<110> Immune Design Corp.
Dubensky, et al.

<120> Vaccines for HSV-2

<130> 31943/47733

<150> 61/647,764
<151> 2012-05-16

<150> 61/679,387
<151> 2012-08-03

<150> 61/714,158
<151> 2012-10-15

<160> 17

<170> PatentIn version 3.5

<210> 1
<211> 904
<212> PRT
<213> Herpes Simplex Virus 2

<400> 1

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Met Arg Gly Gly Gly Leu Ile Cys Ala Leu Val Val Gly Ala Leu Val
1               5                   10                  15


Ala Ala Val Ala Ser Ala Ala Pro Ala Ala Pro Ala Ala Pro Arg Ala
            20                  25                  30


Ser Gly Gly Val Ala Ala Thr Val Ala Ala Asn Gly Gly Pro Ala Ser
        35                  40                  45


Arg Pro Pro Pro Val Pro Ser Pro Ala Thr Thr Lys Ala Arg Lys Arg
    50                  55                  60


Lys Thr Lys Lys Pro Pro Lys Arg Pro Glu Ala Thr Pro Pro Pro Asp
65                  70                  75                  80


Ala Asn Ala Thr Val Ala Ala Gly His Ala Thr Leu Arg Ala His Leu
                85                  90                  95


Arg Glu Ile Lys Val Glu Asn Ala Asp Ala Gln Phe Tyr Val Cys Pro
            100                 105                 110


Pro Pro Thr Gly Ala Thr Val Val Gln Phe Glu Gln Pro Arg Arg Cys
        115                 120                 125


Pro Thr Arg Pro Glu Gly Gln Asn Tyr Thr Glu Gly Ile Ala Val Val
    130                 135                 140


Phe Lys Glu Asn Ile Ala Pro Tyr Lys Phe Lys Ala Thr Met Tyr Tyr
145                 150                 155                 160
```

```
Lys Asp Val Thr Val Ser Gln Val Trp Phe Gly His Arg Tyr Ser Gln
                165                 170                 175

Phe Met Gly Ile Phe Glu Asp Arg Ala Pro Val Pro Phe Glu Glu Val
            180                 185                 190

Ile Asp Lys Ile Asn Thr Lys Gly Val Cys Arg Ser Thr Ala Lys Tyr
        195                 200                 205

Val Arg Asn Asn Met Glu Thr Thr Ala Phe His Arg Asp Asp His Glu
    210                 215                 220

Thr Asp Met Glu Leu Lys Pro Ala Lys Val Ala Thr Arg Thr Ser Arg
225                 230                 235                 240

Gly Trp His Thr Thr Asp Leu Lys Tyr Asn Pro Ser Arg Val Glu Ala
                245                 250                 255

Phe His Arg Tyr Gly Thr Thr Val Asn Cys Ile Val Glu Glu Val Asp
            260                 265                 270

Ala Arg Ser Val Tyr Pro Tyr Asp Glu Phe Val Leu Ala Thr Gly Asp
        275                 280                 285

Phe Val Tyr Met Ser Pro Phe Tyr Gly Tyr Arg Glu Gly Ser His Thr
    290                 295                 300

Glu His Thr Ser Tyr Ala Ala Asp Arg Phe Lys Gln Val Asp Gly Phe
305                 310                 315                 320

Tyr Ala Arg Asp Leu Thr Thr Lys Ala Arg Ala Thr Ser Pro Thr Thr
                325                 330                 335

Arg Asn Leu Leu Thr Thr Pro Lys Phe Thr Val Ala Trp Asp Trp Val
            340                 345                 350

Pro Lys Arg Pro Ala Val Cys Thr Met Thr Lys Trp Gln Glu Val Asp
        355                 360                 365

Glu Met Leu Arg Ala Glu Tyr Gly Gly Ser Phe Arg Phe Ser Ser Asp
    370                 375                 380

Ala Ile Ser Thr Thr Phe Thr Thr Asn Leu Thr Glu Tyr Ser Leu Ser
385                 390                 395                 400

Arg Val Asp Leu Gly Asp Cys Ile Gly Arg Asp Ala Arg Glu Ala Ile
                405                 410                 415

Asp Arg Met Phe Ala Arg Lys Tyr Asn Ala Thr His Ile Lys Val Gly
            420                 425                 430
```

```
Gln Pro Gln Tyr Tyr Leu Ala Thr Gly Gly Phe Leu Ile Ala Tyr Gln
        435                 440                 445

Pro Leu Leu Ser Asn Thr Leu Ala Glu Leu Tyr Val Arg Glu Tyr Met
    450                 455                 460

Arg Glu Gln Asp Arg Lys Pro Arg Asn Ala Thr Pro Ala Pro Leu Arg
465                 470                 475                 480

Glu Ala Pro Ser Ala Asn Ala Ser Val Glu Arg Ile Lys Thr Thr Ser
                485                 490                 495

Ser Ile Glu Phe Ala Arg Leu Gln Phe Thr Tyr Asn His Ile Gln Arg
            500                 505                 510

His Val Asn Asp Met Leu Gly Arg Ile Ala Val Ala Trp Cys Glu Leu
        515                 520                 525

Gln Asn His Glu Leu Thr Leu Trp Asn Glu Ala Arg Lys Leu Asn Pro
    530                 535                 540

Asn Ala Ile Ala Ser Ala Thr Val Gly Arg Arg Val Ser Ala Arg Met
545                 550                 555                 560

Leu Gly Asp Val Met Ala Val Ser Thr Cys Val Pro Val Ala Pro Asp
                565                 570                 575

Asn Val Ile Val Gln Asn Ser Met Arg Val Ser Ser Arg Pro Gly Thr
            580                 585                 590

Cys Tyr Ser Arg Pro Leu Val Ser Phe Arg Tyr Glu Asp Gln Gly Pro
        595                 600                 605

Leu Ile Glu Gly Gln Leu Gly Glu Asn Asn Glu Leu Arg Leu Thr Arg
    610                 615                 620

Asp Ala Leu Glu Pro Cys Thr Val Gly His Arg Arg Tyr Phe Ile Phe
625                 630                 635                 640

Gly Gly Gly Tyr Val Tyr Phe Glu Glu Tyr Ala Tyr Ser His Gln Leu
                645                 650                 655

Ser Arg Ala Asp Val Thr Thr Val Ser Thr Phe Ile Asp Leu Asn Ile
            660                 665                 670

Thr Met Leu Glu Asp His Glu Phe Val Pro Leu Glu Val Tyr Thr Arg
        675                 680                 685

His Glu Ile Lys Asp Ser Gly Leu Leu Asp Tyr Thr Glu Val Gln Arg
    690                 695                 700
```

```
Arg Asn Gln Leu His Asp Leu Arg Phe Ala Asp Ile Asp Thr Val Ile
705                 710                 715                 720

Arg Ala Asp Ala Asn Ala Ala Met Phe Ala Gly Leu Cys Ala Phe Phe
                725                 730                 735

Glu Gly Met Gly Asp Leu Gly Arg Ala Val Gly Lys Val Val Met Gly
            740                 745                 750

Val Val Gly Gly Val Val Ser Ala Val Ser Gly Val Ser Ser Phe Met
        755                 760                 765

Ser Asn Pro Phe Gly Ala Leu Ala Val Gly Leu Leu Val Leu Ala Gly
    770                 775                 780

Leu Val Ala Ala Phe Phe Ala Phe Arg Tyr Val Leu Gln Leu Gln Arg
785                 790                 795                 800

Asn Pro Met Lys Ala Leu Tyr Pro Leu Thr Thr Lys Glu Leu Lys Thr
                805                 810                 815

Ser Asp Pro Gly Gly Val Gly Gly Glu Gly Glu Glu Gly Ala Glu Gly
            820                 825                 830

Gly Gly Phe Asp Glu Ala Lys Leu Ala Glu Ala Arg Glu Met Ile Arg
        835                 840                 845

Tyr Met Ala Leu Val Ser Ala Met Glu Arg Thr Glu His Lys Ala Arg
    850                 855                 860

Lys Lys Gly Thr Ser Ala Leu Leu Ser Ser Lys Val Thr Asn Met Val
865                 870                 875                 880

Leu Arg Lys Arg Asn Lys Ala Arg Tyr Ser Pro Leu His Asn Glu Asp
                885                 890                 895

Glu Ala Gly Asp Glu Asp Glu Leu
            900
```

<210> 2
<211> 393
<212> PRT
<213> Herpes Simplex Virus 2

<400> 2

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

Ala Val Gly Leu Arg Val Val Cys Ala Lys Tyr Ala Leu Ala Asp Pro
            20                  25                  30
```

```
Ser Leu Lys Met Ala Asp Pro Asn Arg Phe Arg Gly Lys Asn Leu Pro
        35                  40                  45

Val Leu Asp Gln Leu Thr Asp Pro Pro Gly Val Lys Arg Val Tyr His
    50                  55                  60

Ile Gln Pro Ser Leu Glu Asp Pro Phe Gln Pro Pro Ser Ile Pro Ile
65                  70                  75                  80

Thr Val Tyr Tyr Ala Val Leu Glu Arg Ala Cys Arg Ser Val Leu Leu
                85                  90                  95

His Ala Pro Ser Glu Ala Pro Gln Ile Val Arg Gly Ala Ser Asp Glu
            100                 105                 110

Ala Arg Lys His Thr Tyr Asn Leu Thr Ile Ala Trp Tyr Arg Met Gly
        115                 120                 125

Asp Asn Cys Ala Ile Pro Ile Thr Val Met Glu Tyr Thr Glu Cys Pro
    130                 135                 140

Tyr Asn Lys Ser Leu Gly Val Cys Pro Ile Arg Thr Gln Pro Arg Trp
145                 150                 155                 160

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

Leu Met His Ala Pro Ala Phe Glu Thr Ala Gly Thr Tyr Leu Arg Leu
            180                 185                 190

Val Lys Ile Asn Asp Trp Thr Glu Ile Thr Gln Phe Ile Leu Glu His
        195                 200                 205

Arg Ala Arg Ala Ser Cys Lys Tyr Ala Leu Pro Leu Arg Ile Pro Pro
    210                 215                 220

Ala Ala Cys Leu Thr Ser Lys Ala Tyr Gln Gln Gly Val Thr Val Asp
225                 230                 235                 240

Ser Ile Gly Met Leu Pro Arg Phe Ile Pro Glu Asn Gln Arg Thr Val
                245                 250                 255

Ala Leu Tyr Ser Leu Lys Ile Ala Gly Trp His Gly Pro Lys Pro Pro
            260                 265                 270

Tyr Thr Ser Thr Leu Leu Pro Pro Glu Leu Ser Asp Thr Thr Asn Ala
        275                 280                 285

Thr Gln Pro Glu Leu Val Pro Glu Asp Pro Glu Asp Ser Ala Leu Leu
    290                 295                 300
```

Glu Asp Pro Ala Gly Thr Val Ser Ser Gln Ile Pro Pro Asn Trp His
305 310 315 320

Ile Pro Ser Ile Gln Asp Val Ala Pro His His Ala Pro Ala Ala Pro
325 330 335

Ser Asn Pro Gly Leu Ile Ile Gly Ala Leu Ala Gly Ser Thr Leu Ala
340 345 350

Val Leu Val Ile Gly Gly Ile Ala Phe Trp Val Arg Arg Arg Ala Gln
355 360 365

Met Ala Pro Lys Arg Leu Arg Leu Pro His Ile Arg Asp Asp Asp Ala
370 375 380

Pro Pro Ser His Gln Pro Leu Phe Tyr
385 390

<210> 3
<211> 306
<212> PRT
<213> Herpes Simplex Virus 2

<400> 3

Lys Tyr Ala Leu Ala Asp Pro Ser Leu Lys Met Ala Asp Pro Asn Arg
1 5 10 15

Phe Arg Gly Lys Asn Leu Pro Val Leu Asp Gln Leu Thr Asp Pro Pro
20 25 30

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

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

Ala Cys Arg Ser Val Leu Leu His Ala Pro Ser Glu Ala Pro Gln Ile
65 70 75 80

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

Ile Ala Trp Tyr Arg Met Gly Asp Asn Cys Ala Ile Pro Ile Thr Val
100 105 110

Met Glu Tyr Thr Glu Cys Pro Tyr Asn Lys Ser Leu Gly Val Cys Pro
115 120 125

Ile Arg Thr Gln Pro Arg Trp Ser Tyr Tyr Asp Ser Phe Ser Ala Val
130 135 140

Ser Glu Asp Asn Leu Gly Phe Leu Met His Ala Pro Ala Phe Glu Thr

145 150 155 160

Ala Gly Thr Tyr Leu Arg Leu Val Lys Ile Asn Asp Trp Thr Glu Ile
165 170 175

Thr Gln Phe Ile Leu Glu His Arg Ala Arg Ala Ser Cys Lys Tyr Ala
180 185 190

Leu Pro Leu Arg Ile Pro Pro Ala Ala Cys Leu Thr Ser Lys Ala Tyr
195 200 205

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

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

Trp His Gly Pro Lys Pro Pro Tyr Thr Ser Thr Leu Leu Pro Pro Glu
245 250 255

Leu Ser Asp Thr Thr Asn Ala Thr Gln Pro Glu Leu Val Pro Glu Asp
260 265 270

Pro Glu Asp Ser Ala Leu Leu Glu Asp Pro Ala Gly Thr Val Ser Ser
275 280 285

Gln Ile Pro Pro Asn Trp His Ile Pro Ser Ile Gln Asp Val Ala Pro
290 295 300

His His
305

<210> 4
<211> 1374
<212> PRT
<213> Herpes Simplex Virus 2

<400> 4

Met Ala Ala Pro Ala Arg Asp Pro Pro Gly Tyr Arg Tyr Ala Ala Ala
1 5 10 15

Met Val Pro Thr Gly Ser Ile Leu Ser Thr Ile Glu Val Ala Ser His
20 25 30

Arg Arg Leu Phe Asp Phe Phe Ala Arg Val Arg Ser Asp Glu Asn Ser
35 40 45

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

Leu Ser Leu Val Arg Phe Leu Glu Leu Gly Leu Ser Val Ala Cys Val
65 70 75 80

```
Cys Thr Lys Phe Pro Glu Leu Ala Tyr Met Asn Glu Gly Arg Val Gln
                85                  90                  95

Phe Glu Val His Gln Pro Leu Ile Ala Arg Asp Gly Pro His Pro Val
            100                 105                 110

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

Leu Asn Ala Ala Phe Ser Leu Ala Thr Glu Ala Ile Ala Leu Leu Thr
    130                 135                 140

Gly Glu Ala Leu Asp Gly Thr Gly Ile Ser Leu His Arg Gln Leu Arg
145                 150                 155                 160

Ala Ile Gln Gln Leu Ala Arg Asn Val Gln Ala Val Leu Gly Ala Phe
                165                 170                 175

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

Pro Pro Leu Ala Leu Leu Leu Pro Met Gln Arg Tyr Leu Asp Asn Gly
        195                 200                 205

Arg Leu Ala Thr Arg Val Ala Arg Ala Thr Leu Val Ala Glu Leu Lys
    210                 215                 220

Arg Ser Phe Cys Asp Thr Ser Phe Phe Leu Gly Lys Ala Gly His Arg
225                 230                 235                 240

Arg Glu Ala Ile Glu Ala Trp Leu Val Asp Leu Thr Thr Ala Thr Gln
                245                 250                 255

Pro Ser Val Ala Val Pro Arg Leu Thr His Ala Asp Thr Arg Gly Arg
            260                 265                 270

Pro Val Asp Gly Val Leu Val Thr Thr Ala Ala Ile Lys Gln Arg Leu
        275                 280                 285

Leu Gln Ser Phe Leu Lys Val Glu Asp Thr Glu Ala Asp Val Pro Val
    290                 295                 300

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

Val Met Gly Lys Ala Val Arg Ser Leu Asp Asp Val Gly Arg His Leu
                325                 330                 335

Leu Glu Met Gln Glu Glu Gln Leu Glu Ala Asn Arg Glu Thr Leu Asp
            340                 345                 350
```

```
Glu Leu Glu Ser Ala Pro Gln Thr Thr Arg Val Arg Ala Asp Leu Val
        355                 360                 365

Ala Ile Gly Asp Arg Leu Val Phe Leu Glu Ala Leu Glu Lys Arg Ile
    370                 375                 380

Tyr Ala Ala Thr Asn Val Pro Tyr Pro Leu Val Gly Ala Met Asp Leu
385                 390                 395                 400

Thr Phe Val Leu Pro Leu Gly Leu Phe Asn Pro Ala Met Glu Arg Phe
                405                 410                 415

Ala Ala His Ala Gly Asp Leu Val Pro Ala Pro Gly His Pro Glu Pro
            420                 425                 430

Arg Ala Phe Pro Pro Arg Gln Leu Phe Phe Trp Gly Lys Asp His Gln
        435                 440                 445

Val Leu Arg Leu Ser Met Glu Asn Ala Val Gly Thr Val Cys His Pro
    450                 455                 460

Ser Leu Met Asn Ile Asp Ala Ala Val Gly Gly Val Asn His Asp Pro
465                 470                 475                 480

Val Glu Ala Ala Asn Pro Tyr Gly Ala Tyr Val Ala Ala Pro Ala Gly
                485                 490                 495

Pro Gly Ala Asp Met Gln Gln Arg Phe Leu Asn Ala Trp Arg Gln Arg
            500                 505                 510

Leu Ala His Gly Arg Val Arg Trp Val Ala Glu Cys Gln Met Thr Ala
        515                 520                 525

Glu Gln Phe Met Gln Pro Asp Asn Ala Asn Leu Ala Leu Glu Leu His
    530                 535                 540

Pro Ala Phe Asp Phe Phe Ala Gly Val Ala Asp Val Glu Leu Pro Gly
545                 550                 555                 560

Gly Glu Val Pro Pro Ala Gly Pro Gly Ala Ile Gln Ala Thr Trp Arg
                565                 570                 575

Val Val Asn Gly Asn Leu Pro Leu Ala Leu Cys Pro Val Ala Phe Arg
            580                 585                 590

Asp Ala Arg Gly Leu Glu Leu Gly Val Gly Arg His Ala Met Ala Pro
        595                 600                 605

Ala Thr Ile Ala Ala Val Arg Gly Ala Phe Glu Asp Arg Ser Tyr Pro
    610                 615                 620
```

```
Ala Val Phe Tyr Leu Leu Gln Ala Ala Ile His Gly Ser Glu His Val
625                 630                 635                 640

Phe Cys Ala Leu Ala Arg Leu Val Thr Gln Cys Ile Thr Ser Tyr Trp
                645                 650                 655

Asn Asn Thr Arg Cys Ala Ala Phe Val Asn Asp Tyr Ser Leu Val Ser
            660                 665                 670

Tyr Ile Val Thr Tyr Leu Gly Gly Asp Leu Pro Glu Glu Cys Met Ala
        675                 680                 685

Val Tyr Arg Asp Leu Val Ala His Val Glu Ala Leu Ala Gln Leu Val
    690                 695                 700

Asp Asp Phe Thr Leu Pro Gly Pro Glu Leu Gly Gly Gln Ala Gln Ala
705                 710                 715                 720

Glu Leu Asn His Leu Met Arg Asp Pro Ala Leu Leu Pro Pro Leu Val
                725                 730                 735

Trp Asp Cys Asp Gly Leu Met Arg His Ala Ala Leu Asp Arg His Arg
            740                 745                 750

Asp Cys Arg Ile Asp Ala Gly Gly His Glu Pro Val Tyr Ala Ala Ala
        755                 760                 765

Cys Asn Val Ala Thr Ala Asp Phe Asn Arg Asn Asp Gly Arg Leu Leu
    770                 775                 780

His Asn Thr Gln Ala Arg Ala Ala Asp Ala Ala Asp Asp Arg Pro His
785                 790                 795                 800

Arg Pro Ala Asp Trp Thr Val His His Lys Ile Tyr Tyr Tyr Val Leu
                805                 810                 815

Val Pro Ala Phe Ser Arg Gly Arg Cys Cys Thr Ala Gly Val Arg Phe
            820                 825                 830

Asp Arg Val Tyr Ala Thr Leu Gln Asn Met Val Val Pro Glu Ile Ala
        835                 840                 845

Pro Gly Glu Glu Cys Pro Ser Asp Pro Val Thr Asp Pro Ala His Pro
    850                 855                 860

Leu His Pro Ala Asn Leu Val Ala Asn Thr Val Asn Ala Met Phe His
865                 870                 875                 880

Asn Gly Arg Val Val Val Asp Gly Pro Ala Met Leu Thr Leu Gln Val
                885                 890                 895
```

```
Leu Ala His Asn Met Ala Glu Arg Thr Thr Ala Leu Leu Cys Ser Ala
            900                 905                 910

Ala Pro Asp Ala Gly Ala Asn Thr Ala Ser Thr Ala Asn Met Arg Ile
        915                 920                 925

Phe Asp Gly Ala Leu His Ala Gly Val Leu Leu Met Ala Pro Gln His
    930                 935                 940

Leu Asp His Thr Ile Gln Asn Gly Glu Tyr Phe Tyr Val Leu Pro Val
945                 950                 955                 960

His Ala Leu Phe Ala Gly Ala Asp His Val Ala Asn Ala Pro Asn Phe
                965                 970                 975

Pro Pro Ala Leu Arg Asp Leu Ala Arg His Val Pro Leu Val Pro Pro
            980                 985                 990

Ala Leu Gly Ala Asn Tyr Phe Ser  Ser Ile Arg Gln Pro  Val Val Gln
        995                 1000                1005

His Ala  Arg Glu Ser Ala Ala  Gly Glu Asn Ala Leu  Thr Tyr Ala
    1010                1015                1020

Leu Met  Ala Gly Tyr Phe Lys  Met Ser Pro Val Ala  Leu Tyr His
    1025                1030                1035

Gln Leu  Lys Thr Gly Leu His  Pro Gly Phe Gly Phe  Thr Val Val
    1040                1045                1050

Arg Gln  Asp Arg Phe Val Thr  Glu Asn Val Leu Phe  Ser Glu Arg
    1055                1060                1065

Ala Ser  Glu Ala Tyr Phe Leu  Gly Gln Leu Gln Val  Ala Arg His
    1070                1075                1080

Glu Thr  Gly Gly Gly Val Ser  Phe Thr Leu Thr Gln  Pro Arg Gly
    1085                1090                1095

Asn Val  Asp Leu Gly Val Gly  Tyr Thr Ala Val Ala  Ala Thr Ala
    1100                1105                1110

Thr Val  Arg Asn Pro Val Thr  Asp Met Gly Asn Leu  Pro Gln Asn
    1115                1120                1125

Phe Tyr  Leu Gly Arg Gly Ala  Pro Pro Leu Leu Asp  Asn Ala Ala
    1130                1135                1140

Ala Val  Tyr Leu Arg Asn Ala  Val Val Ala Gly Asn  Arg Leu Gly
    1145                1150                1155
```

Pro Ala Gln Pro Leu Pro Val Phe Gly Cys Ala Gln Val Pro Arg
1160 1165 1170

Arg Ala Gly Met Asp His Gly Gln Asp Ala Val Cys Glu Phe Ile
1175 1180 1185

Ala Thr Pro Val Ala Thr Asp Ile Asn Tyr Phe Arg Arg Pro Cys
1190 1195 1200

Asn Pro Arg Gly Arg Ala Ala Gly Gly Val Tyr Ala Gly Asp Lys
1205 1210 1215

Glu Gly Asp Val Ile Ala Leu Met Tyr Asp His Gly Gln Ser Asp
1220 1225 1230

Pro Ala Arg Pro Phe Ala Ala Thr Ala Asn Pro Trp Ala Ser Gln
1235 1240 1245

Arg Phe Ser Tyr Gly Asp Leu Leu Tyr Asn Gly Ala Tyr His Leu
1250 1255 1260

Asn Gly Ala Ser Pro Val Leu Ser Pro Cys Phe Lys Phe Phe Thr
1265 1270 1275

Ala Ala Asp Ile Thr Ala Lys His Arg Cys Leu Glu Arg Leu Ile
1280 1285 1290

Val Glu Thr Gly Ser Ala Val Ser Thr Ala Thr Ala Ala Ser Asp
1295 1300 1305

Val Gln Phe Lys Arg Pro Pro Gly Cys Arg Glu Leu Val Glu Asp
1310 1315 1320

Pro Cys Gly Leu Phe Gln Glu Ala Tyr Pro Ile Thr Cys Ala Ser
1325 1330 1335

Asp Pro Ala Leu Leu Arg Ser Ala Arg Asp Gly Glu Ala His Ala
1340 1345 1350

Arg Glu Thr His Phe Thr Gln Tyr Leu Ile Tyr Asp Ala Ser Pro
1355 1360 1365

Leu Lys Gly Leu Ser Leu
1370

<210> 5
<211> 585
<212> PRT
<213> Herpes Simplex Virus 2

<400> 5

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Met Asp Pro Tyr Tyr Pro Phe Asp Ala Leu Asp Val Trp Glu His Arg
1               5                  10                  15

Arg Phe Ile Val Ala Asp Ser Arg Ser Phe Ile Thr Pro Glu Phe Pro
            20                  25                  30

Arg Asp Phe Trp Met Leu Pro Val Phe Asn Ile Pro Arg Glu Thr Ala
        35                  40                  45

Ala Glu Arg Ala Ala Val Leu Gln Ala Gln Arg Thr Ala Ala Ala Ala
    50                  55                  60

Ala Leu Glu Asn Ala Ala Leu Gln Ala Ala Glu Leu Pro Val Asp Ile
65                  70                  75                  80

Glu Arg Arg Ile Arg Pro Ile Glu Gln Gln Val His His Ile Ala Asp
                85                  90                  95

Ala Leu Glu Ala Leu Glu Thr Ala Ala Ala Ala Ala Glu Glu Ala Asp
            100                 105                 110

Ala Ala Arg Asp Ala Glu Ala Arg Gly Glu Gly Ala Ala Asp Gly Ala
        115                 120                 125

Ala Pro Ser Pro Thr Ala Gly Pro Ala Ala Ala Glu Met Glu Val Gln
    130                 135                 140

Ile Val Arg Asn Asp Pro Pro Leu Arg Tyr Asp Thr Asn Leu Pro Val
145                 150                 155                 160

Asp Leu Leu His Met Val Tyr Ala Gly Arg Gly Ala Ala Gly Ser Ser
                165                 170                 175

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

Ala Asp Phe Pro Leu Thr Thr Arg Ser Ala Asp Phe Arg Asp Gly Arg
        195                 200                 205

Met Ser Lys Thr Phe Met Thr Ala Leu Val Leu Ser Leu Gln Ser Cys
    210                 215                 220

Gly Arg Leu Tyr Val Gly Gln Arg His Tyr Ser Ala Phe Glu Cys Ala
225                 230                 235                 240

Val Leu Cys Leu Tyr Leu Leu Tyr Arg Thr Thr His Glu Ser Ser Pro
                245                 250                 255

Asp Arg Asp Arg Ala Pro Val Ala Phe Gly Asp Leu Leu Ala Arg Leu
            260                 265                 270
```

```
Pro Arg Tyr Leu Ala Arg Leu Ala Ala Val Ile Gly Asp Glu Ser Gly
        275                 280                 285

Arg Pro Gln Tyr Arg Tyr Arg Asp Asp Lys Leu Pro Lys Ala Gln Phe
    290                 295                 300

Ala Ala Ala Gly Gly Arg Tyr Glu His Gly Ala Leu Ala Thr His Val
305                 310                 315                 320

Val Ile Ala Thr Leu Val Arg His Gly Val Leu Pro Ala Ala Pro Gly
                325                 330                 335

Asp Val Pro Arg Asp Thr Ser Thr Arg Val Asn Pro Asp Asp Val Ala
            340                 345                 350

His Arg Asp Asp Val Asn Arg Ala Ala Ala Ala Phe Leu Ala Arg Gly
        355                 360                 365

His Asn Leu Phe Leu Trp Glu Asp Gln Thr Leu Leu Arg Ala Thr Ala
    370                 375                 380

Asn Thr Ile Thr Ala Leu Ala Val Leu Arg Arg Leu Leu Ala Asn Gly
385                 390                 395                 400

Asn Val Tyr Ala Asp Arg Leu Asp Asn Arg Leu Gln Leu Gly Met Leu
                405                 410                 415

Ile Pro Gly Ala Val Pro Ala Glu Ala Ile Ala Arg Gly Ala Ser Gly
            420                 425                 430

Leu Asp Ser Gly Ala Ile Lys Ser Gly Asp Asn Asn Leu Glu Ala Leu
        435                 440                 445

Cys Val Asn Tyr Val Leu Pro Leu Tyr Gln Ala Asp Pro Thr Val Glu
    450                 455                 460

Leu Thr Gln Leu Phe Pro Gly Leu Ala Ala Leu Cys Leu Asp Ala Gln
465                 470                 475                 480

Ala Gly Arg Pro Leu Ala Ser Thr Arg Arg Val Val Asp Met Ser Ser
                485                 490                 495

Gly Ala Arg Gln Ala Ala Leu Val Arg Leu Thr Ala Leu Glu Leu Ile
            500                 505                 510

Asn Arg Thr Arg Thr Asn Thr Thr Pro Val Gly Glu Ile Ile Asn Ala
        515                 520                 525

His Asp Ala Leu Gly Ile Gln Tyr Glu Gln Gly Leu Gly Leu Leu Ala
    530                 535                 540
```

```
Gln Gln Ala Arg Ile Gly Leu Ala Ser Asn Ala Lys Arg Phe Ala Thr
545                 550                 555                 560


Phe Asn Val Gly Ser Asp Tyr Asp Leu Leu Tyr Phe Leu Cys Leu Gly
                565                 570                 575


Phe Ile Pro Gln Tyr Leu Ser Val Ala
            580                 585


<210>  6
<211>  696
<212>  PRT
<213>  Herpes Simplex Virus 2

<400>  6

Met Ser Val Arg Gly His Ala Val Arg Arg Arg Arg Ala Ser Thr Arg
1               5                   10                  15


Ser His Ala Pro Ser Ala His Arg Ala Asp Ser Pro Val Glu Asp Glu
            20                  25                  30


Pro Glu Gly Gly Gly Gly Gly Leu Met Gly Tyr Leu Arg Ala Val Phe
        35                  40                  45


Asn Val Asp Asp Asp Ser Glu Val Glu Ala Ala Gly Glu Met Ala Ser
    50                  55                  60


Glu Glu Pro Pro Pro Arg Arg Arg Arg Glu Ala Arg Gly His Pro Gly
65                  70                  75                  80


Ser Arg Arg Ala Ser Glu Ala Arg Ala Ala Ala Pro Pro Arg Arg Ala
                85                  90                  95


Ser Phe Pro Arg Pro Arg Ser Val Thr Ala Arg Ser Gln Ser Val Arg
            100                 105                 110


Gly Arg Arg Asp Ser Ala Ile Thr Arg Ala Pro Arg Gly Gly Tyr Leu
        115                 120                 125


Gly Pro Met Asp Pro Arg Asp Val Leu Gly Arg Val Gly Gly Ser Arg
    130                 135                 140


Val Val Pro Ser Pro Leu Phe Leu Asp Glu Leu Ser Tyr Glu Glu Asp
145                 150                 155                 160


Asp Tyr Pro Ala Ala Val Ala His Asp Asp Gly Ala Gly Ala Arg Pro
                165                 170                 175


Pro Ala Thr Val Glu Ile Leu Ala Gly Arg Val Ser Gly Pro Glu Leu
            180                 185                 190
```

```
Gln Ala Ala Phe Pro Leu Asp Arg Leu Thr Pro Arg Val Ala Ala Trp
        195                 200                 205

Asp Glu Ser Val Arg Ser Ala Leu Ala Leu Gly His Pro Ala Gly Phe
    210                 215                 220

Tyr Pro Cys Pro Asp Ser Ala Phe Gly Leu Ser Arg Val Gly Val Met
225                 230                 235                 240

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

Gln Gln Gly Glu Ala Leu Ala Trp Tyr Val Thr Gly Asp Ala Ile Leu
            260                 265                 270

Asp Leu Thr Asp Arg Arg Ala Lys Thr Ser Pro Ser Arg Ala Met Gly
        275                 280                 285

Phe Leu Val Asp Ala Ile Val Arg Val Ala Ile Asn Gly Trp Val Cys
    290                 295                 300

Gly Thr Arg Leu His Thr Glu Gly Arg Gly Ser Glu Leu Asp Asp Arg
305                 310                 315                 320

Ala Ala Glu Leu Arg Arg Gln Phe Ala Ser Leu Thr Ala Leu Arg Pro
                325                 330                 335

Val Gly Ala Ala Ala Val Pro Leu Leu Ser Ala Gly Gly Ala Ala Pro
            340                 345                 350

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

Leu Leu Tyr Trp Pro Gly Val Arg Ala Leu Leu Gly Arg Asp Cys Arg
    370                 375                 380

Val Ala Ala Arg Tyr Ala Gly Arg Met Thr Tyr Ile Ala Thr Gly Ala
385                 390                 395                 400

Leu Leu Ala Arg Phe Asn Pro Gly Ala Val Lys Cys Val Leu Pro Arg
                405                 410                 415

Glu Ala Ala Phe Ala Gly Arg Val Leu Asp Val Leu Ala Val Leu Ala
            420                 425                 430

Glu Gln Thr Val Gln Trp Leu Ser Val Val Val Gly Ala Arg Leu His
        435                 440                 445

Pro His Ser Ala His Pro Ala Phe Ala Asp Val Glu Gln Glu Ala Leu
    450                 455                 460
```

```
Phe Arg Ala Leu Pro Leu Gly Ser Pro Gly Val Val Ala Ala Glu His
465                 470                 475                 480

Glu Ala Leu Gly Asp Thr Ala Ala Arg Arg Leu Leu Ala Thr Ser Gly
                485                 490                 495

Leu Asn Ala Val Leu Gly Ala Ala Val Tyr Ala Leu His Thr Ala Leu
            500                 505                 510

Ala Thr Val Thr Leu Lys Tyr Ala Leu Ala Cys Gly Asp Ala Arg Arg
        515                 520                 525

Arg Arg Asp Asp Ala Ala Ala Ala Arg Ala Val Leu Ala Thr Gly Leu
    530                 535                 540

Ile Leu Gln Arg Leu Leu Gly Leu Ala Asp Thr Val Val Ala Cys Val
545                 550                 555                 560

Ala Leu Ala Ala Phe Asp Gly Gly Ser Thr Ala Pro Glu Val Gly Thr
                565                 570                 575

Tyr Thr Pro Leu Arg Tyr Ala Cys Val Leu Arg Ala Thr Gln Pro Leu
            580                 585                 590

Tyr Ala Arg Thr Thr Pro Ala Lys Phe Trp Ala Asp Val Arg Ala Ala
        595                 600                 605

Ala Glu His Val Asp Leu Arg Pro Ala Ser Ser Ala Pro Arg Ala Pro
    610                 615                 620

Val Ser Gly Thr Ala Asp Pro Ala Phe Leu Leu Glu Asp Leu Ala Ala
625                 630                 635                 640

Phe Pro Pro Ala Pro Leu Asn Ser Glu Ser Val Leu Gly Pro Arg Val
                645                 650                 655

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

Glu Glu Thr Ala Ala Leu Arg Ala His Val Ser Gly Arg Arg Ala Thr
        675                 680                 685

Gly Leu Gly Gly Pro Pro Arg Pro
    690                 695
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<210> 7
<211> 15
<212> PRT
<213> Herpes simplex virus 2

<400> 7

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Gln Pro Arg Trp Ser Tyr Tyr Asp Ser Phe Ser Ala Val Ser Glu
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1 5 10 15

<210> 8
<211> 15
<212> PRT
<213> Herpes Simplex Virus 2

<400> 8

Ser Gln Ile Pro Pro Asn Trp His Ile Pro Ser Ile Gln Asp Val
1 5 10 15

<210> 9
<211> 15
<212> PRT
<213> Herpes Simplex Virus 2

<400> 9

Asn Tyr Phe Ser Ser Ile Arg Gln Pro Val Val Gln His Ala Arg
1 5 10 15

<210> 10
<211> 15
<212> PRT
<213> Herpes Simplex Virus 2

<400> 10

Cys Glu Phe Ile Ala Thr Pro Val Ala Thr Asp Ile Asn Tyr Phe
1 5 10 15

<210> 11
<211> 15
<212> PRT
<213> Herpes Simplex Virus 2

<400> 11

Met Asp Pro Tyr Tyr Pro Phe Asp Ala Leu Asp Val Trp Glu His
1 5 10 15

<210> 12
<211> 604
<212> PRT
<213> Herpes Simplex Virus 2

<400> 12

Arg Leu Ser Met Glu Asn Ala Val Gly Thr Val Cys His Pro Ser Leu
1 5 10 15

Met Asn Ile Asp Ala Ala Val Gly Gly Val Asn His Asp Pro Val Glu
20 25 30

Ala Ala Asn Pro Tyr Gly Ala Tyr Val Ala Ala Pro Ala Gly Pro Gly
35 40 45

Ala Asp Met Gln Gln Arg Phe Leu Asn Ala Trp Arg Gln Arg Leu Ala
50 55 60

```
His Gly Arg Val Arg Trp Val Ala Glu Cys Gln Met Thr Ala Glu Gln
65                  70                  75                  80

Phe Met Gln Pro Asp Asn Ala Asn Leu Ala Leu Glu Leu His Pro Ala
                85                  90                  95

Phe Asp Phe Phe Ala Gly Val Ala Asp Val Glu Leu Pro Gly Gly Glu
            100                 105                 110

Val Pro Pro Ala Gly Pro Gly Ala Ile Gln Ala Thr Trp Arg Val Val
        115                 120                 125

Asn Gly Asn Leu Pro Leu Ala Leu Cys Pro Val Ala Phe Arg Asp Ala
    130                 135                 140

Arg Gly Leu Glu Leu Gly Val Gly Arg His Ala Met Ala Pro Ala Thr
145                 150                 155                 160

Ile Ala Ala Val Arg Gly Ala Phe Glu Asp Arg Ser Tyr Pro Ala Val
                165                 170                 175

Phe Tyr Leu Leu Gln Ala Ala Ile His Gly Asn Glu His Val Phe Cys
            180                 185                 190

Ala Leu Ala Arg Leu Val Thr Gln Cys Ile Thr Ser Tyr Trp Asn Asn
        195                 200                 205

Thr Arg Cys Ala Ala Phe Val Asn Asp Tyr Ser Leu Val Ser Tyr Ile
    210                 215                 220

Val Thr Tyr Leu Gly Gly Asp Leu Pro Glu Glu Cys Met Ala Val Tyr
225                 230                 235                 240

Arg Asp Leu Val Ala His Val Glu Ala Leu Ala Gln Leu Val Asp Asp
                245                 250                 255

Phe Thr Leu Pro Gly Pro Glu Leu Gly Gly Gln Ala Gln Ala Glu Leu
            260                 265                 270

Asn His Leu Met Arg Asp Pro Ala Leu Leu Pro Pro Leu Val Trp Asp
        275                 280                 285

Cys Asp Gly Leu Met Arg His Ala Ala Leu Asp Arg His Arg Asp Cys
    290                 295                 300

Arg Ile Asp Ala Gly Gly His Glu Pro Val Tyr Ala Ala Ala Cys Asn
305                 310                 315                 320

Val Ala Thr Ala Asp Phe Asn Arg Asn Asp Gly Arg Leu Leu His Asn
                325                 330                 335
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Thr Gln Ala Arg Ala Ala Asp Ala Ala Asp Asp Arg Pro His Arg Pro
            340                 345                 350

Ala Asp Trp Thr Val His His Lys Ile Tyr Tyr Tyr Val Leu Val Pro
        355                 360                 365

Ala Phe Ser Arg Gly Arg Cys Cys Thr Ala Gly Val Arg Phe Asp Arg
    370                 375                 380

Val Tyr Ala Thr Leu Gln Asn Met Val Val Pro Glu Ile Ala Pro Gly
385                 390                 395                 400

Glu Glu Cys Pro Ser Asp Pro Val Thr Asp Pro Ala His Pro Leu His
                405                 410                 415

Pro Ala Asn Leu Val Ala Asn Thr Val Lys Arg Met Phe His Asn Gly
            420                 425                 430

Arg Val Val Val Asp Gly Pro Ala Met Leu Thr Leu Gln Val Leu Ala
        435                 440                 445

His Asn Met Ala Glu Arg Thr Thr Ala Leu Leu Cys Ser Ala Ala Pro
    450                 455                 460

Asp Ala Gly Ala Asn Thr Ala Ser Thr Ala Asn Met Arg Ile Phe Asp
465                 470                 475                 480

Gly Ala Leu His Ala Gly Val Leu Leu Met Ala Pro Gln His Leu Asp
                485                 490                 495

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

Leu Phe Ala Gly Ala Asp His Val Ala Asn Ala Pro Asn Phe Pro Pro
        515                 520                 525

Ala Leu Arg Asp Leu Ala Arg Asp Val Pro Leu Val Pro Pro Ala Leu
    530                 535                 540

Gly Ala Asn Tyr Phe Ser Ser Ile Arg Gln Pro Val Val Gln His Ala
545                 550                 555                 560

Arg Glu Ser Ala Ala Gly Glu Asn Ala Leu Thr Tyr Ala Leu Met Ala
                565                 570                 575

Gly Tyr Phe Lys Met Ser Pro Val Ala Leu Tyr His Gln Leu Lys Thr
            580                 585                 590

Gly Leu His Pro Gly Phe Gly Phe Thr Val Val Arg
        595                 600
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<210> 13
<211> 683
<212> DNA
<213> Human immunodeficiency virus type 1

<400> 13
cctagaaaaa catggagcaa tcacaagtag caatacagca gctaccaatg ctgattgtgc 60

ctggctagaa gcacaagagg aggaggaggt gggttttcca gtcacacctc aggtaccttt 120

aagaccaatg acttacaagg cagctgtaga tcttagccac tttttaaaag aaaaggggg 180

actggaaggg ctaattcact cccaacgaag acaagatatc cttgatctgt ggatctacca 240

cacacaaggc tacttccctg attggcagaa ctacacacca gggccaggga tcagatatcc 300

actgaccttt ggatggtgct acaagctagt accagttgag caagagaagg tagaagaagc 360

caatgaagga gagaacaccc gcttgttaca ccctgtgagc ctgcatggga tggatgaccc 420

ggagagagaa gtattagagt ggaggtttga cagccgccta gcatttcatc acatggcccg 480

agagctgcat ccggactgta ctgggtctct ctggttagac cagatctgag cctgggagct 540

ctctggctaa ctagggaacc cactgcttaa gcctcaataa agcttgcctt gagtgcttca 600

agtagtgtgt gcccgtctgt tgtgtgactc tggtaactag agatccctca gacccttta 660

gtcagtgtgg aaaatctcta gca 683

<210> 14
<211> 416
<212> DNA
<213> Human immunodeficiency virus type 1

<400> 14
cctagaaaaa catggagcaa tcacaagtag caatacagca gctaccaatg ctgattgtgc 60

ctggctagaa gcacaagagg aggaggaggt gggttttcca gtcacacctc aggtaccttt 120

aagaccaatg acttacaagg cagctgtaga tcttagccac tttttaaaag aaaaggggg 180

actggaaggg ctaattcact cccaacgaag acaagatctg ctttttgcct gtactgggtc 240

tctctggtta gaccagatct gagcctggga gctctctggc taactaggga acccactgct 300

taagcctcaa taaagcttgc cttgagtgct tcaagtagtg tgtgcccgtc tgttgtgtga 360

ctctggtaac tagagatccc tcagaccctt ttagtcagtg tggaaaatct ctagca 416

<210> 15
<211> 401
<212> DNA
<213> Human immunodeficiency virus type 1

<400> 15
cctagaaaaa catggagcaa tcacaagtag caatacagca gctaccaatg ctgattgtgc 60

ctggctagaa gcacaagagg aggaggaggt gggttttcca gtcacacctc aggtaccttt 120

aagaccaatg acttacaagg cagctgtaga tcttagccac tttttactgg aagggctaat 180

tcactcccaa cgaagacaag atctgctttt tgcctgtact gggtctctct ggttagacca 240

gatctgagcc tgggagctct ctggctaact agggaaccca ctgcttaagc ctcaataaag 300

cttgccttga gtgcttcaag tagtgtgtgc ccgtctgttg tgtgactctg gtaactagag 360

atccctcaga ccctttttagt cagtgtggaa aatctctagc a 401

<210> 16
<211> 4
<212> PRT
<213> HSV-2 fragment

<400> 16

Cys Ala Lys Tyr
1

<210> 17
<211> 4
<212> PRT
<213> HSV-2 modified fragment

<400> 17

Gly Leu Ala Val
1