SEQUENCE LISTING

<110> University Court of the University of St Andrews

<120> Cell Modulation

<130> SP100809SGM

<160> 11

<170> PatentIn version 3.5

<210> 1
<211> 781
<212> PRT
<213> Vibrio cholerae

<400> 1

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Met Arg Phe Lys Asn Val Lys Lys Thr Ala Leu Met Leu Ala Met Phe
1               5                  10                  15

Gly Met Ala Thr Ser Ser Asn Ala Ala Leu Phe Asp Tyr Asn Ala Thr
            20                  25                  30

Gly Asp Thr Glu Phe Asp Ser Pro Ala Lys Gln Gly Trp Met Gln Asp
        35                  40                  45

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

Ala Trp Leu Val Gln Gly Ile Gly Gly Arg Ala Gln Trp Thr Tyr Ser
65                  70                  75                  80

Leu Ser Thr Asn Gln His Ala Gln Ala Ser Ser Phe Gly Trp Arg Met
                85                  90                  95

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

Ala Asn Gly Thr Gln Arg Val Leu Pro Ile Ile Ser Leu Asp Ser Ser
        115                 120                 125
```

```
Gly Asn Leu Val Val Glu Phe Glu Gly Gln Thr Gly Arg Thr Val Leu
    130                 135                 140

Ala Thr Gly Thr Ala Ala Thr Glu Tyr His Lys Phe Glu Leu Val Phe
145                 150                 155                 160

Leu Pro Gly Ser Asn Pro Ser Ala Ser Phe Tyr Phe Asp Gly Lys Leu
                165                 170                 175

Ile Arg Asp Asn Ile Gln Pro Thr Ala Ser Lys Gln Asn Met Ile Val
            180                 185                 190

Trp Gly Asn Gly Ser Ser Asn Thr Asp Gly Val Ala Ala Tyr Arg Asp
        195                 200                 205

Ile Lys Phe Glu Ile Gln Gly Asp Val Ile Phe Arg Gly Pro Asp Arg
    210                 215                 220

Ile Pro Ser Ile Val Ala Ser Ser Val Thr Pro Gly Val Val Thr Ala
225                 230                 235                 240

Phe Ala Glu Lys Arg Val Gly Gly Gly Asp Pro Gly Ala Leu Ser Asn
                245                 250                 255

Thr Asn Asp Ile Ile Thr Arg Thr Ser Arg Asp Gly Gly Ile Thr Trp
            260                 265                 270

Asp Thr Glu Leu Asn Leu Thr Glu Gln Ile Asn Val Ser Asp Glu Phe
        275                 280                 285

Asp Phe Ser Asp Pro Arg Pro Ile Tyr Asp Pro Ser Ser Asn Thr Val
    290                 295                 300

Leu Val Ser Tyr Ala Arg Trp Pro Thr Asp Ala Ala Gln Asn Gly Asp
305                 310                 315                 320

Arg Ile Lys Pro Trp Met Pro Asn Gly Ile Phe Tyr Ser Val Tyr Asp
                325                 330                 335

Val Ala Ser Gly Asn Trp Gln Ala Pro Ile Asp Val Thr Asp Gln Val
```

```
            340                 345                 350

Lys Glu Arg Ser Phe Gln Ile Ala Gly Trp Gly Gly Ser Glu Leu Tyr
        355                 360                 365

Arg Arg Asn Thr Ser Leu Asn Ser Gln Gln Asp Trp Gln Ser Asn Ala
    370                 375                 380

Lys Ile Arg Ile Val Asp Gly Ala Ala Asn Gln Ile Gln Val Ala Asp
385                 390                 395                 400

Gly Ser Arg Lys Tyr Val Val Thr Leu Ser Ile Asp Glu Ser Gly Gly
                405                 410                 415

Leu Val Ala Asn Leu Asn Gly Val Ser Ala Pro Ile Ile Leu Gln Ser
            420                 425                 430

Glu His Ala Lys Val His Ser Phe His Asp Tyr Glu Leu Gln Tyr Ser
        435                 440                 445

Ala Leu Asn His Thr Thr Thr Leu Phe Val Asp Gly Gln Gln Ile Thr
    450                 455                 460

Thr Trp Ala Gly Glu Val Ser Gln Glu Asn Asn Ile Gln Phe Gly Asn
465                 470                 475                 480

Ala Asp Ala Gln Ile Asp Gly Arg Leu His Val Gln Lys Ile Val Leu
                485                 490                 495

Thr Gln Gln Gly His Asn Leu Val Glu Phe Asp Ala Phe Tyr Leu Ala
            500                 505                 510

Gln Gln Thr Pro Glu Val Glu Lys Asp Leu Glu Lys Leu Gly Trp Thr
        515                 520                 525

Lys Ile Lys Thr Gly Asn Thr Met Ser Leu Tyr Gly Asn Ala Ser Val
    530                 535                 540

Asn Pro Gly Pro Gly His Gly Ile Thr Leu Thr Arg Gln Gln Asn Ile
545                 550                 555                 560
```

```
Ser Gly Ser Gln Asn Gly Arg Leu Ile Tyr Pro Ala Ile Val Leu Asp
                565                 570                 575

Arg Phe Phe Leu Asn Val Met Ser Ile Tyr Ser Asp Asp Gly Gly Ser
            580                 585                 590

Asn Trp Gln Thr Gly Ser Thr Leu Pro Ile Pro Phe Arg Trp Lys Ser
        595                 600                 605

Ser Ser Ile Leu Glu Thr Leu Glu Pro Ser Glu Ala Asp Met Val Glu
    610                 615                 620

Leu Gln Asn Gly Asp Leu Leu Leu Thr Ala Arg Leu Asp Phe Asn Gln
625                 630                 635                 640

Ile Val Asn Gly Val Asn Tyr Ser Pro Arg Gln Gln Phe Leu Ser Lys
                645                 650                 655

Asp Gly Gly Ile Thr Trp Ser Leu Leu Glu Ala Asn Asn Ala Asn Val
            660                 665                 670

Phe Ser Asn Ile Ser Thr Gly Thr Val Asp Ala Ser Ile Thr Arg Phe
        675                 680                 685

Glu Gln Ser Asp Gly Ser His Phe Leu Leu Phe Thr Asn Pro Gln Gly
    690                 695                 700

Asn Pro Ala Gly Thr Asn Gly Arg Gln Asn Leu Gly Leu Trp Phe Ser
705                 710                 715                 720

Phe Asp Glu Gly Val Thr Trp Lys Gly Pro Ile Gln Leu Val Asn Gly
                725                 730                 735

Ala Ser Ala Tyr Ser Asp Ile Tyr Gln Leu Asp Ser Glu Asn Ala Ile
            740                 745                 750

Val Ile Val Glu Thr Asp Asn Ser Asn Met Arg Ile Leu Arg Met Pro
        755                 760                 765

Ile Thr Leu Leu Lys Gln Lys Leu Thr Leu Ser Gln Asn
```

770 775 780

<210> 2
<211> 192
<212> PRT
<213> Vibrio cholerae

<400> 2

Ala Leu Phe Asp Tyr Asn Ala Thr Gly Asp Thr Glu Phe Asp Ser Pro
1 5 10 15

Ala Lys Gln Gly Trp Met Gln Asp Asn Thr Asn Asn Gly Ser Gly Val
20 25 30

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

Gly Arg Ala Gln Trp Thr Tyr Ser Leu Ser Thr Asn Gln His Ala Gln
50 55 60

Ala Ser Ser Phe Gly Trp Arg Met Thr Thr Glu Met Lys Val Leu Ser
65 70 75 80

Gly Gly Met Ile Thr Asn Tyr Tyr Ala Asn Gly Thr Gln Arg Val Leu
85 90 95

Pro Ile Ile Ser Leu Asp Ser Ser Gly Asn Leu Val Val Glu Phe Glu
100 105 110

Gly Gln Thr Gly Arg Thr Val Leu Ala Thr Gly Thr Ala Ala Thr Glu
115 120 125

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

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

Ala Ser Lys Gln Asn Met Ile Val Trp Gly Asn Gly Ser Ser Asn Thr
165 170 175

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

<210> 3
<211> 1035
<212> PRT
<213> Streptococcus pneumoniae

<400> 3

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Met Ser Tyr Phe Arg Asn Arg Asp Ile Asp Ile Glu Arg Asn Ser Met
1               5                   10                  15

Asn Arg Ser Val Gln Glu Arg Lys Cys Arg Tyr Ser Ile Arg Lys Leu
            20                  25                  30

Ser Val Gly Ala Val Ser Met Ile Val Gly Ala Val Val Phe Gly Thr
        35                  40                  45

Ser Pro Val Leu Ala Gln Glu Gly Ala Ser Glu Gln Pro Leu Ala Asn
    50                  55                  60

Glu Thr Gln Leu Ser Gly Glu Ser Ser Thr Leu Thr Asp Thr Glu Lys
65                  70                  75                  80

Ser Gln Pro Ser Ser Glu Thr Glu Leu Ser Gly Asn Lys Gln Glu Gln
                85                  90                  95

Glu Arg Lys Asp Lys Gln Glu Glu Lys Ile Pro Arg Asp Tyr Tyr Ala
            100                 105                 110

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

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

Lys Leu Lys Lys Leu Glu Asn Ala Thr Val His Met Glu Phe Lys Pro
145                 150                 155                 160

Asp Ala Lys Ala Pro Ala Phe Tyr Asn Leu Phe Ser Val Ser Ser Ala
                165                 170                 175
```

```
Thr Lys Lys Asp Glu Tyr Phe Thr Met Ala Val Tyr Asn Asn Thr Ala
            180                 185                 190

Thr Leu Glu Gly Arg Gly Ser Asp Gly Lys Gln Phe Tyr Asn Asn Tyr
        195                 200                 205

Asn Asp Ala Pro Leu Lys Val Lys Pro Gly Gln Trp Asn Ser Val Thr
    210                 215                 220

Phe Thr Val Glu Lys Pro Thr Ala Glu Leu Pro Lys Gly Arg Val Arg
225                 230                 235                 240

Leu Tyr Val Asn Gly Val Leu Ser Arg Thr Ser Leu Arg Ser Gly Asn
                245                 250                 255

Phe Ile Lys Asp Met Pro Asp Val Thr His Val Gln Ile Gly Ala Thr
            260                 265                 270

Lys Arg Ala Asn Asn Thr Val Trp Gly Ser Asn Leu Gln Ile Arg Asn
        275                 280                 285

Leu Thr Val Tyr Asn Arg Ala Leu Thr Pro Glu Glu Val Gln Lys Arg
    290                 295                 300

Ser Gln Leu Phe Lys Arg Ser Asp Leu Glu Lys Lys Leu Pro Glu Gly
305                 310                 315                 320

Ala Ala Leu Thr Glu Lys Thr Asp Ile Phe Glu Ser Gly Arg Asn Gly
                325                 330                 335

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

Lys Thr Asp Lys Gly Thr Leu Ile Ala Gly Ala Asp Glu Arg Arg Leu
        355                 360                 365

His Ser Ser Asp Trp Gly Asp Ile Gly Met Val Ile Arg Arg Ser Glu
    370                 375                 380
```

```
Asp Asn Gly Lys Thr Trp Gly Asp Arg Val Thr Ile Thr Asn Leu Arg
385                 390                 395                 400

Asp Asn Pro Lys Ala Ser Asp Pro Ser Ile Gly Ser Pro Val Asn Ile
                405                 410                 415

Asp Met Val Leu Val Gln Asp Pro Glu Thr Lys Arg Ile Phe Ser Ile
            420                 425                 430

Tyr Asp Met Phe Pro Glu Gly Lys Gly Ile Phe Gly Met Ser Ser Gln
        435                 440                 445

Lys Glu Glu Ala Tyr Lys Lys Ile Asp Gly Lys Thr Tyr Gln Ile Leu
    450                 455                 460

Tyr Arg Glu Gly Glu Lys Gly Ala Tyr Thr Ile Arg Glu Asn Gly Thr
465                 470                 475                 480

Val Tyr Thr Pro Asp Gly Lys Ala Thr Asp Tyr Arg Val Val Val Asp
                485                 490                 495

Pro Val Lys Pro Ala Tyr Ser Asp Lys Gly Asp Leu Tyr Lys Gly Asn
            500                 505                 510

Gln Leu Leu Gly Asn Ile Tyr Phe Thr Thr Asn Lys Thr Ser Pro Phe
        515                 520                 525

Arg Ile Ala Lys Asp Ser Tyr Leu Trp Met Ser Tyr Ser Asp Asp Asp
    530                 535                 540

Gly Lys Thr Trp Ser Ala Pro Gln Asp Ile Thr Pro Met Val Lys Ala
545                 550                 555                 560

Asp Trp Met Lys Phe Leu Gly Val Gly Pro Gly Thr Gly Ile Val Leu
                565                 570                 575

Arg Asn Gly Pro His Lys Gly Arg Ile Leu Ile Pro Val Tyr Thr Thr
            580                 585                 590

Asn Asn Val Ser His Leu Asn Gly Ser Gln Ser Ser Arg Ile Ile Tyr
        595                 600                 605
```

```
Ser Asp Asp His Gly Lys Thr Trp His Ala Gly Glu Ala Val Asn Asp
    610                 615                 620

Asn Arg Gln Val Asp Gly Gln Lys Ile His Ser Ser Thr Met Asn Asn
625                 630                 635                 640

Arg Arg Ala Gln Asn Thr Glu Ser Thr Val Val Gln Leu Asn Asn Gly
                645                 650                 655

Asp Val Lys Leu Phe Met Arg Gly Leu Thr Gly Asp Leu Gln Val Ala
            660                 665                 670

Thr Ser Lys Asp Gly Gly Val Thr Trp Glu Lys Asp Ile Lys Arg Tyr
        675                 680                 685

Pro Gln Val Lys Asp Val Tyr Val Gln Met Ser Ala Ile His Thr Met
    690                 695                 700

His Glu Gly Lys Glu Tyr Ile Ile Leu Ser Asn Ala Gly Gly Pro Lys
705                 710                 715                 720

Arg Glu Asn Gly Met Val His Leu Ala Arg Val Glu Glu Asn Gly Glu
                725                 730                 735

Leu Thr Trp Leu Lys His Asn Pro Ile Gln Lys Gly Glu Phe Ala Tyr
            740                 745                 750

Asn Ser Leu Gln Glu Leu Gly Asn Gly Glu Tyr Gly Ile Leu Tyr Glu
        755                 760                 765

His Thr Glu Lys Gly Gln Asn Ala Tyr Thr Leu Ser Phe Arg Lys Phe
    770                 775                 780

Asn Trp Asp Phe Leu Ser Lys Asp Leu Ile Ser Pro Thr Glu Ala Lys
785                 790                 795                 800

Val Lys Arg Thr Arg Glu Met Gly Lys Gly Val Ile Gly Leu Glu Phe
                805                 810                 815
```

```
Asp Ser Glu Val Leu Val Asn Lys Ala Pro Thr Leu Gln Leu Ala Asn
            820                 825                 830

Gly Lys Thr Ala Arg Phe Met Thr Gln Tyr Asp Thr Lys Thr Leu Leu
        835                 840                 845

Phe Thr Val Asp Ser Glu Asp Met Gly Gln Lys Val Thr Gly Leu Ala
    850                 855                 860

Glu Gly Ala Ile Glu Ser Met His Asn Leu Pro Val Ser Val Ala Gly
865                 870                 875                 880

Thr Lys Leu Ser Asn Gly Met Asn Gly Ser Glu Ala Ala Val His Glu
                885                 890                 895

Val Pro Glu Tyr Thr Gly Pro Leu Gly Thr Ser Gly Glu Glu Pro Ala
            900                 905                 910

Pro Thr Val Glu Lys Pro Glu Tyr Thr Gly Pro Leu Gly Thr Ser Gly
        915                 920                 925

Glu Glu Pro Ala Pro Thr Val Glu Lys Pro Glu Tyr Thr Gly Pro Leu
    930                 935                 940

Gly Thr Ala Gly Glu Glu Ala Ala Pro Thr Val Glu Lys Pro Glu Phe
945                 950                 955                 960

Thr Gly Gly Val Asn Gly Thr Glu Pro Ala Val His Glu Ile Ala Glu
                965                 970                 975

Tyr Lys Gly Ser Asp Ser Leu Val Thr Leu Thr Thr Lys Glu Asp Tyr
            980                 985                 990

Thr Tyr Lys Ala Pro Leu Ala Gln  Gln Ala Leu Pro Glu  Thr Gly Asn
        995                 1000                1005

Lys Glu  Ser Asp Leu Leu Ala  Ser Leu Gly Leu Thr  Ala Phe Phe
    1010                1015                1020

Leu Gly  Leu Phe Thr Leu Gly  Lys Lys Arg Glu Gln
    1025                1030                1035
```

<210> 4
<211> 185
<212> PRT
<213> Streptococcus pneumoniae

<400> 4

Val Ile Glu Lys Glu Asp Val Glu Thr Asn Ala Ser Asn Gly Gln Arg
1 5 10 15

Val Asp Leu Ser Ser Glu Leu Asp Lys Leu Lys Lys Leu Glu Asn Ala
20 25 30

Thr Val His Met Glu Phe Lys Pro Asp Ala Lys Ala Pro Ala Phe Tyr
35 40 45

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

Met Ala Val Tyr Asn Asn Thr Ala Thr Leu Glu Gly Arg Gly Ser Asp
65 70 75 80

Gly Lys Gln Phe Tyr Asn Asn Tyr Asn Asp Ala Pro Leu Lys Val Lys
85 90 95

Pro Gly Gln Trp Asn Ser Val Thr Phe Thr Val Glu Lys Pro Thr Ala
100 105 110

Glu Leu Pro Lys Gly Arg Val Arg Leu Tyr Val Asn Gly Val Leu Ser
115 120 125

Arg Thr Ser Leu Arg Ser Gly Asn Phe Ile Lys Asp Met Pro Asp Val
130 135 140

Thr His Val Gln Ile Gly Ala Thr Lys Arg Ala Asn Asn Thr Val Trp
145 150 155 160

Gly Ser Asn Leu Gln Ile Arg Asn Leu Thr Val Tyr Asn Arg Ala Leu
165 170 175

Thr Pro Glu Glu Val Gln Lys Arg Ser
180 185

<210> 5
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Linker

<400> 5

Ala Leu Asn Gly Ser
1 5

<210> 6
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Linker

<400> 6

Leu Gln Ala Leu Gly
1 5

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

<220>
<223> Linker

<400> 7

Gly Gly Asn Ser Gly
1 5

<210> 8
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Linker

<400> 8

Ala Leu Asn Gly Ser Gly Gly Gly Ser Gly
1 5 10

<210> 9
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Linker

<400> 9

Leu Gln Ala Leu Gly Gly Gly Gly Ser Leu
1 5 10

<210> 10
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Linker

<400> 10

Ala Leu Asn Gly Ser Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
1 5 10 15

<210> 11
<211> 438
<212> PRT
<213> Pseudomonas aeruginosa

<400> 11

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

Tyr Glu Ser Tyr Tyr Asp His Phe Gly Gln Met Asp Ile Leu Ser Asp
20 25 30

Gly Ser Leu Tyr Leu Ile Tyr Arg Arg Ala Thr Glu His Val Gly Gly
35 40 45

```
Ser Asp Gly Arg Val Val Phe Ser Lys Leu Glu Gly Gly Ile Trp Ser
    50                  55                  60

Ala Pro Thr Ile Val Ala Gln Ala Gly Gly Gln Asp Phe Arg Asp Val
65                  70                  75                  80

Ala Gly Gly Thr Met Pro Ser Gly Arg Ile Val Ala Ala Ser Thr Val
                85                  90                  95

Tyr Glu Thr Gly Glu Val Lys Val Tyr Val Ser Asp Asp Ser Gly Val
            100                 105                 110

Thr Trp Val His Lys Phe Thr Leu Ala Arg Gly Gly Ala Asp Tyr Asn
        115                 120                 125

Phe Ala His Gly Lys Ser Phe Gln Val Gly Ala Arg Tyr Val Ile Pro
    130                 135                 140

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

Ser Asp Gly Gly Glu Thr Trp Gly Glu Gly Ser Thr Ile Tyr Ser Gly
                165                 170                 175

Asn Thr Pro Tyr Asn Glu Thr Ser Tyr Leu Pro Val Gly Asp Gly Val
            180                 185                 190

Ile Leu Ala Val Ala Arg Val Gly Ser Gly Ala Gly Gly Ala Leu Arg
        195                 200                 205

Gln Phe Ile Ser Leu Asp Asp Gly Gly Thr Trp Thr Asp Gln Gly Asn
    210                 215                 220

Val Thr Ala Gln Asn Gly Asp Ser Thr Asp Ile Leu Val Ala Pro Ser
225                 230                 235                 240

Leu Ser Tyr Ile Tyr Ser Glu Gly Gly Thr Pro His Val Val Leu Leu
                245                 250                 255

Tyr Thr Asn Arg Thr Thr His Phe Cys Tyr Tyr Arg Thr Ile Leu Leu
            260                 265                 270
```

```
Ala Lys Ala Val Ala Gly Ser Ser Gly Trp Thr Glu Arg Val Pro Val
        275                 280                 285

Tyr Ser Ala Pro Ala Ala Ser Gly Tyr Thr Ser Gln Val Val Leu Gly
    290                 295                 300

Gly Arg Arg Ile Leu Gly Asn Leu Phe Arg Glu Thr Ser Ser Thr Thr
305                 310                 315                 320

Ser Gly Ala Tyr Gln Phe Glu Val Tyr Leu Gly Gly Val Pro Asp Phe
                325                 330                 335

Glu Ser Asp Trp Phe Ser Val Ser Ser Asn Ser Leu Tyr Thr Leu Ser
            340                 345                 350

His Gly Leu Gln Arg Ser Pro Arg Arg Val Val Val Glu Phe Ala Arg
        355                 360                 365

Ser Ser Ser Pro Ser Thr Trp Asn Ile Val Met Pro Ser Tyr Phe Asn
    370                 375                 380

Asp Gly Gly His Lys Gly Ser Gly Ala Gln Val Glu Val Gly Ser Leu
385                 390                 395                 400

Asn Ile Arg Leu Gly Thr Gly Ala Ala Val Trp Gly Thr Gly Tyr Phe
                405                 410                 415

Gly Gly Ile Asp Asn Ser Ala Thr Thr Arg Phe Ala Thr Gly Tyr Tyr
            420                 425                 430

Arg Val Arg Ala Trp Ile
        435
```