SEQUENCE LISTING

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<120> METHODS AND COMPOSITIONS FOR RECOMBINANT DENGUE VIRUSES FOR VACCINE AND DIAGNOSTIC DEVELOPMENT

<130> 5470-723WO

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<160> 40

<170> PatentIn version 3.5

<210> 1
<211> 495
<212> PRT
<213> Dengue virus type 4

<400> 1

Met Arg Cys Val Gly Val Gly Asn Arg Asp Phe Val Glu Gly Val Ser
1 5 10 15

Gly Gly Ala Trp Val Asp Leu Val Leu Glu His Gly Gly Cys Val Thr
20 25 30

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

Thr Ala Lys Glu Val Ala Leu Leu Arg Thr Tyr Cys Ile Glu Ala Ser
50 55 60

Ile Ser Asn Ile Thr Thr Ala Thr Arg Cys Pro Thr Gln Gly Glu Pro
65 70 75 80

```
Tyr Leu Lys Glu Glu Gln Asp Gln Gln Tyr Ile Cys Arg Arg Asp Val
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Gly
            100                 105                 110

Val Val Thr Cys Ala Lys Phe Ser Cys Ser Gly Lys Ile Thr Gly Asn
        115                 120                 125

Leu Val Gln Ile Glu Asn Leu Glu Tyr Thr Val Val Val Thr Val His
    130                 135                 140

Asn Gly Asp Thr His Ala Val Gly Asn Asp Thr Ser Asn His Gly Val
145                 150                 155                 160

Thr Ala Thr Ile Thr Pro Arg Ser Pro Ser Val Glu Val Lys Leu Pro
                165                 170                 175

Asp Tyr Gly Glu Leu Thr Leu Asp Cys Glu Pro Arg Ser Gly Ile Asp
            180                 185                 190

Phe Asn Glu Met Ile Leu Met Lys Met Lys Lys Lys Thr Trp Leu Val
        195                 200                 205

His Lys Gln Trp Phe Leu Asp Leu Pro Leu Pro Trp Thr Ala Gly Ala
    210                 215                 220

Asp Thr Ser Glu Val His Trp Asn Tyr Lys Glu Arg Met Val Thr Phe
225                 230                 235                 240

Lys Val Pro His Ala Lys Arg Gln Asp Val Thr Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Ser Ala Leu Ala Gly Ala Thr Glu Val Asp Ser
            260                 265                 270

Gly Asp Gly Asn His Met Phe Ala Gly His Leu Lys Cys Lys Val Arg
        275                 280                 285
```

```
Met Glu Lys Leu Arg Ile Lys Gly Met Ser Tyr Thr Met Cys Ser Gly
    290                 295                 300

Lys Phe Ser Ile Asp Lys Glu Met Ala Glu Thr Gln His Gly Thr Thr
305                 310                 315                 320

Val Val Lys Val Lys Tyr Glu Gly Ala Gly Ala Pro Cys Lys Val Pro
                325                 330                 335

Ile Glu Ile Arg Asp Val Asn Lys Glu Lys Val Val Gly Arg Val Ile
            340                 345                 350

Ser Ser Thr Pro Leu Ala Glu Asn Thr Asn Ser Val Thr Asn Ile Glu
        355                 360                 365

Leu Glu Pro Pro Phe Gly Asp Ser Tyr Ile Val Ile Gly Val Gly Asn
    370                 375                 380

Ser Ala Leu Thr Leu His Trp Phe Arg Lys Gly Ser Ser Ile Gly Lys
385                 390                 395                 400

Met Phe Glu Ser Thr Tyr Arg Gly Ala Lys Arg Met Ala Ile Leu Gly
                405                 410                 415

Glu Thr Ala Trp Asp Phe Gly Ser Val Gly Gly Leu Phe Thr Ser Leu
            420                 425                 430

Gly Lys Ala Val His Gln Val Phe Gly Ser Val Tyr Thr Thr Met Phe
        435                 440                 445

Gly Gly Val Ser Trp Met Ile Arg Ile Leu Ile Gly Phe Leu Val Leu
    450                 455                 460

Trp Ile Gly Thr Asn Ser Arg Asn Thr Ser Met Ala Met Thr Cys Ile
465                 470                 475                 480
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Ala Val Gly Gly Ile Thr Leu Phe Leu Gly Phe Thr Val Gln Ala
485 490 495

<210> 2
<211> 495
<212> PRT
<213> Artificial

<220>
<223> DENV4 M12 E glycoprotein sequence

<400> 2

Met Arg Cys Val Gly Val Gly Asn Arg Asp Phe Val Glu Gly Val Ser
1 5 10 15

Gly Gly Ala Trp Val Asp Leu Val Leu Glu His Gly Gly Cys Val Thr
20 25 30

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

Thr Ala Thr Gln Leu Ala Thr Leu Arg Lys Leu Cys Ile Glu Ala Ser
50 55 60

Ile Ser Asn Ile Thr Thr Ala Thr Arg Cys Pro Thr Gln Gly Glu Pro
65 70 75 80

Tyr Leu Lys Glu Glu Gln Asp Gln Gln Tyr Ile Cys Arg Arg Asp Val
85 90 95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Gly
100 105 110

Val Val Thr Cys Ala Lys Phe Ser Cys Ser Gly Pro Ile Glu Gly Lys
115 120 125

Val Val Gln Ile Glu Asn Leu Glu Tyr Thr Val Val Val Thr Val His
130 135 140

```
Asn Gly Asp Thr His Ala Val Gly Asn Asp Thr Ser Asn His Gly Val
145                 150                 155                 160

Thr Ala Thr Ile Thr Pro Arg Ser Pro Ser Val Glu Val Lys Leu Pro
                165                 170                 175

Asp Tyr Gly Glu Leu Thr Leu Asp Cys Glu Pro Arg Ser Gly Ile Asp
            180                 185                 190

Phe Asn Glu Met Ile Leu Leu Thr Met Lys Lys Lys Ala Trp Met Val
        195                 200                 205

His Arg Gln Trp Phe Phe Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala
    210                 215                 220

Asp Thr Ser Glu Val His Trp Asn Tyr Lys Glu Arg Met Val Thr Phe
225                 230                 235                 240

Lys Val Pro His Ala Lys Arg Gln Asp Val Thr Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Ser Ala Leu Ala Gly Ala Thr Glu Ile Gln Asn
            260                 265                 270

Ser Gly Gly Thr Ser Ile Phe Ala Gly His Leu Lys Cys Lys Val Arg
        275                 280                 285

Met Glu Lys Leu Arg Ile Lys Gly Met Ser Tyr Thr Met Cys Ser Gly
    290                 295                 300

Lys Phe Ser Ile Asp Lys Glu Met Ala Glu Thr Gln His Gly Thr Thr
305                 310                 315                 320

Val Val Lys Val Lys Tyr Glu Gly Ala Gly Ala Pro Cys Lys Val Pro
                325                 330                 335

Ile Glu Ile Arg Asp Val Asn Lys Glu Lys Val Val Gly Arg Val Ile
            340                 345                 350
```

```
Ser Ser Thr Pro Leu Ala Glu Asn Thr Asn Ser Val Thr Asn Ile Glu
        355                 360                 365

Leu Glu Pro Pro Phe Gly Asp Ser Tyr Ile Val Ile Gly Val Gly Asn
    370                 375                 380

Ser Ala Leu Thr Leu His Trp Phe Arg Lys Gly Ser Ser Ile Gly Lys
385                 390                 395                 400

Met Phe Glu Ser Thr Tyr Arg Gly Ala Lys Arg Met Ala Ile Leu Gly
                405                 410                 415

Glu Thr Ala Trp Asp Phe Gly Ser Val Gly Gly Leu Phe Thr Ser Leu
            420                 425                 430

Gly Lys Ala Val His Gln Val Phe Gly Ser Val Tyr Thr Thr Met Phe
        435                 440                 445

Gly Gly Val Ser Trp Met Ile Arg Ile Leu Ile Gly Phe Leu Val Leu
    450                 455                 460

Trp Ile Gly Thr Asn Ser Arg Asn Thr Ser Met Ala Met Thr Cys Ile
465                 470                 475                 480

Ala Val Gly Gly Ile Thr Leu Phe Leu Gly Phe Thr Val Gln Ala
                485                 490                 495
```

<210> 3
<211> 495
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<213> Artificial

<220>
<223> DENV4 M14 E glycoprotein sequence

<400> 3

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Met Arg Cys Val Gly Val Gly Asn Arg Asp Phe Val Glu Gly Val Ser
1               5                   10                  15
```

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Gly Gly Ala Trp Val Asp Leu Val Leu Glu His Gly Gly Cys Val Thr
            20                  25                  30

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

Glu Ala Thr Gln Leu Ala Thr Leu Arg Lys Leu Cys Ile Glu Ala Ser
    50                  55                  60

Ile Ser Asn Ile Thr Thr Ala Thr Arg Cys Pro Thr Gln Gly Glu Pro
65                  70                  75                  80

Tyr Leu Lys Glu Glu Gln Asp Gln Gln Tyr Ile Cys Arg Arg Asp Val
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Gly
            100                 105                 110

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

Val Val Gln Tyr Glu Asn Leu Glu Tyr Thr Val Val Val Thr Val His
    130                 135                 140

Asn Gly Asp Thr His Ala Val Gly Asn Asp Thr Ser Asn His Gly Val
145                 150                 155                 160

Thr Ala Thr Ile Thr Pro Arg Ser Pro Ser Val Glu Val Lys Leu Pro
                165                 170                 175

Asp Tyr Gly Glu Leu Thr Leu Asp Cys Glu Pro Arg Ser Gly Ile Asp
            180                 185                 190

Phe Asn Glu Met Ile Leu Leu Thr Met Lys Lys Lys Ala Trp Met Val
        195                 200                 205
```

```
His Arg Gln Trp Phe Phe Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala
    210                 215                 220

Asp Thr Ser Glu Val His Trp Asn Tyr Lys Glu Arg Met Val Thr Phe
225                 230                 235                 240

Lys Val Pro His Ala Lys Arg Gln Asp Val Thr Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Ser Ala Leu Ala Gly Ala Thr Glu Ile Gln Asn
            260                 265                 270

Ser Gly Gly Thr Ser Ile Phe Ala Gly His Leu Lys Cys Lys Val Arg
        275                 280                 285

Met Glu Lys Leu Arg Ile Lys Gly Met Ser Tyr Thr Met Cys Ser Gly
    290                 295                 300

Lys Phe Ser Ile Asp Lys Glu Met Ala Glu Thr Gln His Gly Thr Thr
305                 310                 315                 320

Val Val Lys Val Lys Tyr Glu Gly Ala Gly Ala Pro Cys Lys Val Pro
                325                 330                 335

Ile Glu Ile Arg Asp Val Asn Lys Glu Lys Val Val Gly Arg Val Ile
            340                 345                 350

Ser Ser Thr Pro Leu Ala Glu Asn Thr Asn Ser Val Thr Asn Ile Glu
        355                 360                 365

Leu Glu Pro Pro Phe Gly Asp Ser Tyr Ile Val Ile Gly Val Gly Asn
    370                 375                 380

Ser Ala Leu Thr Leu His Trp Phe Arg Lys Gly Ser Ser Ile Gly Lys
385                 390                 395                 400

Met Phe Glu Ser Thr Tyr Arg Gly Ala Lys Arg Met Ala Ile Leu Gly
                405                 410                 415
```

```
Glu Thr Ala Trp Asp Phe Gly Ser Val Gly Gly Leu Phe Thr Ser Leu
            420                 425                 430

Gly Lys Ala Val His Gln Val Phe Gly Ser Val Tyr Thr Thr Met Phe
        435                 440                 445

Gly Gly Val Ser Trp Met Ile Arg Ile Leu Ile Gly Phe Leu Val Leu
    450                 455                 460

Trp Ile Gly Thr Asn Ser Arg Asn Thr Ser Met Ala Met Thr Cys Ile
465                 470                 475                 480

Ala Val Gly Gly Ile Thr Leu Phe Leu Gly Phe Thr Val Gln Ala
                485                 490                 495
```

<210> 4
<211> 495
<212> PRT
<213> Artificial

<220>
<223> DENV4 M16 E glycoprotein sequence

<400> 4

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Met Arg Cys Val Gly Val Gly Asn Arg Asp Phe Val Glu Gly Val Ser
1               5                   10                  15

Gly Gly Ala Trp Val Asp Leu Val Leu Glu His Gly Gly Cys Val Thr
            20                  25                  30

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

Glu Ala Thr Gln Leu Ala Thr Leu Arg Lys Leu Cys Ile Glu Ala Ser
    50                  55                  60

Ile Ser Asn Ile Thr Thr Asp Thr Arg Cys Pro Thr Gln Gly Glu Pro
65                  70                  75                  80
```

```
Tyr Leu Lys Glu Glu Gln Asp Gln Gln Tyr Ile Cys Arg Arg Asp Val
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Gly
            100                 105                 110

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

Val Val Gln Tyr Glu Asn Leu Glu Tyr Thr Val Val Val Thr Val His
    130                 135                 140

Asn Gly Asp Gln His Ala Val Gly Asn Asp Thr Ser Asn His Gly Val
145                 150                 155                 160

Thr Ala Thr Ile Thr Pro Arg Ser Pro Ser Val Glu Val Lys Leu Pro
                165                 170                 175

Asp Tyr Gly Glu Leu Thr Leu Asp Cys Glu Pro Arg Ser Gly Ile Asp
            180                 185                 190

Phe Asn Glu Met Ile Leu Leu Thr Met Lys Lys Lys Ala Trp Met Val
        195                 200                 205

His Arg Gln Trp Phe Phe Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala
    210                 215                 220

Thr Thr Ser Glu Pro His Trp Asn Tyr Lys Glu Arg Met Val Thr Phe
225                 230                 235                 240

Lys Val Pro His Ala Lys Arg Gln Asp Val Thr Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Ser Ala Leu Ala Gly Ala Thr Glu Ile Gln Asn
            260                 265                 270
```

```
Ser Gly Gly Thr Ser Ile Phe Ala Gly His Leu Lys Cys Lys Val Arg
        275                 280                 285

Met Glu Lys Leu Arg Ile Lys Gly Met Ser Tyr Thr Met Cys Ser Gly
    290                 295                 300

Lys Phe Ser Ile Lys Lys Glu Met Ala Glu Thr Gln His Gly Thr Thr
305                 310                 315                 320

Val Val Lys Val Lys Tyr Glu Gly Ala Gly Ala Pro Cys Lys Val Pro
                325                 330                 335

Ile Glu Ile Arg Asp Val Asn Lys Glu Lys Val Val Gly Arg Val Ile
            340                 345                 350

Ser Ser Thr Pro Leu Ala Glu Asn Thr Asn Ser Pro Thr Asn Ile Glu
        355                 360                 365

Leu Glu Pro Pro Phe Gly Asp Ser Tyr Ile Val Ile Gly Val Gly Asn
    370                 375                 380

Ser Ala Leu Thr Leu His Trp Phe Arg Lys Gly Ser Ser Ile Gly Lys
385                 390                 395                 400

Met Phe Glu Ser Thr Tyr Arg Gly Ala Lys Arg Met Ala Ile Leu Gly
                405                 410                 415

Glu Thr Ala Trp Asp Phe Gly Ser Val Gly Gly Leu Phe Thr Ser Leu
            420                 425                 430

Gly Lys Ala Val His Gln Val Phe Gly Ser Val Tyr Thr Thr Met Phe
        435                 440                 445

Gly Gly Val Ser Trp Met Ile Arg Ile Leu Ile Gly Phe Leu Val Leu
    450                 455                 460

Trp Ile Gly Thr Asn Ser Arg Asn Thr Ser Met Ala Met Thr Cys Ile
465                 470                 475                 480
```

```
Ala Val Gly Gly Ile Thr Leu Phe Leu Gly Phe Thr Val Gln Ala
                485                 490                 495


<210>  5
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<213>  Artificial

<220>
<223>  DV4-EDIII-DV2 E glycoprotein sequence

<400>  5

Met Arg Cys Val Gly Val Gly Asn Arg Asp Phe Val Glu Gly Val Ser
1               5                   10                  15


Gly Gly Ala Trp Val Asp Leu Val Leu Glu His Gly Gly Cys Val Thr
            20                  25                  30


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


Thr Ala Lys Glu Val Ala Leu Leu Arg Thr Tyr Cys Ile Glu Ala Ser
    50                  55                  60


Ile Ser Asn Ile Thr Thr Ala Thr Arg Cys Pro Thr Gln Gly Glu Pro
65                  70                  75                  80


Tyr Leu Lys Glu Glu Gln Asp Gln Gln Tyr Ile Cys Arg Arg Asp Val
                85                  90                  95


Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Gly
            100                 105                 110


Val Val Thr Cys Ala Lys Phe Ser Cys Ser Gly Lys Ile Thr Gly Asn
        115                 120                 125


Leu Val Gln Ile Glu Asn Leu Glu Tyr Thr Val Val Val Thr Val His
    130                 135                 140
```

```
Asn Gly Asp Thr His Ala Val Gly Asn Asp Thr Ser Asn His Gly Val
145                 150                 155                 160

Thr Ala Thr Ile Thr Pro Arg Ser Pro Ser Val Glu Val Lys Leu Pro
                165                 170                 175

Asp Tyr Gly Glu Leu Thr Leu Asp Cys Glu Pro Arg Ser Gly Ile Asp
            180                 185                 190

Phe Asn Glu Met Ile Leu Met Lys Met Lys Lys Lys Thr Trp Leu Val
        195                 200                 205

His Lys Gln Trp Phe Leu Asp Leu Pro Leu Pro Trp Thr Ala Gly Ala
    210                 215                 220

Asp Thr Ser Glu Val His Trp Asn Tyr Lys Glu Arg Met Val Thr Phe
225                 230                 235                 240

Lys Val Pro His Ala Lys Arg Gln Asp Val Thr Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Ser Ala Leu Ala Gly Ala Thr Glu Val Asp Ser
            260                 265                 270

Gly Asp Gly Asn His Met Phe Ala Gly His Leu Lys Cys Lys Val Arg
        275                 280                 285

Met Glu Lys Leu Arg Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly
    290                 295                 300

Lys Phe Lys Ile Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320

Val Ile Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro
                325                 330                 335
```

```
Phe Glu Ile Thr Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile
            340                 345                 350

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

Ala Glu Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Glu Pro
    370                 375                 380

Gly Gln Leu Lys Leu Asn Trp Phe Lys Lys Gly Ser Ser Ile Gly Lys
385                 390                 395                 400

Met Phe Glu Ser Thr Tyr Arg Gly Ala Lys Arg Met Ala Ile Leu Gly
                405                 410                 415

Glu Thr Ala Trp Asp Phe Gly Ser Val Gly Gly Leu Phe Thr Ser Leu
            420                 425                 430

Gly Lys Ala Val His Gln Val Phe Gly Ser Val Tyr Thr Thr Met Phe
        435                 440                 445

Gly Gly Val Ser Trp Met Ile Arg Ile Leu Ile Gly Phe Leu Val Leu
    450                 455                 460

Trp Ile Gly Thr Asn Ser Arg Asn Thr Ser Met Ala Met Thr Cys Ile
465                 470                 475                 480

Ala Val Gly Gly Ile Thr Leu Phe Leu Gly Phe Thr Val Gln Ala
                485                 490                 495
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<210> 6
<211> 495
<212> PRT
<213> Artificial

<220>
<223> DENV2-1F4E E glycoprotein sequence

<400> 6

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Met Arg Cys Ile Gly Ile Ser Asn Arg Asp Phe Val Glu Gly Val Ser
1               5                  10                  15

Gly Gly Ser Trp Val Asp Ile Val Leu Glu His Gly Ser Cys Val Thr
            20                  25                  30

Thr Met Ala Lys Asn Lys Pro Thr Leu Asp Phe Glu Leu Phe Lys Thr
        35                  40                  45

Glu Val Thr Asn Pro Ala Val Leu Arg Lys Tyr Cys Ile Glu Ala Lys
    50                  55                  60

Leu Thr Asn Thr Thr Thr Glu Ser Arg Cys Pro Thr Gln Gly Glu Pro
65                  70                  75                  80

Ser Leu Asn Glu Glu Gln Asp Lys Arg Phe Ile Cys Lys His Ser Met
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Gly
            100                 105                 110

Ile Val Thr Cys Ala Met Phe Thr Cys Lys Lys Asn Met Glu Gly Lys
        115                 120                 125

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

Ser Gly Glu Glu His Ala Val Gly Asn Asp Thr Thr Glu His Gly Thr
145                 150                 155                 160

Thr Ala Thr Ile Thr Pro Gln Ala Pro Thr Ser Glu Ile Gln Leu Thr
                165                 170                 175

Asp Tyr Gly Ala Leu Thr Leu Glu Cys Ser Pro Arg Thr Gly Leu Asp
            180                 185                 190

Phe Asn Glu Met Val Leu Leu Gln Met Glu Asp Lys Ala Trp Leu Val
        195                 200                 205
```

```
His Arg Gln Trp Phe Leu Asp Leu Pro Leu Pro Trp Leu Pro Gly Ala
    210                 215                 220

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

Lys Asn Pro His Ala Lys Lys Gln Asp Val Val Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Thr
            260                 265                 270

Ser Gly Thr Thr Thr Leu Phe Thr Gly His Leu Lys Cys Arg Leu Arg
        275                 280                 285

Met Asp Lys Leu Gln Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly
    290                 295                 300

Lys Phe Lys Ile Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320

Val Ile Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro
                325                 330                 335

Phe Glu Ile Thr Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile
            340                 345                 350

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

Ala Glu Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Glu Pro
    370                 375                 380

Gly Gln Leu Lys Leu Asn Trp Phe Lys Lys Gly Ser Ser Ile Gly Gln
385                 390                 395                 400
```

Met Phe Glu Thr Thr Met Arg Gly Ala Lys Arg Met Ala Ile Leu Gly
405 410 415

Asp Thr Ala Trp Asp Phe Gly Ser Leu Gly Gly Val Phe Thr Ser Ile
420 425 430

Gly Lys Ala Leu His Gln Val Phe Gly Ala Ile Tyr Gly Ala Ala Phe
435 440 445

Ser Gly Val Ser Trp Thr Met Lys Ile Leu Ile Gly Val Ile Ile Thr
450 455 460

Trp Ile Gly Met Asn Ser Arg Ser Thr Ser Leu Ser Val Ser Leu Val
465 470 475 480

Leu Val Gly Val Val Thr Leu Tyr Leu Gly Ala Val Val Gln Ala
485 490 495

<210> 7
<211> 11
<212> DNA
<213> Artificial

<220>
<223> PflMI restriction site

<400> 7
ccaaacagtg g 11

<210> 8
<211> 11
<212> DNA
<213> Artificial

<220>
<223> PflMI restriction site

<400> 8
ccagattttg g 11

<210> 9
<211> 11

<212> DNA
<213> Artificial

<220>
<223> PflMI restriction site

<400> 9
ccacctttg g 11

<210> 10
<211> 11
<212> DNA
<213> Artificial

<220>
<223> PflMI restriction site

<400> 10
ccactagctg g 11

<210> 11
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<212> DNA
<213> Artificial

<220>
<223> PflMI restriction site

<400> 11
ccaaaccatg g 11

<210> 12
<211> 493
<212> PRT
<213> Dengue virus type 3

<400> 12

Met Arg Cys Val Gly Ile Gly Asn Arg Asp Phe Val Glu Gly Leu Ser
1 5 10 15

Gly Ala Thr Trp Val Asp Val Val Leu Glu His Gly Gly Cys Val Thr
20 25 30

Thr Met Ala Lys Asn Lys Pro Thr Leu Asp Ile Glu Leu Gln Lys Thr

```
        35                  40                  45

Glu Ala Thr Gln Leu Ala Thr Leu Arg Lys Leu Cys Ile Glu Gly Lys
    50                  55                  60

Ile Thr Asn Ile Thr Thr Asp Ser Arg Cys Pro Thr Gln Gly Glu Ala
65                  70                  75                  80

Val Leu Pro Glu Glu Gln Asp Gln Asn Tyr Val Cys Lys His Thr Tyr
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Ser
            100                 105                 110

Leu Val Thr Cys Ala Lys Phe Gln Cys Leu Glu Pro Ile Glu Gly Lys
        115                 120                 125

Val Val Gln Tyr Glu Asn Leu Lys Tyr Thr Val Ile Ile Thr Val His
    130                 135                 140

Thr Gly Asp Gln His Gln Val Gly Asn Glu Thr Gln Gly Val Thr Ala
145                 150                 155                 160

Glu Ile Thr Pro Gln Ala Ser Thr Thr Glu Ala Ile Leu Pro Glu Tyr
                165                 170                 175

Gly Thr Leu Gly Leu Glu Cys Ser Pro Arg Thr Gly Leu Asp Phe Asn
            180                 185                 190

Glu Met Ile Leu Leu Thr Met Lys Asn Lys Ala Trp Met Val His Arg
        195                 200                 205

Gln Trp Phe Phe Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala Thr Thr
    210                 215                 220

Glu Thr Pro Thr Trp Asn Arg Lys Glu Leu Leu Val Thr Phe Lys Asn
225                 230                 235                 240
```

```
Ala His Ala Lys Lys Gln Glu Val Val Val Leu Gly Ser Gln Glu Gly
               245                 250                 255

Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Asn Ser Gly
            260                 265                 270

Gly Thr Ser Ile Phe Ala Gly His Leu Lys Cys Arg Leu Lys Met Asp
        275                 280                 285

Lys Leu Glu Leu Lys Gly Met Ser Tyr Ala Met Cys Thr Asn Thr Phe
    290                 295                 300

Val Leu Lys Lys Glu Val Ser Glu Thr Gln His Gly Thr Ile Leu Ile
305                 310                 315                 320

Lys Val Glu Tyr Lys Gly Glu Asp Ala Pro Cys Lys Ile Pro Phe Ser
               325                 330                 335

Thr Glu Asp Gly Gln Gly Lys Ala His Asn Gly Arg Leu Ile Thr Ala
            340                 345                 350

Asn Pro Val Val Thr Lys Lys Glu Glu Pro Val Asn Ile Glu Ala Glu
        355                 360                 365

Pro Pro Phe Gly Glu Ser Asn Ile Val Ile Gly Ile Gly Asp Asn Ala
    370                 375                 380

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

Glu Ala Thr Ala Arg Gly Ala Arg Arg Met Ala Ile Leu Gly Asp Thr
               405                 410                 415

Ala Trp Asp Phe Gly Ser Val Gly Gly Val Leu Asn Ser Leu Gly Lys
            420                 425                 430

Met Val His Gln Ile Phe Gly Ser Ala Tyr Thr Ala Leu Phe Ser Gly
```

```
        435                 440                 445

Val Ser Trp Val Met Lys Ile Gly Ile Gly Val Leu Leu Thr Trp Ile
    450                 455                 460

Gly Leu Asn Ser Lys Asn Thr Ser Met Ser Phe Ser Cys Ile Ala Ile
465                 470                 475                 480

Gly Ile Ile Thr Leu Tyr Leu Gly Ala Val Val Gln Ala
                485                 490

<210>  13
<211>  495
<212>  PRT
<213>  Dengue virus type 2

<400>  13

Met Arg Cys Ile Gly Ile Ser Asn Arg Asp Phe Val Glu Gly Val Ser
1               5                   10                  15

Gly Gly Ser Trp Val Asp Ile Val Leu Glu His Gly Ser Cys Val Thr
            20                  25                  30

Thr Met Ala Lys Asn Lys Pro Thr Leu Asp Phe Glu Leu Ile Lys Thr
        35                  40                  45

Glu Ala Lys Gln Pro Ala Thr Leu Arg Lys Tyr Cys Ile Glu Ala Lys
    50                  55                  60

Leu Thr Asn Thr Thr Thr Glu Ser Arg Cys Pro Thr Gln Gly Glu Pro
65                  70                  75                  80

Ser Leu Asn Glu Glu Gln Asp Lys Arg Phe Ile Cys Lys His Ser Met
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Gly
            100                 105                 110
```

```
Ile Val Thr Cys Ala Met Phe Thr Cys Lys Lys Asn Met Glu Gly Lys
        115                 120                 125

Val Val Gln Pro Glu Asn Leu Glu Tyr Thr Ile Val Ile Thr Pro His
    130                 135                 140

Ser Gly Glu Glu His Ala Val Gly Asn Asp Thr Gly Lys His Gly Lys
145                 150                 155                 160

Glu Ile Lys Ile Thr Pro Gln Ser Ser Ile Thr Glu Ala Glu Leu Thr
                165                 170                 175

Gly Tyr Gly Thr Val Thr Met Glu Cys Ser Pro Arg Thr Gly Leu Asp
            180                 185                 190

Phe Asn Glu Met Val Leu Leu Gln Met Glu Asp Lys Ala Trp Leu Val
        195                 200                 205

His Arg Gln Trp Phe Leu Asp Leu Pro Leu Pro Trp Leu Pro Gly Ala
    210                 215                 220

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

Lys Asn Pro His Ala Lys Lys Gln Asp Val Val Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Met
            260                 265                 270

Ser Ser Gly Asn Leu Leu Phe Thr Gly His Leu Lys Cys Arg Leu Arg
        275                 280                 285

Met Asp Lys Leu Gln Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly
    290                 295                 300

Lys Phe Lys Ile Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320
```

```
Val Ile Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro
                325                 330                 335

Phe Glu Ile Thr Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile
            340                 345                 350

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

Ala Glu Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Glu Pro
    370                 375                 380

Gly Gln Leu Lys Leu Asn Trp Phe Lys Lys Gly Ser Ser Ile Gly Gln
385                 390                 395                 400

Met Phe Glu Thr Thr Met Arg Gly Ala Lys Arg Met Ala Ile Leu Gly
                405                 410                 415

Asp Thr Ala Trp Asp Phe Gly Ser Leu Gly Gly Val Phe Thr Ser Ile
            420                 425                 430

Gly Lys Ala Leu His Gln Val Phe Gly Ala Ile Tyr Gly Ala Ala Phe
        435                 440                 445

Ser Gly Val Ser Trp Thr Met Lys Ile Leu Ile Gly Val Ile Ile Thr
    450                 455                 460

Trp Ile Gly Met Asn Ser Arg Ser Thr Ser Leu Ser Val Ser Leu Val
465                 470                 475                 480

Leu Val Gly Val Val Thr Leu Tyr Leu Gly Ala Val Val Gln Ala
                485                 490                 495
```

<210> 14
<211> 495
<212> PRT
<213> Dengue virus type 1

<400> 14

```
Met Arg Cys Val Gly Ile Gly Asn Arg Asp Phe Val Glu Gly Leu Ser
1               5                  10                  15

Gly Ala Thr Trp Val Asp Val Val Leu Glu His Gly Ser Cys Val Thr
            20                  25                  30

Thr Met Ala Lys Asp Lys Pro Thr Leu Asp Ile Glu Leu Leu Lys Thr
        35                  40                  45

Glu Val Thr Asn Pro Ala Val Leu Arg Lys Leu Cys Ile Glu Ala Lys
    50                  55                  60

Ile Ser Asn Thr Thr Thr Asp Ser Arg Cys Pro Thr Gln Gly Glu Ala
65                  70                  75                  80

Thr Leu Val Glu Glu Gln Asp Thr Asn Phe Val Cys Arg Arg Thr Phe
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Ser
            100                 105                 110

Leu Ile Thr Cys Ala Lys Phe Lys Cys Val Thr Lys Leu Glu Gly Lys
        115                 120                 125

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

Thr Gly Asp Gln His Gln Val Gly Asn Glu Thr Thr Glu His Gly Thr
145                 150                 155                 160

Thr Ala Thr Ile Thr Pro Gln Ala Pro Thr Ser Glu Ile Gln Leu Thr
                165                 170                 175

Asp Tyr Gly Ala Leu Thr Leu Asp Cys Ser Pro Arg Thr Gly Leu Asp
            180                 185                 190
```

```
Phe Asn Glu Met Val Leu Leu Thr Met Glu Lys Lys Ser Trp Leu Val
        195                 200                 205

His Lys Gln Trp Phe Leu Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala
    210                 215                 220

Ser Thr Ser Gln Glu Thr Trp Asn Arg Gln Asp Leu Leu Val Thr Phe
225                 230                 235                 240

Lys Thr Ala His Ala Lys Lys Gln Glu Val Val Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Thr
            260                 265                 270

Ser Gly Thr Thr Thr Ile Phe Ala Gly His Leu Lys Cys Arg Leu Lys
        275                 280                 285

Met Asp Lys Leu Thr Leu Lys Gly Met Ser Tyr Val Met Cys Thr Gly
    290                 295                 300

Ser Phe Lys Leu Glu Lys Glu Val Ala Glu Thr Gln His Gly Thr Val
305                 310                 315                 320

Leu Val Gln Val Lys Tyr Glu Gly Thr Asp Ala Pro Cys Lys Ile Pro
                325                 330                 335

Phe Ser Ser Gln Asp Glu Lys Gly Val Thr Gln Asn Gly Arg Leu Ile
            340                 345                 350

Thr Ala Asn Pro Ile Val Thr Asp Lys Glu Lys Pro Val Asn Ile Glu
        355                 360                 365

Ala Glu Pro Pro Phe Gly Glu Ser Tyr Ile Val Val Gly Ala Gly Glu
    370                 375                 380

Lys Ala Leu Lys Leu Ser Trp Phe Lys Lys Gly Ser Ser Ile Gly Lys
```

385 390 395 400

Met Phe Glu Ala Thr Ala Arg Gly Ala Arg Arg Met Ala Ile Leu Gly
405 410 415

Asp Thr Ala Trp Asp Phe Gly Ser Ile Gly Gly Val Phe Thr Ser Val
420 425 430

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

Ser Gly Val Ser Trp Thr Met Lys Ile Gly Ile Gly Ile Leu Leu Thr
450 455 460

Trp Leu Gly Leu Asn Ser Arg Ser Thr Ser Leu Ser Met Thr Cys Ile
465 470 475 480

Ala Val Gly Met Val Thr Leu Tyr Leu Gly Val Met Val Gln Ala
485 490 495

<210> 15
<211> 495
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 15

Met Arg Cys Val Gly Ile Gly Asn Arg Asp Phe Val Glu Gly Leu Ser
1 5 10 15

Gly Ala Thr Trp Val Asp Val Val Leu Glu His Gly Ser Cys Val Thr
20 25 30

Thr Met Ala Lys Asp Lys Pro Thr Leu Asp Ile Glu Leu Leu Lys Thr
35 40 45

Glu Val Thr Asn Pro Ala Val Leu Arg Lys Leu Cys Ile Glu Ala Lys

```
    50                  55                  60

Ile Ser Asn Thr Thr Thr Asp Ser Arg Cys Pro Thr Gln Gly Glu Ala
65                  70                  75                  80

Thr Leu Val Glu Glu Gln Asp Thr Asn Phe Val Cys Arg Arg Thr Phe
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Ser
            100                 105                 110

Leu Ile Thr Cys Ala Lys Phe Lys Cys Val Thr Lys Leu Glu Gly Lys
        115                 120                 125

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

Thr Gly Asp Gln His Gln Val Gly Asn Glu Ala Thr Glu His Gly Val
145                 150                 155                 160

Thr Ala Met Ile Thr Pro Gln Ser Pro Ser Val Glu Val Lys Leu Pro
                165                 170                 175

Asp Tyr Gly Glu Leu Thr Leu Asp Cys Ser Pro Arg Thr Gly Leu Asp
            180                 185                 190

Phe Asn Glu Met Val Leu Leu Thr Met Lys Lys Lys Ser Trp Leu Val
        195                 200                 205

His Lys Gln Trp Phe Leu Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala
    210                 215                 220

Ser Thr Ser Gln Glu Thr Trp Asn Arg Gln Asp Leu Leu Val Thr Phe
225                 230                 235                 240

Lys Thr Ala His Ala Lys Lys Gln Glu Val Val Val Leu Gly Ser Gln
                245                 250                 255
```

```
Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Thr
            260                 265                 270

Ser Gly Thr Thr Thr Ile Phe Ala Gly His Leu Lys Cys Arg Leu Lys
        275                 280                 285

Met Asp Lys Leu Arg Leu Lys Gly Met Ser Tyr Val Met Cys Thr Gly
    290                 295                 300

Ser Phe Lys Leu Glu Lys Glu Val Ala Glu Thr Gln His Gly Thr Val
305                 310                 315                 320

Leu Val Gln Val Lys Tyr Glu Gly Thr Asp Ala Pro Cys Lys Ile Pro
                325                 330                 335

Phe Ser Ser Gln Asp Glu Lys Gly Val Thr Gln Asn Gly Arg Leu Ile
            340                 345                 350

Thr Ala Asn Pro Ile Val Thr Asp Lys Glu Lys Pro Val Asn Ile Glu
        355                 360                 365

Ala Glu Pro Pro Phe Gly Glu Ser Tyr Ile Val Val Gly Ala Gly Glu
    370                 375                 380

Lys Ala Leu Lys Leu Ser Trp Phe Lys Lys Gly Ser Ser Ile Gly Lys
385                 390                 395                 400

Met Phe Glu Ala Thr Ala Arg Gly Ala Arg Arg Met Ala Ile Leu Gly
                405                 410                 415

Asp Thr Ala Trp Asp Phe Gly Ser Ile Gly Gly Val Phe Thr Ser Val
            420                 425                 430

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

Ser Gly Val Ser Trp Thr Met Lys Ile Gly Ile Gly Ile Leu Leu Thr
```

```
    450                 455                 460

Trp Leu Gly Leu Asn Ser Arg Ser Thr Ser Leu Ser Met Thr Cys Ile
465                 470                 475                 480

Ala Val Gly Met Val Thr Leu Tyr Leu Gly Val Met Val Gln Ala
                485                 490                 495
```

<210> 16
<211> 495
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 16

```
Met Arg Cys Ile Gly Ile Ser Asn Arg Asp Phe Val Glu Gly Val Ser
1               5                   10                  15

Gly Gly Ser Trp Val Asp Ile Val Leu Glu His Gly Ser Cys Val Thr
            20                  25                  30

Thr Met Ala Lys Asn Lys Pro Thr Leu Asp Phe Glu Leu Ile Lys Thr
        35                  40                  45

Glu Ala Lys Gln Pro Ala Thr Leu Arg Lys Tyr Cys Ile Glu Ala Lys
    50                  55                  60

Leu Thr Asn Thr Thr Thr Glu Ser Arg Cys Pro Thr Gln Gly Glu Pro
65                  70                  75                  80

Ser Leu Asn Glu Glu Gln Asp Lys Arg Phe Ile Cys Lys His Ser Met
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Gly
            100                 105                 110

Ile Val Thr Cys Ala Met Phe Thr Cys Lys Lys Asn Met Glu Gly Lys
```

```
        115                 120                 125

Val Val Gln Pro Glu Asn Leu Glu Tyr Thr Ile Val Ile Thr Pro His
    130                 135                 140

Ser Gly Glu Glu His Ala Val Gly Asn Asp Ala Gly Lys His Gly Val
145                 150                 155                 160

Thr Ala Met Ile Thr Pro Gln Ser Ser Ser Val Glu Val Lys Leu Pro
                165                 170                 175

Asp Tyr Gly Glu Val Thr Met Glu Cys Ser Pro Arg Thr Gly Leu Asp
            180                 185                 190

Phe Asn Glu Met Val Leu Leu Gln Met Glu Asp Lys Ala Trp Leu Val
        195                 200                 205

His Arg Gln Trp Phe Leu Asp Leu Pro Leu Pro Trp Leu Pro Gly Ala
    210                 215                 220

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

Lys Asn Pro His Ala Lys Lys Gln Asp Val Val Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Met
            260                 265                 270

Ser Ser Gly Asn Leu Leu Phe Thr Gly His Leu Lys Cys Arg Leu Arg
        275                 280                 285

Met Asp Lys Leu Arg Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly
    290                 295                 300

Lys Phe Lys Ile Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320
```

```
Val Ile Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro
                325                 330                 335

Phe Glu Ile Thr Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile
            340                 345                 350

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

Ala Glu Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Glu Pro
    370                 375                 380

Gly Gln Leu Lys Leu Asn Trp Phe Lys Lys Gly Ser Ser Ile Gly Gln
385                 390                 395                 400

Met Phe Glu Thr Thr Met Arg Gly Ala Lys Arg Met Ala Ile Leu Gly
                405                 410                 415

Asp Thr Ala Trp Asp Phe Gly Ser Leu Gly Gly Val Phe Thr Ser Ile
            420                 425                 430

Gly Lys Ala Leu His Gln Val Phe Gly Ala Ile Tyr Gly Ala Ala Phe
        435                 440                 445

Ser Gly Val Ser Trp Thr Met Lys Ile Leu Ile Gly Val Ile Ile Thr
    450                 455                 460

Trp Ile Gly Met Asn Ser Arg Ser Thr Ser Leu Ser Val Ser Leu Val
465                 470                 475                 480

Leu Val Gly Val Val Thr Leu Tyr Leu Gly Ala Val Val Gln Ala
                485                 490                 495
```

<210> 17
<211> 495
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 17

```
Met Arg Cys Ile Gly Ile Ser Asn Arg Asp Phe Val Glu Gly Val Ser
1               5                  10                  15


Gly Gly Ser Trp Val Asp Ile Val Leu Glu His Gly Ser Cys Val Thr
            20                  25                  30


Thr Met Ala Lys Asn Lys Pro Thr Leu Asp Phe Glu Leu Phe Lys Thr
        35                  40                  45


Glu Val Thr Asn Pro Ala Val Leu Arg Lys Tyr Cys Ile Glu Ala Lys
    50                  55                  60


Leu Thr Asn Thr Thr Thr Glu Ser Arg Cys Pro Thr Gln Gly Glu Pro
65                  70                  75                  80


Ser Leu Asn Glu Glu Gln Asp Lys Arg Phe Val Cys Lys His Ser Met
                85                  90                  95


Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Gly
            100                 105                 110


Ile Val Thr Cys Ala Met Phe Thr Cys Lys Lys Asn Met Glu Gly Lys
        115                 120                 125


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


Ser Gly Glu Glu His Ala Val Gly Asn Asp Thr Thr Glu His Gly Thr
145                 150                 155                 160


Thr Ala Thr Val Thr Pro Gln Ala Pro Thr Ser Glu Ile Gln Leu Thr
                165                 170                 175


Asp Tyr Gly Ala Leu Thr Leu Glu Cys Ser Pro Arg Thr Gly Leu Asp
```

```
            180                 185                 190

Phe Asn Glu Met Val Leu Leu Gln Met Glu Asn Lys Ala Trp Leu Val
        195                 200                 205

His Arg Gln Trp Phe Leu Asp Leu Pro Leu Pro Trp Leu Pro Gly Ala
    210                 215                 220

Asp Thr Gln Gly Ser Asn Trp Ile Gln Lys Glu Thr Leu Val Thr Phe
225                 230                 235                 240

Lys Asn Pro His Ala Lys Lys Gln Asp Val Val Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Thr
            260                 265                 270

Ser Gly Thr Thr Thr Leu Phe Thr Gly His Leu Lys Cys Arg Leu Arg
        275                 280                 285

Met Asp Lys Leu Gln Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly
    290                 295                 300

Lys Phe Lys Val Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320

Val Ile Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro
                325                 330                 335

Phe Glu Ile Met Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile
            340                 345                 350

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

Ala Glu Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Asp Pro
    370                 375                 380
```

```
Gly Gln Leu Lys Leu Asn Trp Phe Lys Lys Gly Ser Ser Ile Gly Gln
385                 390                 395                 400


Met Phe Glu Thr Thr Met Arg Gly Ala Lys Arg Met Ala Ile Leu Gly
                405                 410                 415


Asp Thr Ala Trp Asp Phe Gly Ser Leu Gly Gly Val Phe Thr Ser Ile
            420                 425                 430


Gly Lys Ala Leu His Gln Val Phe Gly Ala Ile Tyr Gly Ala Ala Phe
        435                 440                 445


Ser Gly Val Ser Trp Thr Met Lys Ile Leu Ile Gly Val Ile Ile Thr
    450                 455                 460


Trp Ile Gly Met Asn Ser Arg Ser Thr Ser Leu Ser Val Ser Leu Val
465                 470                 475                 480


Leu Val Gly Val Val Thr Leu Tyr Leu Gly Ala Val Val Gln Ala
                485                 490                 495


<210>  18
<211>  495
<212>  PRT
<213>  Artificial

<220>
<223>  Chimeric Dengue virus E glycoprotein sequence

<400>  18

Met Arg Cys Val Gly Val Gly Asn Arg Asp Phe Val Glu Gly Val Ser
1               5                   10                  15


Gly Gly Ala Trp Val Asp Leu Val Leu Glu His Gly Gly Cys Val Thr
            20                  25                  30


Thr Met Ala Gln Gly Lys Pro Thr Leu Asp Phe Glu Leu Phe Lys Thr
        35                  40                  45
```

```
Thr Val Thr Asn Pro Ala Val Leu Arg Thr Tyr Cys Ile Glu Ala Ser
    50                  55                  60

Ile Ser Asn Ile Thr Thr Ala Thr Arg Cys Pro Thr Gln Gly Glu Pro
65                  70                  75                  80

Tyr Leu Lys Glu Glu Gln Asp Gln Gln Tyr Ile Cys Arg Arg Asp Val
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Gly
            100                 105                 110

Val Val Thr Cys Ala Lys Phe Ser Cys Ser Gly Lys Ile Thr Gly Asn
        115                 120                 125

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

Asn Gly Asp Thr His Ala Val Gly Asn Asp Thr Thr Glu His Gly Thr
145                 150                 155                 160

Thr Ala Thr Ile Thr Pro Arg Ala Pro Thr Ser Glu Ile Gln Leu Thr
                165                 170                 175

Asp Tyr Gly Ala Leu Thr Leu Asp Cys Glu Pro Arg Ser Gly Ile Asp
            180                 185                 190

Phe Asn Glu Met Ile Leu Met Lys Met Lys Lys Lys Thr Trp Leu Val
        195                 200                 205

His Lys Gln Trp Phe Leu Asp Leu Pro Leu Pro Trp Thr Ala Gly Ala
    210                 215                 220

Asp Thr Ser Glu Val His Trp Asn Tyr Lys Glu Arg Met Val Thr Phe
225                 230                 235                 240

Lys Val Pro His Ala Lys Arg Gln Asp Val Thr Val Leu Gly Ser Gln
```

```
                245                 250                 255

Glu Gly Ala Met His Ser Ala Leu Ala Gly Ala Thr Glu Val Asp Thr
            260                 265                 270

Gly Gly Thr Thr Thr Met Phe Ala Gly His Leu Lys Cys Lys Val Arg
        275                 280                 285

Met Glu Lys Leu Arg Ile Lys Gly Met Ser Tyr Thr Met Cys Ser Gly
    290                 295                 300

Lys Phe Ser Ile Asp Lys Glu Met Ala Glu Thr Gln His Gly Thr Thr
305                 310                 315                 320

Val Val Lys Val Lys Tyr Glu Gly Ala Gly Ala Pro Cys Lys Val Pro
                325                 330                 335

Ile Glu Ile Arg Asp Val Asn Lys Glu Lys Val Val Gly Arg Val Ile
            340                 345                 350

Ser Ser Thr Pro Leu Ala Glu Asn Thr Asn Ser Val Thr Asn Ile Glu
        355                 360                 365

Leu Glu Pro Pro Phe Gly Asp Ser Tyr Ile Val Ile Gly Val Gly Asn
    370                 375                 380

Ser Ala Leu Thr Leu His Trp Phe Arg Lys Gly Ser Ser Ile Gly Lys
385                 390                 395                 400

Met Phe Glu Ser Thr Tyr Arg Gly Ala Lys Arg Met Ala Ile Leu Gly
                405                 410                 415

Glu Thr Ala Trp Asp Phe Gly Ser Val Gly Gly Leu Phe Thr Ser Leu
            420                 425                 430

Gly Lys Ala Val His Gln Val Phe Gly Ser Val Tyr Thr Thr Met Phe
        435                 440                 445
```

Gly Gly Val Ser Trp Met Ile Arg Ile Leu Ile Gly Phe Leu Val Leu
450 455 460

Trp Ile Gly Thr Asn Ser Arg Asn Thr Ser Met Ala Met Thr Cys Ile
465 470 475 480

Ala Val Gly Gly Ile Thr Leu Phe Leu Gly Phe Thr Val Gln Ala
485 490 495

<210> 19
<211> 495
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 19

Met Arg Cys Val Gly Ile Gly Asn Arg Asp Phe Val Glu Gly Leu Ser
1 5 10 15

Gly Ala Thr Trp Val Asp Val Val Leu Glu His Gly Ser Cys Val Thr
20 25 30

Thr Met Ala Lys Asp Lys Pro Thr Leu Asp Ile Glu Leu Leu Lys Thr
35 40 45

Glu Ala Thr Gln Leu Ala Thr Leu Arg Lys Leu Cys Ile Glu Ala Lys
50 55 60

Ile Ser Asn Thr Thr Thr Asp Ser Arg Cys Pro Thr Gln Gly Glu Ala
65 70 75 80

Thr Leu Val Glu Glu Gln Asp Thr Asn Phe Val Cys Arg Arg Thr Phe
85 90 95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Ser
100 105 110

```
Leu Ile Thr Cys Ala Lys Phe Lys Cys Leu Glu Pro Ile Glu Gly Lys
        115                 120                 125

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

Thr Gly Asp Gln His Gln Val Gly Asn Glu Thr Thr Glu His Gly Thr
145                 150                 155                 160

Ile Ala Thr Ile Thr Pro Gln Ala Pro Thr Ser Glu Ile Gln Leu Thr
                165                 170                 175

Asp Tyr Gly Ala Leu Thr Leu Asp Cys Ser Pro Arg Thr Gly Leu Asp
            180                 185                 190

Phe Asn Glu Met Ile Leu Leu Thr Met Lys Asn Lys Ala Trp Met Val
        195                 200                 205

His Arg Gln Trp Phe Phe Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala
    210                 215                 220

Ser Thr Ser Gln Glu Thr Trp Asn Arg Gln Asp Leu Leu Val Thr Phe
225                 230                 235                 240

Lys Thr Ala His Ala Lys Lys Gln Glu Val Val Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Asn
            260                 265                 270

Ser Gly Gly Thr Ser Ile Phe Ala Gly His Leu Lys Cys Arg Leu Lys
        275                 280                 285

Met Asp Lys Leu Thr Leu Lys Gly Met Ser Tyr Val Met Cys Thr Gly
    290                 295                 300

Ser Phe Lys Leu Glu Lys Glu Val Ala Glu Thr Gln His Gly Thr Val
```

```
305                 310                 315                 320

Leu Val Gln Val Lys Tyr Glu Gly Thr Asp Ala Pro Cys Lys Ile Pro
                325                 330                 335

Phe Ser Ser Gln Asp Glu Lys Gly Val Thr Gln Asn Gly Arg Leu Ile
            340                 345                 350

Thr Ala Asn Pro Ile Val Thr Asp Lys Glu Lys Pro Val Asn Ile Glu
        355                 360                 365

Ala Glu Pro Pro Phe Gly Glu Ser Tyr Ile Val Val Gly Ala Gly Glu
    370                 375                 380

Lys Ala Leu Lys Leu Ser Trp Phe Lys Lys Gly Ser Ser Ile Gly Lys
385                 390                 395                 400

Met Phe Glu Ala Thr Ala Arg Gly Ala Arg Arg Met Ala Ile Leu Gly
                405                 410                 415

Asp Thr Ala Trp Asp Phe Gly Ser Ile Gly Gly Val Phe Thr Ser Val
            420                 425                 430

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

Ser Gly Val Ser Trp Thr Met Lys Ile Gly Ile Gly Ile Leu Leu Thr
    450                 455                 460

Trp Leu Gly Leu Asn Ser Arg Ser Thr Ser Leu Ser Met Thr Cys Ile
465                 470                 475                 480

Ala Val Gly Met Val Thr Leu Tyr Leu Gly Val Met Val Gln Ala
                485                 490                 495
```

<210> 20
<211> 495
<212> PRT

<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 20

```
Met Arg Cys Ile Gly Ile Ser Asn Arg Asp Phe Val Glu Gly Val Ser
1               5                   10                  15


Gly Gly Ser Trp Val Asp Ile Val Leu Glu His Gly Ser Cys Val Thr
            20                  25                  30


Thr Met Ala Lys Asn Lys Pro Thr Leu Asp Phe Glu Leu Ile Lys Thr
        35                  40                  45


Glu Ala Thr Gln Leu Ala Thr Leu Arg Lys Leu Cys Ile Glu Ala Lys
    50                  55                  60


Leu Thr Asn Thr Thr Thr Glu Ser Arg Cys Pro Thr Gln Gly Glu Pro
65                  70                  75                  80


Ser Leu Asn Glu Glu Gln Asp Lys Arg Phe Val Cys Lys His Ser Met
                85                  90                  95


Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Gly
            100                 105                 110


Ile Val Thr Cys Ala Met Phe Thr Cys Lys Glu Pro Ile Glu Gly Lys
        115                 120                 125


Val Val Gln Pro Glu Asn Leu Glu Tyr Thr Ile Val Val Thr Pro His
    130                 135                 140


Ser Gly Glu Glu His Ala Val Gly Asn Asp Thr Gly Lys His Gly Lys
145                 150                 155                 160


Glu Ile Lys Val Thr Pro Gln Ser Ser Ile Thr Glu Ala Glu Leu Thr
                165                 170                 175
```

```
Gly Tyr Gly Thr Val Thr Met Glu Cys Ser Pro Arg Thr Gly Leu Asp
            180                 185                 190

Phe Asn Glu Met Val Leu Leu Thr Met Lys Asn Lys Ala Trp Met Val
        195                 200                 205

His Arg Gln Trp Phe Phe Asp Leu Pro Leu Pro Trp Thr Ser Thr Ala
    210                 215                 220

Asp Thr Gln Gly Pro Asn Trp Ile Gln Lys Glu Thr Leu Val Thr Phe
225                 230                 235                 240

Lys Asn Pro His Ala Lys Lys Gln Asp Val Val Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Asn
            260                 265                 270

Ser Gly Gly Thr Ser Ile Phe Ala Gly His Leu Lys Cys Arg Leu Arg
        275                 280                 285

Met Asp Lys Leu Gln Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly
    290                 295                 300

Lys Phe Lys Val Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320

Val Ile Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro
                325                 330                 335

Phe Glu Ile Met Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile
            340                 345                 350

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

Ala Glu Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Asp Pro
```

```
    370                 375                 380

Gly Gln Leu Lys Leu Asn Trp Phe Lys Lys Gly Ser Ser Ile Gly Gln
385                 390                 395                 400

Met Phe Glu Thr Thr Met Arg Gly Ala Lys Arg Met Ala Ile Leu Gly
                405                 410                 415

Asp Thr Ala Trp Asp Phe Gly Ser Leu Gly Gly Val Phe Thr Ser Ile
            420                 425                 430

Gly Lys Ala Leu His Gln Val Phe Gly Ala Ile Tyr Gly Ala Ala Phe
        435                 440                 445

Ser Gly Val Ser Trp Thr Met Lys Ile Leu Ile Gly Val Ile Ile Thr
    450                 455                 460

Trp Ile Gly Met Asn Ser Arg Ser Thr Ser Leu Ser Val Ser Leu Val
465                 470                 475                 480

Leu Val Gly Ile Val Thr Leu Tyr Leu Gly Val Met Val Gln Ala
                485                 490                 495
```

<210> 21
<211> 495
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 21

```
Met Arg Cys Val Gly Ile Gly Asn Arg Asp Phe Val Glu Gly Leu Ser
1               5                   10                  15

Gly Ala Thr Trp Val Asp Val Val Leu Glu His Gly Gly Cys Val Thr
            20                  25                  30

Thr Met Ala Lys Asn Lys Pro Thr Leu Asp Ile Glu Leu Gln Lys Thr
```

```
        35                  40                  45

Glu Ala Thr Gln Leu Ala Thr Leu Arg Lys Leu Cys Ile Glu Gly Lys
    50                  55                  60

Ile Thr Asn Ile Thr Thr Asp Ser Arg Cys Pro Thr Gln Gly Glu Ala
65                  70                  75                  80

Val Leu Pro Glu Glu Gln Asp Gln Asn Tyr Val Cys Lys His Thr Tyr
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Ser
            100                 105                 110

Leu Val Thr Cys Ala Lys Phe Gln Cys Leu Glu Pro Ile Glu Gly Lys
        115                 120                 125

Val Val Gln Tyr Glu Asn Leu Lys Tyr Thr Val Ile Ile Thr Val His
    130                 135                 140

Thr Gly Asp Gln His Gln Val Gly Asn Glu Ala Ser Asn Gln Gly Val
145                 150                 155                 160

Thr Ala Met Ile Thr Pro Gln Ser Ser Ser Val Glu Val Lys Leu Pro
                165                 170                 175

Asp Tyr Gly Glu Leu Gly Leu Glu Cys Ser Pro Arg Thr Gly Leu Asp
            180                 185                 190

Phe Asn Glu Met Ile Leu Leu Thr Met Lys Asn Lys Ala Trp Met Val
        195                 200                 205

His Arg Gln Trp Phe Phe Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala
    210                 215                 220

Thr Thr Glu Thr Pro Thr Trp Asn Arg Lys Glu Leu Leu Val Thr Phe
225                 230                 235                 240
```

```
Lys Asn Ala His Ala Lys Lys Gln Glu Val Val Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Asn
            260                 265                 270

Ser Gly Gly Thr Ser Ile Phe Ala Gly His Leu Lys Cys Arg Leu Lys
        275                 280                 285

Met Asp Lys Leu Arg Leu Lys Gly Met Ser Tyr Ala Met Cys Thr Asn
    290                 295                 300

Thr Phe Val Leu Lys Lys Glu Val Ser Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320

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

Phe Ser Thr Glu Asp Gly Gln Gly Lys Ala His Asn Gly Arg Leu Ile
            340                 345                 350

Thr Ala Asn Pro Val Val Thr Lys Lys Glu Glu Pro Val Asn Ile Glu
        355                 360                 365

Ala Glu Pro Pro Phe Gly Glu Ser Asn Ile Val Ile Gly Ile Gly Asp
    370                 375                 380

Asn Ala Leu Lys Ile Asn Trp Tyr Lys Lys Gly Ser Ser Ile Gly Lys
385                 390                 395                 400

Met Phe Glu Ala Thr Ala Arg Gly Ala Arg Arg Met Ala Ile Leu Gly
                405                 410                 415

Asp Thr Ala Trp Asp Phe Gly Ser Val Gly Gly Val Leu Asn Ser Leu
            420                 425                 430

Gly Lys Met Val His Gln Ile Phe Gly Ser Ala Tyr Thr Ala Leu Phe
```

```
        435                 440                 445

Ser Gly Val Ser Trp Val Met Lys Ile Gly Ile Gly Val Leu Leu Thr
    450                 455                 460

Trp Ile Gly Leu Asn Ser Lys Asn Thr Ser Met Ser Phe Ser Cys Ile
465                 470                 475                 480

Ala Ile Gly Ile Ile Thr Leu Tyr Leu Gly Ala Val Val Gln Ala
                485                 490                 495
```

<210> 22
<211> 495
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 22

```
Met Arg Cys Val Gly Val Gly Asn Arg Asp Phe Val Glu Gly Val Ser
1               5                   10                  15

Gly Gly Ala Trp Val Asp Leu Val Leu Glu His Gly Gly Cys Val Thr
            20                  25                  30

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

Thr Ala Lys Glu Val Ala Leu Leu Arg Thr Tyr Cys Ile Glu Ala Ser
    50                  55                  60

Ile Ser Asn Ile Thr Thr Ala Thr Arg Cys Pro Thr Gln Gly Glu Pro
65                  70                  75                  80

Tyr Leu Lys Glu Glu Gln Asp Gln Gln Tyr Ile Cys Arg Arg Asp Val
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Gly
```

```
            100                 105                 110

Val Val Thr Cys Ala Lys Phe Ser Cys Ser Gly Lys Ile Thr Gly Asn
        115                 120                 125

Leu Val Gln Ile Glu Asn Leu Glu Tyr Thr Val Val Val Thr Val His
    130                 135                 140

Asn Gly Asp Thr His Ala Val Gly Asn Asp Thr Ser Asn His Gly Val
145                 150                 155                 160

Thr Ala Thr Ile Thr Pro Arg Ser Pro Ser Val Glu Val Lys Leu Pro
                165                 170                 175

Asp Tyr Gly Glu Leu Thr Leu Asp Cys Glu Pro Arg Ser Gly Ile Asp
            180                 185                 190

Phe Asn Glu Met Ile Leu Met Lys Met Lys Lys Lys Thr Trp Leu Val
        195                 200                 205

His Lys Gln Trp Phe Leu Asp Leu Pro Leu Pro Trp Thr Ala Gly Ala
    210                 215                 220

Asp Thr Ser Glu Val His Trp Asn Tyr Lys Glu Arg Met Val Thr Phe
225                 230                 235                 240

Lys Val Pro His Ala Lys Arg Gln Asp Val Thr Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Ser Ala Leu Ala Gly Ala Thr Glu Val Asp Ser
            260                 265                 270

Gly Asp Gly Asn His Met Phe Ala Gly His Leu Lys Cys Lys Val Arg
        275                 280                 285

Met Glu Lys Leu Arg Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly
    290                 295                 300
```

```
Lys Phe Lys Ile Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320

Val Ile Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro
                325                 330                 335

Phe Glu Ile Thr Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile
            340                 345                 350

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

Ala Glu Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Glu Pro
    370                 375                 380

Gly Gln Leu Lys Leu Asn Trp Phe Lys Lys Gly Ser Ser Ile Gly Lys
385                 390                 395                 400

Met Phe Glu Ser Thr Tyr Arg Gly Ala Lys Arg Met Ala Ile Leu Gly
                405                 410                 415

Glu Thr Ala Trp Asp Phe Gly Ser Val Gly Gly Leu Phe Thr Ser Leu
            420                 425                 430

Gly Lys Ala Val His Gln Val Phe Gly Ser Val Tyr Thr Thr Met Phe
        435                 440                 445

Gly Gly Val Ser Trp Met Ile Arg Ile Leu Ile Gly Phe Leu Val Leu
    450                 455                 460

Trp Ile Gly Thr Asn Ser Arg Asn Thr Ser Met Ala Met Thr Cys Ile
465                 470                 475                 480

Ala Val Gly Gly Ile Thr Leu Phe Leu Gly Phe Thr Val Gln Ala
                485                 490                 495
```

<210> 23

<211> 495
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 23

```
Met Arg Cys Val Gly Ile Gly Asn Arg Asp Phe Val Glu Gly Leu Ser
1               5                   10                  15


Gly Ala Thr Trp Val Asp Val Val Leu Glu His Gly Ser Cys Val Thr
            20                  25                  30


Thr Met Ala Lys Asp Lys Pro Thr Leu Asp Ile Glu Leu Leu Lys Thr
        35                  40                  45


Glu Val Thr Asn Pro Ala Val Leu Arg Lys Leu Cys Ile Glu Ala Lys
    50                  55                  60


Ile Ser Asn Thr Thr Thr Asp Ser Arg Cys Pro Thr Gln Gly Glu Ala
65                  70                  75                  80


Thr Leu Val Glu Glu Gln Asp Thr Asn Phe Val Cys Arg Arg Thr Phe
                85                  90                  95


Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Ser
            100                 105                 110


Leu Ile Thr Cys Ala Lys Phe Lys Cys Val Thr Lys Leu Glu Gly Lys
        115                 120                 125


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


Thr Gly Asp Gln His Gln Val Gly Asn Glu Thr Thr Glu His Gly Thr
145                 150                 155                 160


Thr Ala Thr Ile Thr Pro Gln Ala Pro Thr Ser Glu Ile Gln Leu Thr
```

```
                165                 170                 175

Asp Tyr Gly Ala Leu Thr Leu Asp Cys Ser Pro Arg Thr Gly Leu Asp
            180                 185                 190

Phe Asn Glu Met Val Leu Leu Thr Met Glu Lys Lys Ser Trp Leu Val
        195                 200                 205

His Lys Gln Trp Phe Leu Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala
    210                 215                 220

Ser Thr Ser Gln Glu Thr Trp Asn Arg Gln Asp Leu Leu Val Thr Phe
225                 230                 235                 240

Lys Thr Ala His Ala Lys Lys Gln Glu Val Val Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Thr
            260                 265                 270

Ser Gly Thr Thr Thr Ile Phe Ala Gly His Leu Lys Cys Arg Leu Lys
        275                 280                 285

Met Asp Lys Leu Thr Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly
    290                 295                 300

Lys Phe Lys Ile Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320

Val Ile Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro
                325                 330                 335

Phe Glu Ile Thr Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile
            340                 345                 350

Thr Val Asn Pro Ile Val Thr Glu Lys Asp Ser Pro Val Asn Ile Glu
        355                 360                 365
```

```
Ala Glu Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Glu Pro
    370                 375                 380

Gly Gln Leu Lys Leu Asn Trp Phe Lys Lys Gly Ser Ser Ile Gly Lys
385                 390                 395                 400

Met Phe Glu Ala Thr Ala Arg Gly Ala Arg Arg Met Ala Ile Leu Gly
                405                 410                 415

Asp Thr Ala Trp Asp Phe Gly Ser Ile Gly Gly Val Phe Thr Ser Val
            420                 425                 430

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

Ser Gly Val Ser Trp Thr Met Lys Ile Gly Ile Gly Ile Leu Leu Thr
    450                 455                 460

Trp Leu Gly Leu Asn Ser Arg Ser Thr Ser Leu Ser Met Thr Cys Ile
465                 470                 475                 480

Ala Val Gly Met Val Thr Leu Tyr Leu Gly Val Met Val Gln Ala
                485                 490                 495
```

<210> 24
<211> 493
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 24

```
Met Arg Cys Val Gly Ile Gly Asn Arg Asp Phe Val Glu Gly Leu Ser
1               5                   10                  15

Gly Ala Thr Trp Val Asp Val Val Leu Glu His Gly Gly Cys Val Thr
            20                  25                  30
```

```
Thr Met Ala Lys Asn Lys Pro Thr Leu Asp Ile Glu Leu Gln Lys Thr
        35                  40                  45

Glu Ala Thr Gln Leu Ala Thr Leu Arg Lys Leu Cys Ile Glu Gly Lys
    50                  55                  60

Ile Thr Asn Ile Thr Thr Asp Ser Arg Cys Pro Thr Gln Gly Glu Ala
65                  70                  75                  80

Val Leu Pro Glu Glu Gln Asp Gln Asn Tyr Val Cys Lys His Thr Tyr
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Ser
            100                 105                 110

Leu Val Thr Cys Ala Lys Phe Gln Cys Leu Glu Pro Ile Glu Gly Lys
        115                 120                 125

Val Val Gln Tyr Glu Asn Leu Lys Tyr Thr Val Ile Ile Thr Val His
    130                 135                 140

Thr Gly Asp Gln His Gln Val Gly Asn Glu Thr Gln Gly Val Thr Ala
145                 150                 155                 160

Glu Ile Thr Pro Gln Ala Ser Thr Thr Glu Ala Ile Leu Pro Glu Tyr
                165                 170                 175

Gly Thr Leu Gly Leu Glu Cys Ser Pro Arg Thr Gly Leu Asp Phe Asn
            180                 185                 190

Glu Met Ile Leu Leu Thr Met Lys Asn Lys Ala Trp Met Val His Arg
        195                 200                 205

Gln Trp Phe Phe Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala Thr Thr
    210                 215                 220

Glu Thr Pro Thr Trp Asn Arg Lys Glu Leu Leu Val Thr Phe Lys Asn
```

```
225                 230                 235                 240

Ala His Ala Lys Lys Gln Glu Val Val Val Leu Gly Ser Gln Glu Gly
                245                 250                 255

Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Asn Ser Gly
            260                 265                 270

Gly Thr Ser Ile Phe Ala Gly His Leu Lys Cys Arg Leu Lys Met Asp
        275                 280                 285

Lys Leu Glu Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly Lys Phe
    290                 295                 300

Lys Ile Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile Val Ile
305                 310                 315                 320

Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro Phe Glu
                325                 330                 335

Ile Thr Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile Thr Val
            340                 345                 350

Asn Pro Ile Val Thr Glu Lys Asp Ser Pro Val Asn Ile Glu Ala Glu
        355                 360                 365

Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Glu Pro Gly Gln
    370                 375                 380

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

Glu Ala Thr Ala Arg Gly Ala Arg Arg Met Ala Ile Leu Gly Asp Thr
                405                 410                 415

Ala Trp Asp Phe Gly Ser Val Gly Gly Val Leu Asn Ser Leu Gly Lys
            420                 425                 430
```

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

Val Ser Trp Val Met Lys Ile Gly Ile Gly Val Leu Leu Thr Trp Ile
    450   455   460

Gly Leu Asn Ser Lys Asn Thr Ser Met Ser Phe Ser Cys Ile Ala Ile
465   470   475   480

Gly Ile Ile Thr Leu Tyr Leu Gly Ala Val Val Gln Ala
                485   490

<210> 25
<211> 495
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 25

Met Arg Cys Ile Gly Ile Ser Asn Arg Asp Phe Val Glu Gly Val Ser
1   5   10   15

Gly Gly Ser Trp Val Asp Ile Val Leu Glu His Gly Ser Cys Val Thr
            20   25   30

Thr Met Ala Lys Asn Lys Pro Thr Leu Asp Phe Glu Leu Phe Lys Thr
        35   40   45

Glu Val Thr Gln Leu Ala Thr Leu Arg Lys Leu Cys Ile Glu Ala Lys
    50   55   60

Leu Thr Asn Thr Thr Thr Glu Ser Arg Cys Pro Thr Gln Gly Glu Pro
65   70   75   80

Ser Leu Asn Glu Glu Gln Asp Lys Arg Phe Val Cys Lys His Ser Met
                85   90   95

```
Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Gly
            100                 105                 110

Ile Val Thr Cys Ala Met Phe Thr Cys Lys Lys Pro Ile Glu Gly Lys
        115                 120                 125

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

Ser Gly Glu Glu His Ala Val Gly Asn Asp Thr Thr Glu His Gly Thr
145                 150                 155                 160

Thr Ala Thr Val Thr Pro Gln Ser Ser Thr Ser Glu Ile Gln Leu Thr
                165                 170                 175

Asp Tyr Gly Thr Val Thr Met Glu Cys Ser Pro Arg Thr Gly Leu Asp
            180                 185                 190

Phe Asn Glu Met Ile Leu Leu Thr Met Lys Asn Lys Ala Trp Met Val
        195                 200                 205

His Arg Gln Trp Phe Phe Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala
    210                 215                 220

Asp Thr Gln Gly Ser Asn Trp Ile Gln Lys Glu Thr Leu Val Thr Phe
225                 230                 235                 240

Lys Asn Pro His Ala Lys Lys Gln Asp Val Val Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Thr
            260                 265                 270

Ser Ser Thr Thr Thr Ile Phe Ala Gly His Leu Lys Cys Arg Leu Arg
        275                 280                 285

Met Asp Lys Leu Gln Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly
```

```
    290                 295                 300

Lys Phe Lys Val Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320

Val Ile Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro
                325                 330                 335

Phe Glu Ile Met Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile
            340                 345                 350

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

Ala Glu Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Asp Pro
    370                 375                 380

Gly Gln Leu Lys Leu Asn Trp Phe Lys Lys Gly Ser Ser Ile Gly Gln
385                 390                 395                 400

Met Phe Glu Thr Thr Met Arg Gly Ala Lys Arg Met Ala Ile Leu Gly
                405                 410                 415

Asp Thr Ala Trp Asp Phe Gly Ser Leu Gly Gly Val Phe Thr Ser Ile
            420                 425                 430

Gly Lys Ala Leu His Gln Val Phe Gly Ala Ile Tyr Gly Ala Ala Phe
        435                 440                 445

Ser Gly Val Ser Trp Thr Met Lys Ile Leu Ile Gly Val Ile Ile Thr
    450                 455                 460

Trp Ile Gly Met Asn Ser Arg Ser Thr Ser Leu Ser Val Ser Leu Val
465                 470                 475                 480

Leu Val Gly Val Val Thr Leu Tyr Leu Gly Ala Val Val Gln Ala
                485                 490                 495
```

<210> 26
<211> 495
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 26

```
Met Arg Cys Ile Gly Ile Ser Asn Arg Asp Phe Val Glu Gly Val Ser
1               5                   10                  15


Gly Gly Ser Trp Val Asp Ile Val Leu Glu His Gly Ser Cys Val Thr
            20                  25                  30


Thr Met Ala Lys Asn Lys Pro Thr Leu Asp Phe Glu Leu Phe Lys Thr
        35                  40                  45


Glu Val Thr Gln Pro Ala Thr Leu Arg Lys Tyr Cys Ile Glu Ala Lys
    50                  55                  60


Leu Thr Asn Thr Thr Thr Glu Ser Arg Cys Pro Thr Gln Gly Glu Pro
65                  70                  75                  80


Ser Leu Asn Glu Glu Gln Asp Lys Arg Phe Val Cys Lys His Ser Met
                85                  90                  95


Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Gly
            100                 105                 110


Ile Val Thr Cys Ala Met Phe Thr Cys Lys Lys Asn Met Glu Gly Lys
        115                 120                 125


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


Ser Gly Glu Glu His Ala Val Gly Asn Asp Ala Thr Glu His Gly Val
145                 150                 155                 160
```

```
Thr Ala Met Val Thr Pro Gln Ser Ser Thr Val Glu Val Lys Leu Pro
                165                 170                 175

Asp Tyr Gly Glu Val Thr Met Glu Cys Ser Pro Arg Thr Gly Leu Asp
            180                 185                 190

Phe Asn Glu Met Val Leu Leu Gln Met Glu Asn Lys Ala Trp Leu Val
        195                 200                 205

His Arg Gln Trp Phe Leu Asp Leu Pro Leu Pro Trp Leu Pro Gly Ala
    210                 215                 220

Asp Thr Gln Gly Ser Asn Trp Ile Gln Lys Glu Thr Leu Val Thr Phe
225                 230                 235                 240

Lys Asn Pro His Ala Lys Lys Gln Asp Val Val Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Thr
            260                 265                 270

Ser Gly Thr Thr Thr Leu Phe Thr Gly His Leu Lys Cys Arg Leu Arg
        275                 280                 285

Met Asp Lys Leu Arg Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly
    290                 295                 300

Lys Phe Lys Val Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320

Val Ile Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro
                325                 330                 335

Phe Glu Ile Met Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile
            340                 345                 350

Thr Val Asn Pro Ile Val Thr Glu Lys Asp Ser Pro Val Asn Ile Glu
```

```
        355                 360                 365

Ala Glu Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Asp Pro
    370                 375                 380

Gly Gln Leu Lys Leu Asn Trp Phe Lys Lys Gly Ser Ser Ile Gly Gln
385                 390                 395                 400

Met Phe Glu Thr Thr Met Arg Gly Ala Lys Arg Met Ala Ile Leu Gly
                405                 410                 415

Asp Thr Ala Trp Asp Phe Gly Ser Leu Gly Gly Val Phe Thr Ser Ile
            420                 425                 430

Gly Lys Ala Leu His Gln Val Phe Gly Ala Ile Tyr Gly Ala Ala Phe
        435                 440                 445

Ser Gly Val Ser Trp Thr Met Lys Ile Leu Ile Gly Val Ile Ile Thr
    450                 455                 460

Trp Ile Gly Met Asn Ser Arg Ser Thr Ser Leu Ser Val Ser Leu Val
465                 470                 475                 480

Leu Val Gly Val Val Thr Leu Tyr Leu Gly Ala Val Val Gln Ala
                485                 490                 495
```

<210> 27
<211> 495
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 27

```
Met Arg Cys Ile Gly Ile Ser Asn Arg Asp Phe Val Glu Gly Val Ser
1               5                   10                  15

Gly Gly Ser Trp Val Asp Ile Val Leu Glu His Gly Ser Cys Val Thr
```

```
            20                  25                  30

Thr Met Ala Lys Asn Lys Pro Thr Leu Asp Phe Glu Leu Ile Lys Thr
        35                  40                  45

Glu Ala Thr Gln Leu Ala Thr Leu Arg Lys Leu Cys Ile Glu Ala Lys
    50                  55                  60

Leu Thr Asn Thr Thr Thr Glu Ser Arg Cys Pro Thr Gln Gly Glu Pro
65                  70                  75                  80

Ser Leu Asn Glu Glu Gln Asp Lys Arg Phe Val Cys Lys His Ser Met
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Gly
            100                 105                 110

Ile Val Thr Cys Ala Met Phe Thr Cys Lys Glu Pro Ile Glu Gly Lys
        115                 120                 125

Val Val Gln Pro Glu Asn Leu Glu Tyr Thr Ile Val Val Thr Pro His
    130                 135                 140

Ser Gly Glu Glu His Ala Val Gly Asn Asp Ala Gly Lys His Gly Val
145                 150                 155                 160

Thr Ala Met Val Thr Pro Gln Ser Ser Ser Val Glu Val Lys Leu Pro
                165                 170                 175

Asp Tyr Gly Glu Val Thr Met Glu Cys Ser Pro Arg Thr Gly Leu Asp
            180                 185                 190

Phe Asn Glu Met Val Leu Leu Thr Met Lys Asn Lys Ala Trp Met Val
        195                 200                 205

His Arg Gln Trp Phe Phe Asp Leu Pro Leu Pro Trp Thr Ser Thr Ala
    210                 215                 220
```

```
Asp Thr Gln Gly Pro Asn Trp Ile Gln Lys Glu Thr Leu Val Thr Phe
225                 230                 235                 240

Lys Asn Pro His Ala Lys Lys Gln Asp Val Val Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Asn
            260                 265                 270

Ser Gly Gly Thr Ser Ile Phe Ala Gly His Leu Lys Cys Arg Leu Arg
        275                 280                 285

Met Asp Lys Leu Arg Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly
    290                 295                 300

Lys Phe Lys Val Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320

Val Ile Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro
                325                 330                 335

Phe Glu Ile Met Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile
            340                 345                 350

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

Ala Glu Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Asp Pro
    370                 375                 380

Gly Gln Leu Lys Leu Asn Trp Phe Lys Lys Gly Ser Ser Ile Gly Gln
385                 390                 395                 400

Met Phe Glu Thr Thr Met Arg Gly Ala Lys Arg Met Ala Ile Leu Gly
                405                 410                 415

Asp Thr Ala Trp Asp Phe Gly Ser Leu Gly Gly Val Phe Thr Ser Ile
```

```
            420                 425                 430

Gly Lys Ala Leu His Gln Val Phe Gly Ala Ile Tyr Gly Ala Ala Phe
        435                 440                 445

Ser Gly Val Ser Trp Thr Met Lys Ile Leu Ile Gly Val Ile Ile Thr
    450                 455                 460

Trp Ile Gly Met Asn Ser Arg Ser Thr Ser Leu Ser Val Ser Leu Val
465                 470                 475                 480

Leu Val Gly Ile Val Thr Leu Tyr Leu Gly Val Met Val Gln Ala
                485                 490                 495
```

<210> 28
<211> 495
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 28

```
Met Arg Cys Ile Gly Ile Ser Asn Arg Asp Phe Val Glu Gly Val Ser
1               5                   10                  15

Gly Gly Ser Trp Val Asp Ile Val Leu Glu His Gly Ser Cys Val Thr
            20                  25                  30

Thr Met Ala Lys Asn Lys Pro Thr Leu Asp Phe Glu Leu Phe Lys Thr
        35                  40                  45

Glu Val Thr Gln Leu Ala Thr Leu Arg Lys Leu Cys Ile Glu Ala Lys
    50                  55                  60

Leu Thr Asn Thr Thr Thr Glu Ser Arg Cys Pro Thr Gln Gly Glu Pro
65                  70                  75                  80

Ser Leu Asn Glu Glu Gln Asp Lys Arg Phe Val Cys Lys His Ser Met
```

```
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Gly
            100                 105                 110

Ile Val Thr Cys Ala Met Phe Thr Cys Lys Lys Pro Ile Glu Gly Lys
        115                 120                 125

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

Ser Gly Glu Glu His Ala Val Gly Asn Asp Ala Thr Glu His Gly Val
145                 150                 155                 160

Thr Ala Met Val Thr Pro Gln Ala Ser Ser Val Glu Val Lys Leu Pro
                165                 170                 175

Asp Tyr Gly Glu Val Thr Met Glu Cys Ser Pro Arg Thr Gly Leu Asp
            180                 185                 190

Phe Asn Glu Met Ile Leu Leu Thr Met Lys Asn Lys Ala Trp Met Val
        195                 200                 205

His Arg Gln Trp Phe Phe Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala
    210                 215                 220

Asp Thr Gln Gly Ser Asn Trp Ile Gln Lys Glu Thr Leu Val Thr Phe
225                 230                 235                 240

Lys Asn Pro His Ala Lys Lys Gln Asp Val Val Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Thr
            260                 265                 270

Ser Ser Thr Thr Thr Ile Phe Ala Gly His Leu Lys Cys Arg Leu Arg
        275                 280                 285
```

```
Met Asp Lys Leu Arg Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly
    290                 295                 300

Lys Phe Lys Val Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320

Val Ile Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro
                325                 330                 335

Phe Glu Ile Met Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile
            340                 345                 350

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

Ala Glu Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Asp Pro
    370                 375                 380

Gly Gln Leu Lys Leu Asn Trp Phe Lys Lys Gly Ser Ser Ile Gly Gln
385                 390                 395                 400

Met Phe Glu Thr Thr Met Arg Gly Ala Lys Arg Met Ala Ile Leu Gly
                405                 410                 415

Asp Thr Ala Trp Asp Phe Gly Ser Leu Gly Gly Val Phe Thr Ser Ile
            420                 425                 430

Gly Lys Ala Leu His Gln Val Phe Gly Ala Ile Tyr Gly Ala Ala Phe
        435                 440                 445

Ser Gly Val Ser Trp Thr Met Lys Ile Leu Ile Gly Val Ile Ile Thr
    450                 455                 460

Trp Ile Gly Met Asn Ser Arg Ser Thr Ser Leu Ser Val Ser Leu Val
465                 470                 475                 480

Leu Val Gly Val Val Thr Leu Tyr Leu Gly Ala Val Val Gln Ala
```

485 490 495

<210> 29
<211> 495
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 29

Met Arg Cys Val Gly Ile Gly Asn Arg Asp Phe Val Glu Gly Leu Ser
1 5 10 15

Gly Ala Thr Trp Val Asp Val Val Leu Glu His Gly Ser Cys Val Thr
20 25 30

Thr Met Ala Lys Asp Lys Pro Thr Leu Asp Ile Glu Leu Leu Lys Thr
35 40 45

Glu Ala Thr Gln Leu Ala Thr Leu Arg Lys Leu Cys Ile Glu Ala Lys
50 55 60

Ile Ser Asn Thr Thr Thr Asp Ser Arg Cys Pro Thr Gln Gly Glu Ala
65 70 75 80

Thr Leu Val Glu Glu Gln Asp Thr Asn Phe Val Cys Arg Arg Thr Phe
85 90 95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Ser
100 105 110

Leu Ile Thr Cys Ala Lys Phe Lys Cys Val Thr Lys Ile Glu Gly Lys
115 120 125

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

Thr Gly Asp Gln His Gln Val Gly Asn Glu Ala Thr Glu His Gly Val

```
145                 150                 155                 160

Thr Ala Met Ile Thr Pro Gln Ser Pro Ser Val Glu Val Lys Leu Pro
                165                 170                 175

Asp Tyr Gly Glu Leu Thr Leu Asp Cys Ser Pro Arg Thr Gly Leu Asp
            180                 185                 190

Phe Asn Glu Met Ile Leu Leu Thr Met Lys Asn Lys Ala Trp Met Val
        195                 200                 205

His Arg Gln Trp Phe Leu Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala
    210                 215                 220

Ser Thr Ser Gln Glu Thr Trp Asn Arg Gln Asp Leu Leu Val Thr Phe
225                 230                 235                 240

Lys Thr Ala His Ala Lys Lys Gln Glu Val Val Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Asn
            260                 265                 270

Ser Gly Gly Thr Ser Ile Phe Ala Gly His Leu Lys Cys Arg Leu Lys
        275                 280                 285

Met Asp Lys Leu Arg Leu Lys Gly Met Ser Tyr Val Met Cys Thr Gly
    290                 295                 300

Ser Phe Lys Leu Glu Lys Glu Val Ala Glu Thr Gln His Gly Thr Val
305                 310                 315                 320

Leu Val Gln Val Lys Tyr Glu Gly Thr Asp Ala Pro Cys Lys Ile Pro
                325                 330                 335

Phe Ser Ser Gln Asp Glu Lys Gly Val Thr Gln Asn Gly Arg Leu Ile
            340                 345                 350
```

```
Thr Ala Asn Pro Ile Val Thr Asp Lys Glu Lys Pro Val Asn Ile Glu
        355                 360                 365

Ala Glu Pro Pro Phe Gly Glu Ser Tyr Ile Val Val Gly Ala Gly Glu
    370                 375                 380

Lys Ala Leu Lys Leu Ser Trp Phe Lys Lys Gly Ser Ser Ile Gly Lys
385                 390                 395                 400

Met Phe Glu Ala Thr Ala Arg Gly Ala Arg Arg Met Ala Ile Leu Gly
                405                 410                 415

Asp Thr Ala Trp Asp Phe Gly Ser Ile Gly Gly Val Phe Thr Ser Val
            420                 425                 430

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

Ser Gly Val Ser Trp Thr Met Lys Ile Gly Ile Gly Ile Leu Leu Thr
    450                 455                 460

Trp Leu Gly Leu Asn Ser Arg Ser Thr Ser Leu Ser Met Thr Cys Ile
465                 470                 475                 480

Ala Val Gly Met Val Thr Leu Tyr Leu Gly Val Met Val Gln Ala
                485                 490                 495
```

<210> 30
<211> 495
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 30

```
Met Arg Cys Val Gly Ile Gly Asn Arg Asp Phe Val Glu Gly Leu Ser
1               5                   10                  15
```

```
Gly Ala Thr Trp Val Asp Val Val Leu Glu His Gly Ser Cys Val Thr
            20                  25                  30

Thr Met Ala Lys Asp Lys Pro Thr Leu Asp Ile Glu Leu Leu Lys Thr
        35                  40                  45

Glu Ala Thr Gln Leu Ala Thr Leu Arg Lys Leu Cys Ile Glu Ala Lys
    50                  55                  60

Ile Ser Asn Thr Thr Thr Asp Ser Arg Cys Pro Thr Gln Gly Glu Ala
65                  70                  75                  80

Thr Leu Val Glu Glu Gln Asp Thr Asn Phe Val Cys Arg Arg Thr Phe
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Ser
            100                 105                 110

Leu Ile Thr Cys Ala Lys Phe Lys Cys Val Thr Lys Ile Glu Gly Lys
        115                 120                 125

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

Thr Gly Asp Gln His Gln Val Gly Asn Glu Thr Thr Glu His Gly Thr
145                 150                 155                 160

Thr Ala Thr Ile Thr Pro Gln Ala Pro Thr Ser Glu Ile Gln Leu Thr
                165                 170                 175

Asp Tyr Gly Ala Leu Thr Leu Asp Cys Ser Pro Arg Thr Gly Leu Asp
            180                 185                 190

Phe Asn Glu Met Ile Leu Leu Thr Met Lys Asn Lys Ala Trp Met Val
        195                 200                 205

His Arg Gln Trp Phe Leu Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala
```

```
    210                 215                 220

Ser Thr Ser Gln Glu Thr Trp Asn Arg Gln Asp Leu Leu Val Thr Phe
225                 230                 235                 240

Lys Thr Ala His Ala Lys Lys Gln Glu Val Val Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Asn
            260                 265                 270

Ser Gly Gly Thr Ser Ile Phe Ala Gly His Leu Lys Cys Arg Leu Lys
        275                 280                 285

Met Asp Lys Leu Thr Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly
    290                 295                 300

Lys Phe Lys Ile Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320

Val Ile Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro
                325                 330                 335

Phe Glu Ile Thr Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile
            340                 345                 350

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

Ala Glu Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Glu Pro
    370                 375                 380

Gly Gln Leu Lys Leu Asn Trp Phe Lys Lys Gly Ser Ser Ile Gly Lys
385                 390                 395                 400

Met Phe Glu Ala Thr Ala Arg Gly Ala Arg Arg Met Ala Ile Leu Gly
                405                 410                 415
```

```
Asp Thr Ala Trp Asp Phe Gly Ser Ile Gly Gly Val Phe Thr Ser Val
            420                 425                 430

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

Ser Gly Val Ser Trp Thr Met Lys Ile Gly Ile Gly Ile Leu Leu Thr
    450                 455                 460

Trp Leu Gly Leu Asn Ser Arg Ser Thr Ser Leu Ser Met Thr Cys Ile
465                 470                 475                 480

Ala Val Gly Met Val Thr Leu Tyr Leu Gly Val Met Val Gln Ala
                485                 490                 495
```

<210> 31
<211> 495
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 31

```
Met Arg Cys Val Gly Ile Gly Asn Arg Asp Phe Val Glu Gly Leu Ser
1               5                   10                  15

Gly Ala Thr Trp Val Asp Val Val Leu Glu His Gly Ser Cys Val Thr
            20                  25                  30

Thr Met Ala Lys Asp Lys Pro Thr Leu Asp Ile Glu Leu Leu Lys Thr
        35                  40                  45

Glu Val Thr Asn Pro Ala Val Leu Arg Lys Leu Cys Ile Glu Ala Lys
    50                  55                  60

Ile Ser Asn Thr Thr Thr Asp Ser Arg Cys Pro Thr Gln Gly Glu Ala
65                  70                  75                  80
```

```
Thr Leu Val Glu Glu Gln Asp Thr Asn Phe Val Cys Arg Arg Thr Phe
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Ser
            100                 105                 110

Leu Ile Thr Cys Ala Lys Phe Lys Cys Val Thr Lys Leu Glu Gly Lys
        115                 120                 125

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

Thr Gly Asp Gln His Gln Val Gly Asn Glu Ala Thr Glu His Gly Val
145                 150                 155                 160

Thr Ala Met Ile Thr Pro Gln Ser Pro Ser Val Glu Val Lys Leu Pro
                165                 170                 175

Asp Tyr Gly Glu Leu Thr Leu Asp Cys Ser Pro Arg Thr Gly Leu Asp
            180                 185                 190

Phe Asn Glu Met Val Leu Leu Thr Met Glu Lys Lys Ser Trp Leu Val
        195                 200                 205

His Lys Gln Trp Phe Leu Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala
    210                 215                 220

Ser Thr Ser Gln Glu Thr Trp Asn Arg Gln Asp Leu Leu Val Thr Phe
225                 230                 235                 240

Lys Thr Ala His Ala Lys Lys Gln Glu Val Val Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Thr
            260                 265                 270

Ser Gly Thr Thr Thr Ile Phe Ala Gly His Leu Lys Cys Arg Leu Lys
```

```
        275                 280                 285

Met Asp Lys Leu Arg Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly
    290                 295                 300

Lys Phe Lys Ile Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320

Val Ile Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro
                325                 330                 335

Phe Glu Ile Thr Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile
            340                 345                 350

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

Ala Glu Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Glu Pro
    370                 375                 380

Gly Gln Leu Lys Leu Asn Trp Phe Lys Lys Gly Ser Ser Ile Gly Lys
385                 390                 395                 400

Met Phe Glu Ala Thr Ala Arg Gly Ala Arg Arg Met Ala Ile Leu Gly
                405                 410                 415

Asp Thr Ala Trp Asp Phe Gly Ser Ile Gly Gly Val Phe Thr Ser Val
            420                 425                 430

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

Ser Gly Val Ser Trp Thr Met Lys Ile Gly Ile Gly Ile Leu Leu Thr
    450                 455                 460

Trp Leu Gly Leu Asn Ser Arg Ser Thr Ser Leu Ser Met Thr Cys Ile
465                 470                 475                 480
```

Ala Val Gly Met Val Thr Leu Tyr Leu Gly Val Met Val Gln Ala
485 490 495

<210> 32
<211> 495
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 32

Met Arg Cys Val Gly Ile Gly Asn Arg Asp Phe Val Glu Gly Leu Ser
1 5 10 15

Gly Ala Thr Trp Val Asp Val Val Leu Glu His Gly Ser Cys Val Thr
20 25 30

Thr Met Ala Lys Asp Lys Pro Thr Leu Asp Ile Glu Leu Leu Lys Thr
35 40 45

Glu Ala Thr Gln Leu Ala Thr Leu Arg Lys Leu Cys Ile Glu Ala Lys
50 55 60

Ile Ser Asn Thr Thr Thr Asp Ser Arg Cys Pro Thr Gln Gly Glu Ala
65 70 75 80

Thr Leu Val Glu Glu Gln Asp Thr Asn Phe Val Cys Arg Arg Thr Phe
85 90 95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Ser
100 105 110

Leu Ile Thr Cys Ala Lys Phe Lys Cys Val Thr Lys Ile Glu Gly Lys
115 120 125

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

```
Thr Gly Asp Gln His Gln Val Gly Asn Glu Ala Thr Glu His Gly Val
145                 150                 155                 160


Thr Ala Met Ile Thr Pro Gln Ser Pro Ser Val Glu Val Lys Leu Pro
                165                 170                 175


Asp Tyr Gly Glu Leu Thr Leu Asp Cys Ser Pro Arg Thr Gly Leu Asp
            180                 185                 190


Phe Asn Glu Met Ile Leu Leu Thr Met Lys Asn Lys Ala Trp Met Val
        195                 200                 205


His Arg Gln Trp Phe Leu Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala
    210                 215                 220


Ser Thr Ser Gln Glu Thr Trp Asn Arg Gln Asp Leu Leu Val Thr Phe
225                 230                 235                 240


Lys Thr Ala His Ala Lys Lys Gln Glu Val Val Val Leu Gly Ser Gln
                245                 250                 255


Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Asn
            260                 265                 270


Ser Gly Gly Thr Ser Ile Phe Ala Gly His Leu Lys Cys Arg Leu Lys
        275                 280                 285


Met Asp Lys Leu Arg Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly
    290                 295                 300


Lys Phe Lys Ile Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320


Val Ile Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro
                325                 330                 335


Phe Glu Ile Thr Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile
```

```
            340                 345                 350

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

Ala Glu Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Glu Pro
    370                 375                 380

Gly Gln Leu Lys Leu Asn Trp Phe Lys Lys Gly Ser Ser Ile Gly Lys
385                 390                 395                 400

Met Phe Glu Ala Thr Ala Arg Gly Ala Arg Arg Met Ala Ile Leu Gly
                405                 410                 415

Asp Thr Ala Trp Asp Phe Gly Ser Ile Gly Gly Val Phe Thr Ser Val
            420                 425                 430

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

Ser Gly Val Ser Trp Thr Met Lys Ile Gly Ile Gly Ile Leu Leu Thr
    450                 455                 460

Trp Leu Gly Leu Asn Ser Arg Ser Thr Ser Leu Ser Met Thr Cys Ile
465                 470                 475                 480

Ala Val Gly Met Val Thr Leu Tyr Leu Gly Val Met Val Gln Ala
                485                 490                 495
```

<210> 33
<211> 495
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 33

```
Met Arg Cys Val Gly Ile Gly Asn Arg Asp Phe Val Glu Gly Leu Ser
```

```
1               5                   10                  15

Gly Ala Thr Trp Val Asp Val Val Leu Glu His Gly Gly Cys Val Thr
            20                  25                  30

Thr Met Ala Lys Asn Lys Pro Thr Leu Asp Ile Glu Leu Phe Lys Thr
        35                  40                  45

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

Ile Thr Asn Ile Thr Thr Asp Ser Arg Cys Pro Thr Gln Gly Glu Ala
65                  70                  75                  80

Val Leu Pro Glu Glu Gln Asp Gln Asn Tyr Val Cys Lys His Thr Tyr
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Ser
            100                 105                 110

Leu Val Thr Cys Ala Lys Phe Gln Cys Leu Glu Pro Ile Glu Gly Lys
        115                 120                 125

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

Thr Gly Asp Gln His Gln Val Gly Asn Glu Ala Thr Glu His Gly Val
145                 150                 155                 160

Thr Ala Met Ile Thr Pro Gln Ser Ser Ser Val Glu Val Lys Leu Pro
                165                 170                 175

Asp Tyr Gly Glu Leu Gly Leu Glu Cys Ser Pro Arg Thr Gly Leu Asp
            180                 185                 190

Phe Asn Glu Met Ile Leu Leu Thr Met Lys Asn Lys Ala Trp Met Val
        195                 200                 205
```

```
His Arg Gln Trp Phe Phe Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala
    210                 215                 220

Thr Thr Glu Thr Pro Thr Trp Asn Arg Lys Glu Leu Leu Val Thr Phe
225                 230                 235                 240

Lys Asn Ala His Ala Lys Lys Gln Glu Val Val Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Asn
            260                 265                 270

Ser Gly Thr Thr Ser Ile Phe Ala Gly His Leu Lys Cys Arg Leu Lys
        275                 280                 285

Met Asp Lys Leu Arg Leu Lys Gly Met Ser Tyr Ala Met Cys Thr Asn
    290                 295                 300

Thr Phe Val Leu Lys Lys Glu Val Ser Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320

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

Phe Ser Thr Glu Asp Gly Gln Gly Lys Ala His Asn Gly Arg Leu Ile
            340                 345                 350

Thr Ala Asn Pro Val Val Thr Lys Lys Glu Glu Pro Val Asn Ile Glu
        355                 360                 365

Ala Glu Pro Pro Phe Gly Glu Ser Asn Ile Val Ile Gly Ile Gly Asp
    370                 375                 380

Asn Ala Leu Lys Ile Asn Trp Tyr Lys Lys Gly Ser Ser Ile Gly Lys
385                 390                 395                 400

Met Phe Glu Ala Thr Ala Arg Gly Ala Arg Arg Met Ala Ile Leu Gly
```

405 410 415

Asp Thr Ala Trp Asp Phe Gly Ser Val Gly Gly Val Leu Asn Ser Leu
420 425 430

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

Ser Gly Val Ser Trp Val Met Lys Ile Gly Ile Gly Val Leu Leu Thr
450 455 460

Trp Ile Gly Leu Asn Ser Lys Asn Thr Ser Met Ser Phe Ser Cys Ile
465 470 475 480

Ala Ile Gly Ile Ile Thr Leu Tyr Leu Gly Ala Val Val Gln Ala
485 490 495

<210> 34
<211> 495
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 34

Met Arg Cys Val Gly Ile Gly Asn Arg Asp Phe Val Glu Gly Leu Ser
1 5 10 15

Gly Ala Thr Trp Val Asp Val Val Leu Glu His Gly Gly Cys Val Thr
20 25 30

Thr Met Ala Lys Asn Lys Pro Thr Leu Asp Ile Glu Leu Phe Lys Thr
35 40 45

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

Ile Thr Asn Ile Thr Thr Asp Ser Arg Cys Pro Thr Gln Gly Glu Ala

```
65                  70                  75                  80

Val Leu Pro Glu Glu Gln Asp Gln Asn Tyr Val Cys Lys His Thr Tyr
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Ser
            100                 105                 110

Leu Val Thr Cys Ala Lys Phe Gln Cys Leu Glu Pro Ile Glu Gly Lys
        115                 120                 125

Val Val Gln Tyr Glu Asn Leu Lys Tyr Thr Val Ile Val Thr Val His
    130                 135                 140

Thr Gly Asp Gln His Gln Val Gly Asn Glu Thr Thr Glu His Gly Thr
145                 150                 155                 160

Thr Ala Thr Ile Thr Pro Gln Ala Ser Thr Ser Glu Ile Gln Leu Thr
                165                 170                 175

Asp Tyr Gly Thr Leu Gly Leu Glu Cys Ser Pro Arg Thr Gly Leu Asp
            180                 185                 190

Phe Asn Glu Met Ile Leu Leu Thr Met Lys Asn Lys Ala Trp Met Val
        195                 200                 205

His Arg Gln Trp Phe Phe Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala
    210                 215                 220

Thr Thr Glu Thr Pro Thr Trp Asn Arg Lys Glu Leu Leu Val Thr Phe
225                 230                 235                 240

Lys Asn Ala His Ala Lys Lys Gln Glu Val Val Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Thr
            260                 265                 270
```

```
Ser Gly Thr Thr Thr Ile Phe Ala Gly His Leu Lys Cys Arg Leu Lys
        275                 280                 285

Met Asp Lys Leu Glu Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly
    290                 295                 300

Lys Phe Lys Ile Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320

Val Ile Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro
                325                 330                 335

Phe Glu Ile Thr Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile
            340                 345                 350

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

Ala Glu Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Glu Pro
    370                 375                 380

Gly Gln Leu Lys Leu Asn Trp Tyr Lys Lys Gly Ser Ser Ile Gly Lys
385                 390                 395                 400

Met Phe Glu Ala Thr Ala Arg Gly Ala Arg Arg Met Ala Ile Leu Gly
                405                 410                 415

Asp Thr Ala Trp Asp Phe Gly Ser Val Gly Gly Val Leu Asn Ser Leu
            420                 425                 430

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

Ser Gly Val Ser Trp Val Met Lys Ile Gly Ile Gly Val Leu Leu Thr
    450                 455                 460

Trp Ile Gly Leu Asn Ser Lys Asn Thr Ser Met Ser Phe Ser Cys Ile
```

465 470 475 480

Ala Ile Gly Ile Ile Thr Leu Tyr Leu Gly Ala Val Val Gln Ala
485 490 495

<210> 35
<211> 493
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 35

Met Arg Cys Val Gly Ile Gly Asn Arg Asp Phe Val Glu Gly Leu Ser
1 5 10 15

Gly Ala Thr Trp Val Asp Val Val Leu Glu His Gly Gly Cys Val Thr
20 25 30

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

Glu Ala Thr Gln Leu Ala Thr Leu Arg Lys Leu Cys Ile Glu Gly Lys
50 55 60

Ile Thr Asn Ile Thr Thr Asp Ser Arg Cys Pro Thr Gln Gly Glu Ala
65 70 75 80

Val Leu Pro Glu Glu Gln Asp Gln Asn Tyr Val Cys Lys His Thr Tyr
85 90 95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Ser
100 105 110

Leu Val Thr Cys Ala Lys Phe Gln Cys Leu Glu Pro Ile Glu Gly Lys
115 120 125

Val Val Gln Tyr Glu Asn Leu Lys Tyr Thr Val Ile Ile Thr Val His

```
    130                 135                 140

Thr Gly Asp Gln His Gln Val Gly Asn Glu Ala Gln Gly Val Thr Ala
145                 150                 155                 160

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

Gly Glu Leu Gly Leu Glu Cys Ser Pro Arg Thr Gly Leu Asp Phe Asn
            180                 185                 190

Glu Met Ile Leu Leu Thr Met Lys Asn Lys Ala Trp Met Val His Arg
        195                 200                 205

Gln Trp Phe Phe Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala Thr Thr
    210                 215                 220

Glu Thr Pro Thr Trp Asn Arg Lys Glu Leu Leu Val Thr Phe Lys Asn
225                 230                 235                 240

Ala His Ala Lys Lys Gln Glu Val Val Val Leu Gly Ser Gln Glu Gly
                245                 250                 255

Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Asn Ser Gly
            260                 265                 270

Gly Thr Ser Ile Phe Ala Gly His Leu Lys Cys Arg Leu Lys Met Asp
        275                 280                 285

Lys Leu Arg Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly Lys Phe
    290                 295                 300

Lys Ile Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile Val Ile
305                 310                 315                 320

Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro Phe Glu
                325                 330                 335
```

```
Ile Thr Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile Thr Val
            340                 345                 350

Asn Pro Ile Val Thr Glu Lys Asp Ser Pro Val Asn Ile Glu Ala Glu
        355                 360                 365

Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Glu Pro Gly Gln
    370                 375                 380

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

Glu Ala Thr Ala Arg Gly Ala Arg Arg Met Ala Ile Leu Gly Asp Thr
                405                 410                 415

Ala Trp Asp Phe Gly Ser Val Gly Gly Val Leu Asn Ser Leu Gly Lys
            420                 425                 430

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

Val Ser Trp Val Met Lys Ile Gly Ile Gly Val Leu Leu Thr Trp Ile
    450                 455                 460

Gly Leu Asn Ser Lys Asn Thr Ser Met Ser Phe Ser Cys Ile Ala Ile
465                 470                 475                 480

Gly Ile Ile Thr Leu Tyr Leu Gly Ala Val Val Gln Ala
                485                 490
```

<210> 36
<211> 495
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 36

```
Met Arg Cys Val Gly Ile Gly Asn Arg Asp Phe Val Glu Gly Leu Ser
1               5                  10                  15

Gly Ala Thr Trp Val Asp Val Val Leu Glu His Gly Gly Cys Val Thr
            20                  25                  30

Thr Met Ala Lys Asn Lys Pro Thr Leu Asp Ile Glu Leu Phe Lys Thr
        35                  40                  45

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

Ile Thr Asn Ile Thr Thr Asp Ser Arg Cys Pro Thr Gln Gly Glu Ala
65                  70                  75                  80

Val Leu Pro Glu Glu Gln Asp Gln Asn Tyr Val Cys Lys His Thr Tyr
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Ser
            100                 105                 110

Leu Val Thr Cys Ala Lys Phe Gln Cys Leu Glu Pro Ile Glu Gly Lys
        115                 120                 125

Val Val Gln Tyr Glu Asn Leu Lys Tyr Thr Val Ile Val Thr Val His
    130                 135                 140

Thr Gly Asp Gln His Gln Val Gly Asn Glu Ala Thr Glu His Gly Val
145                 150                 155                 160

Thr Ala Met Ile Thr Pro Gln Ser Ser Ser Val Glu Val Lys Leu Pro
                165                 170                 175

Asp Tyr Gly Glu Leu Gly Leu Glu Cys Ser Pro Arg Thr Gly Leu Asp
            180                 185                 190

Phe Asn Glu Met Ile Leu Leu Thr Met Lys Asn Lys Ala Trp Met Val
```

```
        195                 200                 205

His Arg Gln Trp Phe Phe Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala
    210                 215                 220

Thr Thr Glu Thr Pro Thr Trp Asn Arg Lys Glu Leu Leu Val Thr Phe
225                 230                 235                 240

Lys Asn Ala His Ala Lys Lys Gln Glu Val Val Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Thr Ala Leu Thr Gly Ala Thr Glu Ile Gln Thr
            260                 265                 270

Ser Gly Thr Thr Thr Ile Phe Ala Gly His Leu Lys Cys Arg Leu Lys
        275                 280                 285

Met Asp Lys Leu Arg Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly
    290                 295                 300

Lys Phe Lys Ile Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320

Val Ile Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro
                325                 330                 335

Phe Glu Ile Thr Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile
            340                 345                 350

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

Ala Glu Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Glu Pro
    370                 375                 380

Gly Gln Leu Lys Leu Asn Trp Tyr Lys Lys Gly Ser Ser Ile Gly Lys
385                 390                 395                 400
```

```
Met Phe Glu Ala Thr Ala Arg Gly Ala Arg Arg Met Ala Ile Leu Gly
                405                 410                 415


Asp Thr Ala Trp Asp Phe Gly Ser Val Gly Gly Val Leu Asn Ser Leu
            420                 425                 430


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


Ser Gly Val Ser Trp Val Met Lys Ile Gly Ile Gly Val Leu Leu Thr
    450                 455                 460


Trp Ile Gly Leu Asn Ser Lys Asn Thr Ser Met Ser Phe Ser Cys Ile
465                 470                 475                 480


Ala Ile Gly Ile Ile Thr Leu Tyr Leu Gly Ala Val Val Gln Ala
                485                 490                 495
```

<210> 37
<211> 495
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 37

```
Met Arg Cys Val Gly Val Gly Asn Arg Asp Phe Val Glu Gly Val Ser
1               5                   10                  15


Gly Gly Ala Trp Val Asp Leu Val Leu Glu His Gly Gly Cys Val Thr
            20                  25                  30


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


Thr Val Thr Gln Leu Ala Thr Leu Arg Lys Leu Cys Ile Glu Ala Ser
    50                  55                  60
```

```
Ile Ser Asn Ile Thr Thr Ala Thr Arg Cys Pro Thr Gln Gly Glu Pro
65                  70                  75                  80

Tyr Leu Lys Glu Glu Gln Asp Gln Gln Tyr Ile Cys Arg Arg Asp Val
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Gly
            100                 105                 110

Val Val Thr Cys Ala Lys Phe Ser Cys Ser Gly Pro Ile Glu Gly Lys
        115                 120                 125

Val Val Gln Ile Glu Asn Leu Lys Tyr Thr Val Ile Val Thr Val His
    130                 135                 140

Asn Gly Asp Thr His Ala Val Gly Asn Asp Thr Thr Glu His Gly Thr
145                 150                 155                 160

Thr Ala Thr Ile Thr Pro Arg Ser Pro Thr Ser Glu Ile Gln Leu Thr
                165                 170                 175

Asp Tyr Gly Glu Leu Thr Leu Asp Cys Glu Pro Arg Ser Gly Ile Asp
            180                 185                 190

Phe Asn Glu Met Ile Leu Leu Thr Met Lys Lys Lys Ala Trp Met Val
        195                 200                 205

His Arg Gln Trp Phe Phe Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala
    210                 215                 220

Asp Thr Ser Glu Val His Trp Asn Tyr Lys Glu Arg Met Val Thr Phe
225                 230                 235                 240

Lys Val Pro His Ala Lys Arg Gln Asp Val Thr Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Ser Ala Leu Ala Gly Ala Thr Glu Ile Gln Asn
```

```
            260                 265                 270

Ser Gly Gly Thr Ser Ile Phe Ala Gly His Leu Lys Cys Lys Val Arg
        275                 280                 285

Met Glu Lys Leu Arg Ile Lys Gly Met Ser Tyr Thr Met Cys Ser Gly
    290                 295                 300

Lys Phe Ser Ile Asp Lys Glu Met Ala Glu Thr Gln His Gly Thr Thr
305                 310                 315                 320

Val Val Lys Val Lys Tyr Glu Gly Ala Gly Ala Pro Cys Lys Val Pro
                325                 330                 335

Ile Glu Ile Arg Asp Val Asn Lys Glu Lys Val Val Gly Arg Val Ile
            340                 345                 350

Ser Ser Thr Pro Leu Ala Glu Asn Thr Asn Ser Val Thr Asn Ile Glu
        355                 360                 365

Leu Glu Pro Pro Phe Gly Asp Ser Tyr Ile Val Ile Gly Val Gly Asn
    370                 375                 380

Ser Ala Leu Thr Leu His Trp Phe Arg Lys Gly Ser Ser Ile Gly Lys
385                 390                 395                 400

Met Phe Glu Ser Thr Tyr Arg Gly Ala Lys Arg Met Ala Ile Leu Gly
                405                 410                 415

Glu Thr Ala Trp Asp Phe Gly Ser Val Gly Gly Leu Phe Thr Ser Leu
            420                 425                 430

Gly Lys Ala Val His Gln Val Phe Gly Ser Val Tyr Thr Thr Met Phe
        435                 440                 445

Gly Gly Val Ser Trp Met Ile Arg Ile Leu Ile Gly Phe Leu Val Leu
    450                 455                 460
```

```
Trp Ile Gly Thr Asn Ser Arg Asn Thr Ser Met Ala Met Thr Cys Ile
465                 470                 475                 480


Ala Val Gly Gly Ile Thr Leu Phe Leu Gly Phe Thr Val Gln Ala
                485                 490                 495


<210>  38
<211>  495
<212>  PRT
<213>  Artificial

<220>
<223>  Chimeric Dengue virus E glycoprotein sequence

<400>  38

Met Arg Cys Val Gly Val Gly Asn Arg Asp Phe Val Glu Gly Val Ser
1               5                   10                  15


Gly Gly Ala Trp Val Asp Leu Val Leu Glu His Gly Gly Cys Val Thr
            20                  25                  30


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


Thr Val Thr Glu Val Ala Leu Leu Arg Thr Tyr Cys Ile Glu Ala Ser
    50                  55                  60


Ile Ser Asn Ile Thr Thr Ala Thr Arg Cys Pro Thr Gln Gly Glu Pro
65                  70                  75                  80


Tyr Leu Lys Glu Glu Gln Asp Gln Gln Tyr Ile Cys Arg Arg Asp Val
                85                  90                  95


Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Gly
            100                 105                 110


Val Val Thr Cys Ala Lys Phe Ser Cys Ser Gly Lys Ile Thr Gly Asn
        115                 120                 125
```

```
Leu Val Gln Ile Glu Asn Leu Lys Tyr Thr Val Ile Val Thr Val His
    130                 135                 140

Asn Gly Asp Thr His Ala Val Gly Asn Asp Thr Thr Glu His Gly Thr
145                 150                 155                 160

Thr Ala Thr Ile Thr Pro Arg Ser Pro Thr Ser Glu Ile Gln Leu Thr
                165                 170                 175

Asp Tyr Gly Glu Leu Thr Leu Asp Cys Glu Pro Arg Ser Gly Ile Asp
            180                 185                 190

Phe Asn Glu Met Ile Leu Met Lys Met Lys Lys Lys Thr Trp Leu Val
        195                 200                 205

His Lys Gln Trp Phe Leu Asp Leu Pro Leu Pro Trp Thr Ala Gly Ala
    210                 215                 220

Asp Thr Ser Glu Val His Trp Asn Tyr Lys Glu Arg Met Val Thr Phe
225                 230                 235                 240

Lys Val Pro His Ala Lys Arg Gln Asp Val Thr Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Ser Ala Leu Ala Gly Ala Thr Glu Val Asp Ser
            260                 265                 270

Gly Gly Thr Thr Thr Met Phe Ala Gly His Leu Lys Cys Lys Val Arg
        275                 280                 285

Met Glu Lys Leu Arg Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly
    290                 295                 300

Lys Phe Lys Ile Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320

Val Ile Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro
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                325                 330                 335

Phe Glu Ile Thr Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile
            340                 345                 350

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

Ala Glu Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Glu Pro
    370                 375                 380

Gly Gln Leu Lys Leu Asn Trp Phe Lys Lys Gly Ser Ser Ile Gly Lys
385                 390                 395                 400

Met Phe Glu Ser Thr Tyr Arg Gly Ala Lys Arg Met Ala Ile Leu Gly
                405                 410                 415

Glu Thr Ala Trp Asp Phe Gly Ser Val Gly Gly Leu Phe Thr Ser Leu
            420                 425                 430

Gly Lys Ala Val His Gln Val Phe Gly Ser Val Tyr Thr Thr Met Phe
        435                 440                 445

Gly Gly Val Ser Trp Met Ile Arg Ile Leu Ile Gly Phe Leu Val Leu
    450                 455                 460

Trp Ile Gly Thr Asn Ser Arg Asn Thr Ser Met Ala Met Thr Cys Ile
465                 470                 475                 480

Ala Val Gly Gly Ile Thr Leu Phe Leu Gly Phe Thr Val Gln Ala
                485                 490                 495
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<210> 39
<211> 495
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 39

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Met Arg Cys Val Gly Val Gly Asn Arg Asp Phe Val Glu Gly Val Ser
1               5                   10                  15

Gly Gly Ala Trp Val Asp Leu Val Leu Glu His Gly Gly Cys Val Thr
            20                  25                  30

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

Thr Ala Thr Gln Leu Ala Thr Leu Arg Lys Leu Cys Ile Glu Ala Ser
    50                  55                  60

Ile Ser Asn Ile Thr Thr Ala Thr Arg Cys Pro Thr Gln Gly Glu Pro
65                  70                  75                  80

Tyr Leu Lys Glu Glu Gln Asp Gln Gln Tyr Ile Cys Arg Arg Asp Val
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Gly
            100                 105                 110

Val Val Thr Cys Ala Lys Phe Ser Cys Ser Gly Pro Ile Glu Gly Lys
        115                 120                 125

Val Val Gln Ile Glu Asn Leu Glu Tyr Thr Val Val Val Thr Val His
    130                 135                 140

Asn Gly Asp Thr His Ala Val Gly Asn Asp Thr Ser Asn His Gly Val
145                 150                 155                 160

Thr Ala Thr Ile Thr Pro Arg Ser Pro Ser Val Glu Val Lys Leu Pro
                165                 170                 175

Asp Tyr Gly Glu Leu Thr Leu Asp Cys Glu Pro Arg Ser Gly Ile Asp
            180                 185                 190
```

```
Phe Asn Glu Met Ile Leu Leu Thr Met Lys Lys Lys Ala Trp Met Val
        195                 200                 205

His Arg Gln Trp Phe Phe Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala
    210                 215                 220

Asp Thr Ser Glu Val His Trp Asn Tyr Lys Glu Arg Met Val Thr Phe
225                 230                 235                 240

Lys Val Pro His Ala Lys Arg Gln Asp Val Thr Val Leu Gly Ser Gln
                245                 250                 255

Glu Gly Ala Met His Ser Ala Leu Ala Gly Ala Thr Glu Ile Gln Asn
            260                 265                 270

Ser Gly Gly Thr Ser Ile Phe Ala Gly His Leu Lys Cys Lys Val Arg
        275                 280                 285

Met Glu Lys Leu Arg Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly
    290                 295                 300

Lys Phe Lys Ile Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320

Val Ile Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro
                325                 330                 335

Phe Glu Ile Thr Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile
            340                 345                 350

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

Ala Glu Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Glu Pro
    370                 375                 380

Gly Gln Leu Lys Leu Asn Trp Phe Lys Lys Gly Ser Ser Ile Gly Lys
```

385 390 395 400

Met Phe Glu Ser Thr Tyr Arg Gly Ala Lys Arg Met Ala Ile Leu Gly
405 410 415

Glu Thr Ala Trp Asp Phe Gly Ser Val Gly Gly Leu Phe Thr Ser Leu
420 425 430

Gly Lys Ala Val His Gln Val Phe Gly Ser Val Tyr Thr Thr Met Phe
435 440 445

Gly Gly Val Ser Trp Met Ile Arg Ile Leu Ile Gly Phe Leu Val Leu
450 455 460

Trp Ile Gly Thr Asn Ser Arg Asn Thr Ser Met Ala Met Thr Cys Ile
465 470 475 480

Ala Val Gly Gly Ile Thr Leu Phe Leu Gly Phe Thr Val Gln Ala
485 490 495

<210> 40
<211> 495
<212> PRT
<213> Artificial

<220>
<223> Chimeric Dengue virus E glycoprotein sequence

<400> 40

Met Arg Cys Val Gly Val Gly Asn Arg Asp Phe Val Glu Gly Val Ser
1 5 10 15

Gly Gly Ala Trp Val Asp Leu Val Leu Glu His Gly Gly Cys Val Thr
20 25 30

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

Thr Val Thr Gln Leu Ala Thr Leu Arg Lys Leu Cys Ile Glu Ala Ser

```
    50                  55                  60

Ile Ser Asn Ile Thr Thr Ala Thr Arg Cys Pro Thr Gln Gly Glu Pro
65                  70                  75                  80

Tyr Leu Lys Glu Glu Gln Asp Gln Gln Tyr Ile Cys Arg Arg Asp Val
                85                  90                  95

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Gly
            100                 105                 110

Val Val Thr Cys Ala Lys Phe Ser Cys Ser Gly Pro Ile Glu Gly Lys
        115                 120                 125

Val Val Gln Ile Glu Asn Leu Lys Tyr Thr Val Ile Val Thr Val His
    130                 135                 140

Asn Gly Asp Thr His Ala Val Gly Asn Asp Thr Thr Glu His Gly Thr
145                 150                 155                 160

Thr Ala Thr Ile Thr Pro Arg Ser Pro Ser Val Glu Val Lys Leu Thr
                165                 170                 175

Asp Tyr Gly Glu Leu Thr Leu Asp Cys Glu Pro Arg Ser Gly Ile Asp
            180                 185                 190

Phe Asn Glu Met Ile Leu Leu Thr Met Lys Lys Lys Ala Trp Met Val
        195                 200                 205

His Arg Gln Trp Phe Phe Asp Leu Pro Leu Pro Trp Thr Ser Gly Ala
    210                 215                 220

Asp Thr Ser Glu Val His Trp Asn Tyr Lys Glu Arg Met Val Thr Phe
225                 230                 235                 240

Lys Val Pro His Ala Lys Arg Gln Asp Val Thr Val Leu Gly Ser Gln
                245                 250                 255
```

```
Glu Gly Ala Met His Ser Ala Leu Ala Gly Ala Thr Glu Ile Gln Asn
            260                 265                 270

Ser Gly Gly Thr Ser Ile Phe Ala Gly His Leu Lys Cys Lys Val Arg
        275                 280                 285

Met Glu Lys Leu Arg Leu Lys Gly Met Ser Tyr Ser Met Cys Thr Gly
    290                 295                 300

Lys Phe Lys Ile Val Lys Glu Ile Ala Glu Thr Gln His Gly Thr Ile
305                 310                 315                 320

Val Ile Arg Val Gln Tyr Glu Gly Asp Gly Ser Pro Cys Lys Ile Pro
                325                 330                 335

Phe Glu Ile Thr Asp Leu Glu Lys Arg His Val Leu Gly Arg Leu Ile
            340                 345                 350

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

Ala Glu Pro Pro Phe Gly Asp Ser Tyr Ile Ile Ile Gly Val Glu Pro
    370                 375                 380

Gly Gln Leu Lys Leu Asn Trp Phe Lys Lys Gly Ser Ser Ile Gly Lys
385                 390                 395                 400

Met Phe Glu Ser Thr Tyr Arg Gly Ala Lys Arg Met Ala Ile Leu Gly
                405                 410                 415

Glu Thr Ala Trp Asp Phe Gly Ser Val Gly Gly Leu Phe Thr Ser Leu
            420                 425                 430

Gly Lys Ala Val His Gln Val Phe Gly Ser Val Tyr Thr Thr Met Phe
        435                 440                 445

Gly Gly Val Ser Trp Met Ile Arg Ile Leu Ile Gly Phe Leu Val Leu
```

```
    450                 455                 460

Trp Ile Gly Thr Asn Ser Arg Asn Thr Ser Met Ala Met Thr Cys Ile
465                 470                 475                 480

Ala Val Gly Gly Ile Thr Leu Phe Leu Gly Phe Thr Val Gln Ala
                485                 490                 495
```