gln Trp His
    290                 295                 300

Phe Asp Gln Asp Lys Gln Val Leu Leu Gly Gln Met Thr Leu Pro Met
305                 310                 315                 320

Pro Ile Ala Ser Lys Gly Gly Ser Ile Gly Leu Asn Pro Thr Val Ser
                325                 330                 335

Ile Ala His Asp Leu Leu Asn Gln Pro Asp Ala Lys Thr Leu Ala Gln
            340                 345                 350

Leu Ile Ala Ser Val Gly Leu Ala Gln Asn Phe Ala Ala Leu Lys Ala
        355                 360                 365

Leu Thr Ser Ser Gly Ile Gln Ala Gly His Met Lys Leu His Ala Lys
    370                 375                 380

Ser Leu Ala Leu Leu Ala Gly Ala Thr Gln Asp Glu Ile Ala Pro Leu
385                 390                 395                 400

Val Asn Ala Leu Leu Ala Asp Lys Pro Ile Asn Leu Glu Lys Ala His
                405                 410                 415

Phe Tyr Leu Ser Gln Leu Arg Gln Ser
            420                 425
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<210> 59
<211> 915
<212> DNA
<213> Streptococcus pyogenes

<400> 59
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gggtttggta aaaagccagc ccaagttgat atcgaaggta tcagcgacaa gacggtttat 180
aaggctgata aaaaagccac tcgaggtgtt ccagaggata ttaatcgtca aaatactccc 240
gcggtcaatt ctgctgatgt agaacctgaa gaaataaaag ccactcaaag gttagaagca 300
gaagatacca aagtggttcc tctcatgtct gaagatagtc cagcgcaaac cccttctaat 360
cttgctgaga cagtcactga aacaaaagca caacaaccgt caatcccagt cgaagaatca 420
gaagtgcccc aagatgctgg taatgatggt ttcagcaaag atattgaaaa agctgctcag 480
gaagtgtccg attatgtgac taaaattatc tatgaaatgg atatcgaagc taccgttgaa 540
accagcaaca atcgtcgcca aatcaatttg cagattgaaa cgccagaggc gggacgtgtg 600
attggttacc atggtaaggt cttgaaatcc ttgcagttgt tagctcaaaa tttcttgcac 660
gaccgctatt caaaaaattt ttcagtatcc ttgaatgtcc atgattatgt ggaacatcga 720
acagaaacct tgattgactt tacgcaaaaa gttgccaaac gcgttttgga atctggtcaa 780
gattacacca tggatcccat gagtaacagt gagcgtaaaa tcgttcataa aaccgtttca 840
tccattgaag gggttgatag ttattctgaa ggcaatgacc ctaaccgcta tgtggtagtc 900
agtcttcaac gttaa 915

<210> 60
<211> 304
<212> PRT
<213> Streptococcus pyogenes

<400> 60
Met Val Leu Phe Thr Gly Lys Thr Val Glu Glu Ala Ile Glu Thr Gly
1 5 10 15

Leu Gln Glu Leu Gly Leu Ser Arg Leu Lys Ala His Ile Lys Val Ile
20 25 30

Ser Lys Glu Lys Lys Gly Phe Leu Gly Phe Gly Lys Lys Pro Ala Gln
35 40 45

Val Asp Ile Glu Gly Ile Ser Asp Lys Thr Val Tyr Lys Ala Asp Lys
50 55 60

Lys Ala Thr Arg Gly Val Pro Glu Asp Ile Asn Arg Gln Asn Thr Pro
65 70 75 80

Ala Val Asn Ser Ala Asp Val Glu Pro Glu Glu Ile Lys Ala Thr Gln
85 90 95

Arg Leu Glu Ala Glu Asp Thr Lys Val Val Pro Leu Met Ser Glu Asp
100 105 110

Ser Pro Ala Gln Thr Pro Ser Asn Leu Ala Glu Thr Val Thr Glu Thr

115 120 125

Lys Ala Gln Gln Pro Ser Ile Pro Val Glu Glu Ser Glu Val Pro Gln
130 135 140

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

Glu Val Ser Asp Tyr Val Thr Lys Ile Ile Tyr Glu Met Asp Ile Glu
165 170 175

Ala Thr Val Glu Thr Ser Asn Asn Arg Arg Gln Ile Asn Leu Gln Ile
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Glu Thr Pro Glu Ala Gly Arg Val Ile Gly Tyr His Gly Lys Val Leu
195 200 205

Lys Ser Leu Gln Leu Leu Ala Gln Asn Phe Leu His Asp Arg Tyr Ser
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Lys Asn Phe Ser Val Ser Leu Asn Val His Asp Tyr Val Glu His Arg
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Thr Glu Thr Leu Ile Asp Phe Thr Gln Lys Val Ala Lys Arg Val Leu
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Glu Ser Gly Gln Asp Tyr Thr Met Asp Pro Met Ser Asn Ser Glu Arg
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Leu Glu Leu Lys Tyr Arg His Leu Ile Tyr Ala Val Pro Lys Ser Gly
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Tyr Tyr Val Leu Gly Asn Val Ser Met Pro Asp Asn Val Leu Asn Leu
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Ser Leu Glu Asp Tyr Asn Asn Met Ala Tyr Glu Asp Phe Arg Leu Cys
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Leu Asn Glu Ala Leu Ser Ala Lys Asp Lys Tyr Leu Phe His Tyr Tyr
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His Lys Thr Glu Gly Leu Glu Glu Leu Arg Glu Ala Leu Leu Leu Tyr
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Ser Gly Thr Gln Gln Ala Leu Tyr Ile Leu Ser Gln Met Pro Phe Pro
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Asn Thr Gly Lys Thr Ile Leu Leu Glu Lys Pro Thr Tyr His Arg Met
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Glu Ala Ile Val Ala Gln Leu Gly Leu Pro Tyr Gln Thr Ile Ser Arg
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His Phe Asn Gly Leu Asp Leu Glu Leu Leu Glu Ser Leu Phe Gln Thr
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Gly Leu Ser Tyr Ser Thr Lys Glu Lys Glu Ala Ile Val Arg Leu Ala
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Gln Arg Tyr Gln Val Tyr Ile Leu Glu Asp Asp Tyr Leu Gly Asp Phe
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Val Lys Leu Lys Glu Pro Pro Ile His Tyr Tyr Asp Thr His His Arg
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Ile Ile Tyr Leu Lys Ser Phe Ser Met Ser Val Phe Pro Ala Leu Arg
275 280 285

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