SEQUENCE LISTING

<110> Vaccibody AS

<120> Betacoronavirus prophylaxis and therapy

<130> P5615PC00

<160> 868

<170> PatentIn version 3.5

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His Ala Asn Glu Tyr Arg Leu Tyr Leu Asp Ala Tyr Asn Met Met Ile
1 5 10 15

Ser Ala Gly Phe Ser Leu Trp Val Tyr Lys Gln Phe Asp Thr Tyr Asn
20 25 30

Leu Trp Asn Thr Phe Thr Arg Leu Gln Ser Leu
35 40

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

Glu Val Gly Phe Val Val Pro Gly Leu Pro Gly Thr Ile Leu Arg Thr
20 25 30

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Thr Asn Gly Asp Phe Leu His Phe Leu Pro Arg Val Phe Ser Ala Val
        35                  40                  45


Gly Asn Ile Cys Tyr Thr Pro Ser Lys Leu Ile Glu Tyr
    50                  55                  60


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<400>  3

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


Arg Tyr Val Leu Met Asp Gly Ser Ile Ile Gln Phe Pro Asn Thr Tyr
            20                  25                  30


Leu



<210>  4
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<400>  4

Gln Glu Tyr Ala Asp Val Phe His Leu Tyr Leu Gln Tyr Ile Arg Lys
1               5                   10                  15


Leu His Asp Glu Leu Thr Gly His Met Leu Asp Met Tyr Ser Val Met
            20                  25                  30


Leu Thr Asn Asp Asn Thr Ser Arg Tyr
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<210>  5
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<400>  5

Leu Thr Asp Glu Met Ile Ala Gln Tyr Thr Ser Ala Leu Leu Ala Gly
1               5                   10                  15


Thr Ile Thr Ser Gly Trp Thr Phe Gly Ala Gly Ala Ala Leu Gln Ile
            20                  25                  30


Pro Phe Ala Met Gln Met Ala Tyr Arg Phe
        35                  40


<210>  6
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<400>  6

Gly Val Val Asp Tyr Gly Ala Arg Phe Tyr Phe Tyr Thr Ser Lys Thr
1               5                   10                  15


Thr Val Ala Ser Leu Ile Asn Thr Leu Asn Asp Leu Asn Glu Thr Leu
            20                  25                  30


Val Thr Met
        35


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<400>  7

Tyr Ser Phe Leu Pro Gly Val Tyr Ser Val Ile Tyr Leu Tyr Leu Thr
1               5                   10                  15


Phe Tyr Leu Thr Asn Asp Val Ser Phe Leu
            20                  25


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<400>  8

Phe Leu Leu Asn Lys Glu Met Tyr Leu Lys Leu Arg Ser Asp Val Leu
1               5                   10                  15


Leu Pro Leu Thr Gln Tyr Asn Arg Tyr Leu Ala Leu Tyr Asn Lys Tyr
            20                  25                  30


Lys Tyr Phe
        35


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<400>  9

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


Ala Ser Phe Tyr Tyr Val Trp Lys Ser Tyr Val His Val
            20                  25

<210>  10
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<220>
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<400>  10

Tyr Tyr Thr Ser Asn Pro Thr Thr Phe His Leu Asp Gly Glu Val Ile
1               5                   10                  15


Thr Phe Asp Asn Leu Lys Thr Leu Leu
            20                  25


<210>  11
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<400>  11

Arg Thr Ile Lys Val Phe Thr Thr Val Asp Asn Ile Asn Leu His Thr
1               5                   10                  15


Gln Val Val Asp Met Ser Met Thr Tyr Gly Gln Gln Phe Gly Pro Thr
            20                  25                  30


Tyr Leu



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<211>  30
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<220>
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<223>  betacoronavirus epitope

<400>  12

Asn Leu His Ser Ser Arg Leu Ser Phe Lys Glu Leu Leu Val Tyr Ala
1               5                   10                  15


Ala Asp Pro Ala Met His Ala Ala Ser Gly Asn Leu Leu Leu
            20                  25                  30


<210>  13
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<220>
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<223>  betacoronavirus epitope

<400>  13

Arg Ala Phe Gly Glu Tyr Ser His Val Val Ala Phe Asn Thr Leu Leu
1               5                   10                  15


Phe Leu Met Ser Phe Thr Val Leu
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<210>  14
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<213>  Unknown

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<220>
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<223>  betacoronavirus epitope

<400>  14

Ile Leu Phe Thr Arg Phe Phe Tyr Val Leu Gly Leu Ala Ala Ile Met
1               5                   10                  15


Gln Leu Phe Phe Ser Tyr Phe Ala Val His Phe Ile Ser Asn Ser Trp
            20                  25                  30


Leu Met



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<220>
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<220>
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<400>  15

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


Leu Val Ser Ser Phe Leu Glu Met
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<210>  16
<211>  20
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<400>  16

Trp Thr Ala Gly Ala Ala Ala Tyr Tyr Val Gly Tyr Leu Gln Pro Arg
1               5                   10                  15


Thr Phe Leu Leu
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<210>  17
<211>  25
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<400>  17

Glu Met Leu Asp Asn Arg Ala Thr Leu Gln Ala Ile Ala Ser Glu Phe
1               5                   10                  15

Ser Ser Leu Pro Ser Tyr Ala Ala Phe
            20                  25


<210>  18
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<400>  18

Asn Leu His Pro Asp Ser Ala Thr Leu Val Ser Asp Ile Asp Ile Thr
1               5                   10                  15


Phe Leu Lys Lys Asp Ala Pro Tyr Ile
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<400>  19

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


Gln Val Asn Gly Tyr Pro Asn Met Phe
            20                  25


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<220>
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<400>  20

Ser Val Ala Tyr Ser Asn Asn Ser Ile Ala Ile Pro Thr Asn Phe Thr
1               5                   10                  15


Ile Ser Val Thr Thr Glu Ile
            20


<210>  21
<211>  26
<212>  PRT
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<220>
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<220>
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<400>  21

Thr Val Tyr Thr Lys Val Asp Gly Val Asp Val Glu Leu Phe Glu Asn
1               5                   10                  15


Lys Thr Thr Leu Pro Val Asn Val Ala Phe
            20                  25


<210>  22
<211>  25
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<220>
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<220>
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<400>  22

His Phe Ala Ile Gly Leu Ala Leu Tyr Tyr Pro Ser Ala Arg Ile Val
1               5                   10                  15


Tyr Thr Ala Cys Ser His Ala Ala Val
            20                  25


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<400>  23

Val Gln Gln Glu Ser Pro Phe Val Met Met Ser Ala Pro Pro Ala Gln
1               5                   10                  15


Tyr Glu Leu



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<400>  24

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


Arg Glu Val Leu Ser Asp Arg Glu Leu His Leu
            20                  25


<210>  25
<211>  28
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<400>  25

Ala Met Ser Ala Phe Ala Met Met Phe Val Lys His Lys His Ala Phe
1               5                   10                  15


Leu Cys Leu Phe Leu Leu Pro Ser Leu Ala Thr Val

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            20                  25


<210>  26
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<400>  26

Ser Ser Gly Asp Ala Thr Thr Ala Tyr Ala Asn Ser Val Phe Asn Ile
1               5                   10                  15


Cys Gln Ala Val Thr Ala Asn Val Asn Ala Leu Leu
            20                  25


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<400>  27

Gln Leu Ile Lys Val Thr Leu Val Phe Leu Phe Val Ala Ala Ile Phe
1               5                   10                  15


Tyr Leu Ile Thr Pro Val His Val Met
            20                  25


<210>  28
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<213>  Unknown

<220>
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<220>
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<400>  28

Val Met Tyr Ala Ser Ala Val Val Leu Leu Ile Leu Met Thr Ala Arg
1               5                   10                  15


Thr Val Tyr



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<220>
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<220>
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<400>  29

Thr Thr Ile Gln Thr Ile Val Glu Val Gln Pro Gln Leu Glu Met Glu
1               5                   10                  15


Leu Thr Pro Val Val Gln Thr Ile
            20


<210>  30
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Ala Ser Ile Lys Asn Phe Lys Ser Val Leu Tyr Tyr Gln Asn Asn Val
1               5                   10                  15


Phe Met



<210>  31
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<212>  PRT
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<220>
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<400>  31

Phe Val Ser Glu Glu Thr Gly Thr Leu Ile Val Asn Ser Val Leu Leu
1               5                   10                  15


Phe Leu



<210>  32
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<400>  32

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


Leu Trp Ala His Gly Phe Glu Leu
            20


<210>  33
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<400>  33

Thr Phe Phe Lys Leu Val Asn Lys Phe Leu Ala Leu Cys Ala Asp Ser
1               5                   10                  15


Ile Ile Ile Gly Gly Ala Lys Leu Lys Ala Leu Asn Leu Gly Glu Thr
            20                  25                  30

Phe

<210>  34
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<400>  34

Lys Met Phe Asp Ala Tyr Val Asn Thr Phe Ser Ser Thr Phe Asn Val
1               5                   10                  15

<210>  35
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<400>  35

Phe Ala Tyr Ala Asn Arg Asn Arg Phe Leu Tyr Ile Ile Lys Leu
1               5                   10                  15

<210>  36
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<400>  36

Phe Gly Asp Asp Thr Val Ile Glu Val Gln Gly Tyr Lys Ser Val Asn
1               5                   10                  15

Ile Thr Phe Glu Leu Asp Glu Arg Ile

20 25

<210> 37
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<400> 37

Phe Leu Tyr Glu Asn Ala Phe Leu Pro Phe Ala Met Gly Ile Ile
1 5 10 15

<210> 38
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<400> 38

Thr Ala Asn Pro Lys Thr Pro Lys Tyr Lys Phe Val Arg Ile Gln Pro
1 5 10 15

Gly Gln Thr Phe
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<210> 39
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<400> 39

Ala Gln Phe Ala Pro Ser Ala Ser Ala Phe Phe Gly Met Ser Arg Ile
1 5 10 15

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<400>  40

Phe Val Asn Glu Phe Tyr Ala Tyr Leu Arg Lys His Phe Ser Met Met
1               5                   10                  15


<210>  41
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<400>  41

Asn Tyr Met Pro Tyr Phe Phe Thr Leu Leu Leu Gln Leu Cys Thr
1               5                   10                  15


<210>  42
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<400>  42

Arg Val Trp Thr Leu Met Asn Val Leu Thr Leu Val Tyr Lys Val
1               5                   10                  15


<210>  43
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<400>  43

Ser Leu Ile Tyr Ser Thr Ala Ala Leu Gly Val Leu Met Ser Asn Leu
1               5                   10                  15


Gly Met Pro Ser Tyr
            20


<210>  44
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<400>  44

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


Asn Val Leu Ser Thr Phe
            20


<210>  45
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<400>  45

Thr Leu Lys Gly Val Glu Ala Val Met Tyr Met Gly Thr Leu Ser Tyr
1               5                   10                  15

<210>  46
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<220>
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<220>
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<400>  46

Glu Ala Phe Glu Lys Met Val Ser Leu Leu Ser Val Leu Leu Ser Met
1               5                   10                  15


<210>  47
<211>  20
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<220>
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<220>
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<400>  47

Arg Ser Leu Lys Val Pro Ala Thr Val Ser Val Ser Ser Pro Asp Ala
1               5                   10                  15


Val Thr Ala Tyr
            20


<210>  48
<211>  19
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<220>
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<400>  48

Thr Val Tyr Ser His Leu Leu Leu Val Ala Ala Gly Leu Glu Ala Pro
1               5                   10                  15


Phe Leu Tyr

<210>  49
<211>  21
<212>  PRT
<213>  Unknown

<220>
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<223>  betacoronavirus epitope

<400>  49

Ser Thr Gln Asp Leu Phe Leu Pro Phe Phe Ser Asn Val Thr Trp Phe
1               5                   10                  15


His Ala Ile His Val
            20


<210>  50
<211>  15
<212>  PRT
<213>  Unknown

<220>
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<220>
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<400>  50

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


<210>  51
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<220>
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<400>  51

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

<210>  52
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<220>
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<400>  52

Gly Ala Leu Asp Ile Ser Ala Ser Ile Val Ala Gly Gly Ile Val Ala
1               5                   10                  15


Ile



<210>  53
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<220>
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<400>  53

His Val Ile Ser Thr Ser His Lys Leu Val Leu Ser Val Asn Pro Tyr
1               5                   10                  15


Val



<210>  54
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<220>
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<400>  54

Ala Val Phe Gln Ser Ala Ser Lys Ile Ile Thr Leu Lys Lys Arg
1               5                   10                  15

<210>  55
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<220>
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<220>
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<400>  55

Phe Leu Asn Arg Phe Thr Thr Thr Leu Asn Asp Phe Asn Leu Val Ala
1               5                   10                  15

Met

<210>  56
<211>  15
<212>  PRT
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<220>
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<220>
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<223>  betacoronavirus epitope

<400>  56

His Ser Tyr Phe Thr Ser Asp Tyr Tyr Gln Leu Tyr Ser Thr Gln
1               5                   10                  15

<210>  57
<211>  15
<212>  PRT
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<220>
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<400>  57

Arg Ala Met Pro Asn Met Leu Arg Ile Met Ala Ser Leu Val Leu
1               5                   10                  15

<210>  58
<211>  15
<212>  PRT
<213>  Unknown

<220>
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<220>
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<222>  (1)..(15)
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<400>  58

Val Ala Ser Gln Ser Ile Ile Ala Tyr Thr Met Ser Leu Gly Ala
1               5                   10                  15

<210>  59
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope

<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  59

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

<210>  60
<211>  19
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope

<220>
<221>  PEPTIDE
<222>  (1)..(19)
<223>  betacoronavirus epitope

<400>  60

Phe Val Phe Lys Asn Ile Asp Gly Tyr Phe Lys Ile Tyr Ser Lys His
1               5                   10                  15

Thr Pro Ile

<210>  61
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  61

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


<210>  62
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  62

Tyr Leu Asn Thr Leu Thr Leu Ala Val Pro Tyr Asn Met Arg Val
1               5                   10                  15


<210>  63
<211>  19
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(19)
<223>  betacoronavirus epitope

<400>  63

Thr Leu Asp Ser Lys Thr Gln Ser Leu Leu Ile Val Asn Asn Ala Thr
1               5                   10                  15


Asn Val Val

<210>  64
<211>  18
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(18)
<223>  betacoronavirus epitope

<400>  64

Ser Ser Val Glu Leu Lys His Phe Phe Phe Ala Gln Asp Gly Asn Ala
1               5                   10                  15


Ala Ile



<210>  65
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  65

Ser Phe Ser Ala Ser Thr Ser Ala Phe Val Glu Thr Val Lys Gly
1               5                   10                  15


<210>  66
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  66

Tyr Leu Ala Thr Ala Leu Leu Thr Leu Gln Gln Ile Glu Leu Lys
1               5                   10                  15

<210>  67
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  67

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


<210>  68
<211>  17
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(17)
<223>  betacoronavirus epitope

<400>  68

Ser Ile Leu Ser Pro Leu Tyr Ala Phe Ala Ser Glu Ala Ala Arg Val
1               5                   10                  15


Val



<210>  69
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  69

Val Met Phe Thr Pro Leu Val Pro Phe Trp Ile Thr Ile Ala Tyr
1               5                   10                  15

<210>  70
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  70

Leu Leu Leu Asp Asp Phe Val Glu Ile Ile Lys Ser Gln Asp Leu
1               5                   10                  15


<210>  71
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  71

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


<210>  72
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  72

Tyr Phe Ile Ala Ser Phe Arg Leu Phe Ala Arg Thr Arg Ser Met
1               5                   10                  15


<210>  73
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  73

Tyr Ser Leu Phe Asp Met Ser Lys Phe Pro Leu Lys Leu Arg Gly
1               5                   10                  15


<210>  74
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  74

Lys Ala Tyr Lys Ile Glu Glu Leu Phe Tyr Ser Tyr Ala Thr His
1               5                   10                  15


<210>  75
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  75

Leu Val Lys Pro Ser Phe Tyr Val Tyr Ser Arg Val Lys Asn Leu
1               5                   10                  15


<210>  76
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>

<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  76

Thr Thr Phe Thr Tyr Ala Ser Ala Leu Trp Glu Ile Gln Gln Val
1               5                   10                  15


<210>  77
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  77

Arg Val Tyr Ser Thr Gly Ser Asn Val Phe Gln Thr Arg Ala Gly
1               5                   10                  15


<210>  78
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  78

Leu Met Ile Glu Arg Phe Val Ser Leu Ala Ile Asp Ala Tyr Pro
1               5                   10                  15


<210>  79
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  79

His Ser Ile Gly Phe Asp Tyr Val Tyr Asn Pro Phe Met Ile Asp
1               5                   10                  15

<210>  80
<211>  16
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope

<220>
<221>  PEPTIDE
<222>  (1)..(16)
<223>  betacoronavirus epitope

<400>  80

Arg Thr Ile Leu Gly Ser Ala Leu Leu Glu Asp Glu Phe Thr Pro Phe
1               5                   10                  15

<210>  81
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope

<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  81

Val Val Tyr Arg Gly Thr Thr Thr Tyr Lys Leu Asn Val Gly Asp
1               5                   10                  15

<210>  82
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope

<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  82

Gln Ile Asn Asp Met Ile Leu Ser Leu Leu Ser Lys Gly Arg Leu
1               5                   10                  15

<210>  83
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  83

Thr Gly Val Glu His Val Thr Phe Phe Ile Tyr Asn Lys Ile Val
1               5                   10                  15


<210>  84
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  84

Val Thr Leu Ala Ile Leu Thr Ala Leu Arg Leu Cys Ala Tyr Cys
1               5                   10                  15


<210>  85
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  85

Tyr Thr Val Glu Leu Gly Thr Glu Val Asn Glu Phe Ala Cys Val
1               5                   10                  15


<210>  86
<211>  18
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(18)
<223>  betacoronavirus epitope

<400>  86

Arg Thr Ile Lys Gly Thr His His Trp Leu Leu Leu Thr Ile Leu Thr
1               5                   10                  15


Ser Leu



<210>  87
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  87

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


<210>  88
<211>  25
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(25)
<223>  betacoronavirus epitope

<400>  88

Val Thr Asp Val Thr Gln Leu Tyr Leu Gly Gly Met Ser Tyr Tyr Cys
1               5                   10                  15


Lys Ser His Lys Pro Pro Ile Ser Phe
            20                  25


<210>  89
<211>  16

<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(16)
<223>  betacoronavirus epitope

<400>  89

Ser Gln Ala Trp Gln Pro Gly Val Ala Met Pro Asn Leu Tyr Lys Met
1               5                   10                  15


<210>  90
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  90

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


<210>  91
<211>  17
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(17)
<223>  betacoronavirus epitope

<400>  91

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


Leu



<210>  92
<211>  15
<212>  PRT

<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  92

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


<210>  93
<211>  19
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(19)
<223>  betacoronavirus epitope

<400>  93

Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val
1               5                   10                  15


Val Val Leu



<210>  94
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  94

Phe Val Asp Gly Val Pro Phe Val Val Ser Thr Gly Tyr His Phe
1               5                   10                  15


<210>  95
<211>  19
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(19)
<223>  betacoronavirus epitope

<400>  95

Lys Gly Val Ala Pro Gly Thr Ala Val Leu Arg Gln Trp Leu Pro Thr
1               5                   10                  15


Gly Thr Leu



<210>  96
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  96

Tyr Tyr Leu Phe Asp Glu Ser Gly Glu Phe Lys Leu Ala Ser His
1               5                   10                  15


<210>  97
<211>  17
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  97

Ile Ser Met Asp Asn Ser Pro Asn Leu Ala Trp Pro Leu Ile Val Thr
1               5                   10                  15


Ala



<210>  98

<211>  17
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(17)
<223>  betacoronavirus epitope

<400>  98

Tyr Tyr His Thr Thr Asp Pro Ser Phe Leu Gly Arg Tyr Met Ser Ala
1               5                   10                  15


Leu



<210>  99
<211>  16
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(16)
<223>  betacoronavirus epitope

<400>  99

Val Val Ala Asp Ala Val Ile Lys Thr Leu Gln Pro Val Ser Glu Leu
1               5                   10                  15


<210>  100
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  100

Arg Phe Asp Asn Pro Val Leu Pro Phe Asn Asp Gly Val Tyr Phe
1               5                   10                  15


<210>  101
<211>  16

<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(16)
<223>  betacoronavirus epitope

<400>  101

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


<210>  102
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  102

Leu Gln Lys Ala Ala Ile Thr Ile Leu Asp Gly Ile Ser Gln Tyr
1               5                   10                  15


<210>  103
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  103

Ala Thr Ile Pro Ile Gln Ala Ser Leu Pro Phe Gly Trp Leu Ile
1               5                   10                  15


<210>  104
<211>  17
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope

<220>
<221>  PEPTIDE
<222>  (1)..(17)
<223>  betacoronavirus epitope

<400>  104

Lys Gln Gly Asp Asp Tyr Val Tyr Leu Pro Tyr Pro Asp Pro Ser Arg
1               5                   10                  15


Ile



<210>  105
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  105

Ser Thr Val Phe Pro Pro Thr Ser Phe Gly Pro Leu Val Arg Lys
1               5                   10                  15


<210>  106
<211>  19
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(19)
<223>  betacoronavirus epitope

<400>  106

Ile Val Asn Gly Val Arg Arg Ser Phe Tyr Val Tyr Ala Asn Gly Gly
1               5                   10                  15


Lys Gly Phe



<210>  107
<211>  16
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(16)
<223>  betacoronavirus epitope

<400>  107

Asp Thr Tyr Pro Ser Leu Glu Thr Ile Gln Ile Thr Ile Ser Ser Phe
1               5                   10                  15


<210>  108
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  108

Val Leu Val Pro His Val Gly Glu Ile Pro Val Ala Tyr Arg Lys
1               5                   10                  15


<210>  109
<211>  16
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(16)
<223>  betacoronavirus epitope

<400>  109

Leu Gln Thr Pro Phe Glu Ile Lys Leu Ala Lys Lys Phe Asp Thr Phe
1               5                   10                  15


<210>  110
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope

<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  110

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


<210>  111
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  111

Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr
1               5                   10                  15


<210>  112
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  112

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


<210>  113
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  113

Lys Met Ala Asp Gln Ala Met Thr Gln Met Tyr Lys Gln Ala Arg
1               5                   10                  15


<210>  114
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  114

Ser Val Gly Pro Lys Gln Ala Ser Leu Asn Gly Val Thr Leu Ile
1               5                   10                  15


<210>  115
<211>  20
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(20)
<223>  betacoronavirus epitope

<400>  115

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


Tyr Asn Tyr Leu
            20


<210>  116
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  116

Phe Ile Ala Gly Leu Ile Ala Ile Val Met Val Thr Ile Met Leu
1               5                   10                  15


<210>  117
<211>  16
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(16)
<223>  betacoronavirus epitope

<400>  117

Leu Thr Tyr Thr Gly Ala Ile Lys Leu Asp Asp Lys Asp Pro Asn Phe
1               5                   10                  15


<210>  118
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  118

Tyr Val Leu Pro Asn Asp Asp Thr Leu Arg Val Glu Ala Phe Glu
1               5                   10                  15


<210>  119
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  119

Ala Met Asp Glu Phe Ile Glu Arg Tyr Lys Leu Glu Gly Tyr Ala
1               5                   10                  15

<210>  120
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  120

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


<210>  121
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  121

Val Met Pro Leu Ser Ala Pro Thr Leu Val Pro Gln Glu His Tyr
1               5                   10                  15


<210>  122
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  122

Lys Leu Phe Asp Arg Tyr Phe Lys Tyr Trp Asp Gln Thr Tyr His
1               5                   10                  15


<210>  123
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  123

Tyr Leu Asn Ser Thr Asn Val Thr Ile Ala Thr Tyr Cys Thr Gly
1               5                   10                  15


<210>  124
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  124

Tyr Ser Asp Val Glu Asn Pro His Leu Met Gly Trp Asp Tyr Pro
1               5                   10                  15


<210>  125
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  125

Arg Leu Tyr Tyr Asp Ser Met Ser Tyr Glu Asp Gln Asp Ala Leu
1               5                   10                  15


<210>  126
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>

<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  126

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


<210>  127
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  127

Tyr Val Asp Asn Ser Ser Leu Thr Ile Lys Lys Pro Asn Glu Leu
1               5                   10                  15


<210>  128
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  128

Ile Val Arg Phe Pro Asn Ile Thr Asn Leu Cys Pro Phe Gly Glu
1               5                   10                  15


<210>  129
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  129

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

<210>  130
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope

<220>
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<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  130

Thr Val Tyr Asp Pro Leu Gln Pro Glu Leu Asp Ser Phe Lys Glu
1               5                   10                  15

<210>  131
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope

<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  131

Tyr Thr Asn Ser Phe Thr Arg Gly Val Tyr Tyr Pro Asp Lys Val
1               5                   10                  15

<210>  132
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope

<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  132

Tyr Thr Val Glu Glu Ala Lys Thr Val Leu Lys Lys Cys Lys Ser
1               5                   10                  15

<210>  133
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  133

Ala Met Tyr Thr Pro His Thr Val Leu Gln Ala Val Gly Ala Cys
1               5                   10                  15


<210>  134
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  134

Lys Val Asp Gly Val Val Gln Gln Leu Pro Glu Thr Tyr Phe Thr
1               5                   10                  15


<210>  135
<211>  16
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(16)
<223>  betacoronavirus epitope

<400>  135

Thr Val Val Ile Gly Thr Ser Lys Phe Tyr Gly Gly Trp His Asn Met
1               5                   10                  15


<210>  136
<211>  16
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(16)
<223>  betacoronavirus epitope

<400>  136

Tyr Ala Lys Pro Phe Leu Asn Lys Val Val Ser Thr Thr Thr Asn Ile
1               5                   10                  15


<210>  137
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  137

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


<210>  138
<211>  17
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(17)
<223>  betacoronavirus epitope

<400>  138

His Thr Ile Asp Gly Ser Ser Gly Val Val Asn Pro Val Met Glu Pro
1               5                   10                  15


Ile



<210>  139
<211>  15
<212>  PRT
<213>  Unknown

<220>

<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  139

Thr Val Tyr Glu Lys Leu Lys Pro Val Leu Asp Trp Leu Glu Glu
1               5                   10                  15


<210>  140
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  140

Phe Leu Thr Glu Asn Leu Leu Leu Tyr Ile Asp Ile Asn Gly Asn
1               5                   10                  15


<210>  141
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  141

Ser Leu Tyr Val Asn Lys His Ala Phe His Thr Pro Ala Phe Asp
1               5                   10                  15


<210>  142
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE

<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  142

Lys Ala Pro Lys Glu Ile Ile Phe Leu Glu Gly Glu Thr Leu Pro
1               5                   10                  15


<210>  143
<211>  16
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(16)
<223>  betacoronavirus epitope

<400>  143

Val Leu Ser Glu Ala Arg Gln His Leu Lys Asp Gly Thr Cys Gly Leu
1               5                   10                  15


<210>  144
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  144

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


<210>  145
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  145

Ser Leu Ser Ser Thr Ala Ser Ala Leu Gly Lys Leu Gln Asp Val
1               5                   10                  15


<210>  146
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  146

Ser Gln Leu Gly Gly Leu His Leu Leu Ile Gly Leu Ala Lys Arg
1               5                   10                  15


<210>  147
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  147

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


<210>  148
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  148

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


<210>  149

<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  149

Phe Val Phe Pro Leu Asn Ser Ile Ile Lys Thr Ile Gln Pro Arg
1               5                   10                  15


<210>  150
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  150

Phe Val Ser Asn Gly Thr His Trp Phe Val Thr Gln Arg Asn Phe
1               5                   10                  15


<210>  151
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  151

Ser Gly Phe Ala Ala Tyr Ser Arg Tyr Arg Ile Gly Asn Tyr Lys
1               5                   10                  15


<210>  152
<211>  15
<212>  PRT
<213>  Unknown

<220>

<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  152

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


<210>  153
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  153

Leu Gln Ala Glu Asn Val Thr Gly Leu Phe Lys Asp Cys Ser Lys
1               5                   10                  15


<210>  154
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  154

Val Ala Thr Ser Arg Thr Leu Ser Tyr Tyr Lys Leu Gly Ala Ser
1               5                   10                  15


<210>  155
<211>  17
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE

<222>  (1)..(17)
<223>  betacoronavirus epitope

<400>  155

Tyr Leu Lys Ser Pro Asn Phe Ser Lys Leu Ile Asn Ile Ile Ile Trp
1               5                   10                  15


Phe



<210>  156
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  156

Phe Val Val Glu Val Val Asp Lys Tyr Phe Asp Cys Tyr Asp Gly
1               5                   10                  15


<210>  157
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  157

Ile Leu Lys Pro Ala Asn Asn Ser Leu Lys Ile Thr Glu Glu Val
1               5                   10                  15


<210>  158
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)

<223>  betacoronavirus epitope

<400>  158

Leu Gln Leu Pro Gln Gly Thr Thr Leu Pro Lys Gly Phe Tyr Ala
1               5                   10                  15


<210>  159
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  159

Leu Leu Tyr Asp Ala Asn Tyr Phe Leu Cys Trp His Thr Asn Cys
1               5                   10                  15


<210>  160
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  160

Ser Val Val Ser Lys Val Val Lys Val Thr Ile Asp Tyr Thr Glu
1               5                   10                  15


<210>  161
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  161

Val Leu Tyr Glu Asn Gln Lys Leu Ile Ala Asn Gln Phe Asn Ser

1 5 10 15

<210> 162
<211> 16
<212> PRT
<213> Unknown

<220>
<223> betacoronavirus epitope

<220>
<221> PEPTIDE
<222> (1)..(16)
<223> betacoronavirus epitope

<400> 162

Val Val Asn Gln Asn Ala Gln Ala Leu Asn Thr Leu Val Lys Gln Leu
1 5 10 15

<210> 163
<211> 15
<212> PRT
<213> Unknown

<220>
<223> betacoronavirus epitope

<220>
<221> PEPTIDE
<222> (1)..(15)
<223> betacoronavirus epitope

<400> 163

Leu Leu Ala Asp Lys Phe Pro Val Leu His Asp Ile Gly Asn Pro
1 5 10 15

<210> 164
<211> 15
<212> PRT
<213> Unknown

<220>
<223> betacoronavirus epitope

<220>
<221> PEPTIDE
<222> (1)..(15)
<223> betacoronavirus epitope

<400> 164

Lys Val Gln Ile Gly Glu Tyr Thr Phe Glu Lys Gly Asp Tyr Gly
1 5 10 15

<210> 165
<211> 15

<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  165

Leu Ala Leu Ser Lys Gly Val His Phe Val Cys Asn Leu Leu Leu
1               5                   10                  15


<210>  166
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  166

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


<210>  167
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  167

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


<210>  168
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope

<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  168

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


<210>  169
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  169

Ser Ala Lys Ser Ala Ser Val Tyr Tyr Ser Gln Leu Met Cys Gln
1               5                   10                  15


<210>  170
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  170

Ser Thr Asp Val Val Tyr Arg Ala Phe Asp Ile Tyr Asn Asp Lys
1               5                   10                  15


<210>  171
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)

<223>  betacoronavirus epitope

<400>  171

Val Phe Ala Gln Val Lys Gln Ile Tyr Lys Thr Pro Pro Ile Lys
1               5                   10                  15


<210>  172
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  172

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


<210>  173
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  173

Phe Leu Arg Asp Gly Trp Glu Ile Val Lys Phe Ile Ser Thr Cys
1               5                   10                  15


<210>  174
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  174

Gly Leu Asn Asp Asn Leu Leu Glu Ile Leu Gln Lys Glu Lys Val

1 5 10 15

<210> 175
<211> 15
<212> PRT
<213> Unknown

<220>
<223> betacoronavirus epitope

<220>
<221> PEPTIDE
<222> (1)..(15)
<223> betacoronavirus epitope

<400> 175

Lys Ile Ala Asp Tyr Asn Tyr Lys Leu Pro Asp Asp Phe Thr Gly
1 5 10 15

<210> 176
<211> 15
<212> PRT
<213> Unknown

<220>
<223> betacoronavirus epitope

<220>
<221> PEPTIDE
<222> (1)..(15)
<223> betacoronavirus epitope

<400> 176

Leu Leu Leu Asp Arg Leu Asn Gln Leu Glu Ser Lys Met Ser Gly
1 5 10 15

<210> 177
<211> 15
<212> PRT
<213> Unknown

<220>
<223> betacoronavirus epitope

<220>
<221> PEPTIDE
<222> (1)..(15)
<223> betacoronavirus epitope

<400> 177

Val Val Asn Val Val Thr Thr Lys Ile Ala Leu Lys Gly Gly Lys
1 5 10 15

<210> 178
<211> 15

<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  178

Tyr Val Arg Asn Leu Gln His Arg Leu Tyr Glu Cys Leu Tyr Arg
1               5                   10                  15


<210>  179
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  179

Cys Thr Asp Asp Asn Ala Leu Ala Tyr Tyr Asn Thr Thr Lys Gly
1               5                   10                  15


<210>  180
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  180

Arg Val Val Phe Asn Gly Val Ser Phe Ser Thr Phe Glu Glu Ala
1               5                   10                  15


<210>  181
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope

<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  181

Thr Gln Ala Pro Thr His Leu Ser Val Asp Thr Lys Phe Lys Thr
1               5                   10                  15


<210>  182
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  182

Val Val Asn Ala Ala Asn Val Tyr Leu Lys His Gly Gly Gly Val
1               5                   10                  15


<210>  183
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  183

Tyr Ala Phe Glu His Ile Val Tyr Gly Asp Phe Ser His Ser Gln
1               5                   10                  15


<210>  184
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)

<223>  betacoronavirus epitope

<400>  184

Tyr Tyr Arg Tyr Asn Leu Pro Thr Met Cys Asp Ile Arg Gln Leu
1               5                   10                  15


<210>  185
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  185

Tyr Ile Val Asp Ser Val Thr Val Lys Asn Gly Ser Ile His Leu
1               5                   10                  15


<210>  186
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  186

His Val Gln Leu Ser Leu Pro Val Leu Gln Val Arg Asp Val Leu
1               5                   10                  15


<210>  187
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  187

Ile Leu Asp Ile Thr Pro Cys Ser Phe Gly Gly Val Ser Val Ile

1 5 10 15

<210> 188
<211> 15
<212> PRT
<213> Unknown

<220>
<223> betacoronavirus epitope

<220>
<221> PEPTIDE
<222> (1)..(15)
<223> betacoronavirus epitope

<400> 188

Met Val Met Cys Gly Gly Ser Leu Tyr Val Lys Pro Gly Gly Thr
1 5 10 15

<210> 189
<211> 15
<212> PRT
<213> Unknown

<220>
<223> betacoronavirus epitope

<220>
<221> PEPTIDE
<222> (1)..(15)
<223> betacoronavirus epitope

<400> 189

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

<210> 190
<211> 15
<212> PRT
<213> Unknown

<220>
<223> betacoronavirus epitope

<220>
<221> PEPTIDE
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<223> betacoronavirus epitope

<400> 190

Tyr Leu Pro Gln Asn Ala Val Val Lys Ile Tyr Cys Pro Ala Cys
1 5 10 15

<210> 191
<211> 15

<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  191

Arg Ile Ile Pro Ala Arg Ala Arg Val Glu Cys Phe Asp Lys Phe
1               5                   10                  15


<210>  192
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  192

Ala Ser Phe Asp Asn Phe Lys Phe Val Cys Asp Asn Ile Lys Phe
1               5                   10                  15


<210>  193
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  193

Thr Ile Lys Pro Val Thr Tyr Lys Leu Asp Gly Val Val Cys Thr
1               5                   10                  15


<210>  194
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope

<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  194

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


<210>  195
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  195

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


<210>  196
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  196

Phe Ser Asn Ser Gly Ser Asp Val Leu Tyr Gln Pro Pro Gln Thr
1               5                   10                  15


<210>  197
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)

<223>  betacoronavirus epitope

<400>  197

Lys Ala Tyr Asn Val Thr Gln Ala Phe Gly Arg Arg Gly Pro Glu
1               5                   10                  15


<210>  198
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  198

Asn Thr Ala Ser Trp Phe Thr Ala Leu Thr Gln His Gly Lys Glu
1               5                   10                  15


<210>  199
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  199

Arg Val Asp Gly Gln Val Asp Leu Phe Arg Asn Ala Arg Asn Gly
1               5                   10                  15


<210>  200
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  200

Ser Ala Phe Tyr Ile Leu Pro Ser Ile Ile Ser Asn Glu Lys Gln

1 5 10 15

<210> 201
<211> 15
<212> PRT
<213> Unknown

<220>
<223> betacoronavirus epitope

<220>
<221> PEPTIDE
<222> (1)..(15)
<223> betacoronavirus epitope

<400> 201

Ser Leu Pro Ile Asn Val Ile Val Phe Asp Gly Lys Ser Lys Cys
1 5 10 15

<210> 202
<211> 15
<212> PRT
<213> Unknown

<220>
<223> betacoronavirus epitope

<220>
<221> PEPTIDE
<222> (1)..(15)
<223> betacoronavirus epitope

<400> 202

Tyr Ile Thr Gly Gly Val Val Gln Leu Thr Ser Gln Trp Leu Thr
1 5 10 15

<210> 203
<211> 15
<212> PRT
<213> Unknown

<220>
<223> betacoronavirus epitope

<220>
<221> PEPTIDE
<222> (1)..(15)
<223> betacoronavirus epitope

<400> 203

Tyr Val Met His Ala Asn Tyr Ile Phe Trp Arg Asn Thr Asn Pro
1 5 10 15

<210> 204
<211> 15

<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  204

Ala Asn Asp Pro Val Gly Phe Thr Leu Lys Asn Thr Val Cys Thr
1               5                   10                  15


<210>  205
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  205

Leu Gln Ala Gly Asn Ala Thr Glu Val Pro Ala Asn Ser Thr Val
1               5                   10                  15


<210>  206
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  206

His Leu Arg Ile Ala Gly His His Leu Gly Arg Cys Asp Ile Lys
1               5                   10                  15


<210>  207
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope

<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  207

His Ser Leu Ser His Phe Val Asn Leu Asp Asn Leu Arg Ala Asn
1               5                   10                  15


<210>  208
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  208

Ile Thr His Asp Val Ser Ser Ala Ile Asn Arg Pro Gln Ile Gly
1               5                   10                  15


<210>  209
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  209

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


<210>  210
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)

<223>  betacoronavirus epitope

<400>  210

Leu Ala Thr His Gly Leu Ala Ala Val Asn Ser Val Pro Trp Asp
1               5                   10                  15


<210>  211
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  211

Lys Thr Ile Gly Pro Asp Met Phe Leu Gly Thr Cys Arg Arg Cys
1               5                   10                  15


<210>  212
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  212

Leu Ala Leu Gly Gly Ser Val Ala Ile Lys Ile Thr Glu His Ser
1               5                   10                  15


<210>  213
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  213

Lys Arg Val Asp Trp Thr Ile Glu Tyr Pro Ile Ile Gly Asp Glu

1 5 10 15

<210> 214
<211> 15
<212> PRT
<213> Unknown

<220>
<223> betacoronavirus epitope

<220>
<221> PEPTIDE
<222> (1)..(15)
<223> betacoronavirus epitope

<400> 214

Lys Ser Asp Gly Thr Gly Thr Ile Tyr Thr Glu Leu Glu Pro Pro
1 5 10 15

<210> 215
<211> 15
<212> PRT
<213> Unknown

<220>
<223> betacoronavirus epitope

<220>
<221> PEPTIDE
<222> (1)..(15)
<223> betacoronavirus epitope

<400> 215

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

<210> 216
<211> 15
<212> PRT
<213> Unknown

<220>
<223> betacoronavirus epitope

<220>
<221> PEPTIDE
<222> (1)..(15)
<223> betacoronavirus epitope

<400> 216

Leu Thr Tyr Asn Lys Val Glu Asn Met Thr Pro Arg Asp Leu Gly
1 5 10 15

<210> 217
<211> 15

<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  217

Leu Val Gln Ala Gly Asn Val Gln Leu Arg Val Ile Gly His Ser
1               5                   10                  15


<210>  218
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  218

Asn Val Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg
1               5                   10                  15


<210>  219
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  219

Tyr Phe Val Val Lys Arg His Thr Phe Ser Asn Tyr Gln His Glu
1               5                   10                  15


<210>  220
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope

<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  220

Phe Val Leu Ala Ala Val Tyr Arg Ile Asn Trp Ile Thr Gly Gly
1               5                   10                  15


<210>  221
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  221

Tyr Val Asp Thr Pro Asn Asn Thr Asp Phe Ser Arg Val Ser Ala
1               5                   10                  15


<210>  222
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  222

Ile Phe Phe Ile Thr Gly Asn Thr Leu Gln Cys Ile Met Leu Val
1               5                   10                  15


<210>  223
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)

<223>  betacoronavirus epitope

<400>  223

Asn Val Asn Arg Phe Asn Val Ala Ile Thr Arg Ala Lys Val Gly
1               5                   10                  15


<210>  224
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  224

Thr Leu Lys Glu Ile Leu Val Thr Tyr Asn Cys Cys Asp Asp Asp
1               5                   10                  15


<210>  225
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  225

Phe Ile Thr Glu Ser Lys Pro Ser Val Glu Gln Arg Lys Gln Asp
1               5                   10                  15


<210>  226
<211>  15
<212>  PRT
<213>  Unknown

<220>
<223>  betacoronavirus epitope


<220>
<221>  PEPTIDE
<222>  (1)..(15)
<223>  betacoronavirus epitope

<400>  226

Thr Ser Asn Gln Val Ala Val Leu Tyr Gln Asp Val Asn Cys Thr

1 5 10 15

<210> 227
<211> 15
<212> PRT
<213> Unknown

<220>
<223> betacoronavirus epitope

<220>
<221> PEPTIDE
<222> (1)..(15)
<223> betacoronavirus epitope

<400> 227

Tyr Leu Phe Gln His Ala Asn Leu Asp Ser Cys Lys Arg Val Leu
1 5 10 15

<210> 228
<211> 15
<212> PRT
<213> Unknown

<220>
<223> betacoronavirus epitope

<220>
<221> PEPTIDE
<222> (1)..(15)
<223> betacoronavirus epitope

<400> 228

Trp Thr Asn Ala Gly Asp Tyr Ile Leu Ala Asn Thr Cys Thr Glu
1 5 10 15

<210> 229
<211> 15
<212> PRT
<213> Unknown

<220>
<223> betacoronavirus epitope

<220>
<221> PEPTIDE
<222> (1)..(15)
<223> betacoronavirus epitope

<400> 229

Ser Leu Ser His Arg Phe Tyr Arg Leu Ala Asn Glu Cys Ala Gln
1 5 10 15

<210> 230
<211> 1273

<212>  PRT
<213>  Unknown

<220>
<223>  spike protein of Severe acute respiratory syndrome coronavirus 2


<220>
<221>  SITE
<222>  (1)..(1273)
<223>  spike protein

<400>  230

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Met Phe Val Phe Leu Val Leu Leu Pro Leu Val Ser Ser Gln Cys Val
1               5                   10                  15


Asn Leu Thr Thr Arg Thr Gln Leu Pro Pro Ala Tyr Thr Asn Ser Phe
            20                  25                  30


Thr Arg Gly Val Tyr Tyr Pro Asp Lys Val Phe Arg Ser Ser Val Leu
        35                  40                  45


His Ser Thr Gln Asp Leu Phe Leu Pro Phe Phe Ser Asn Val Thr Trp
    50                  55                  60


Phe His Ala Ile His Val Ser Gly Thr Asn Gly Thr Lys Arg Phe Asp
65                  70                  75                  80


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


Lys Ser Asn Ile Ile Arg Gly Trp Ile Phe Gly Thr Thr Leu Asp Ser
            100                 105                 110


Lys Thr Gln Ser Leu Leu Ile Val Asn Asn Ala Thr Asn Val Val Ile
        115                 120                 125


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


Tyr His Lys Asn Asn Lys Ser Trp Met Glu Ser Glu Phe Arg Val Tyr
145                 150                 155                 160


Ser Ser Ala Asn Asn Cys Thr Phe Glu Tyr Val Ser Gln Pro Phe Leu
                165                 170                 175


Met Asp Leu Glu Gly Lys Gln Gly Asn Phe Lys Asn Leu Arg Glu Phe
            180                 185                 190


Val Phe Lys Asn Ile Asp Gly Tyr Phe Lys Ile Tyr Ser Lys His Thr
        195                 200                 205
```

```
Pro Ile Asn Leu Val Arg Asp Leu Pro Gln Gly Phe Ser Ala Leu Glu
    210                 215                 220

Pro Leu Val Asp Leu Pro Ile Gly Ile Asn Ile Thr Arg Phe Gln Thr
225                 230                 235                 240

Leu Leu Ala Leu His Arg Ser Tyr Leu Thr Pro Gly Asp Ser Ser Ser
                245                 250                 255

Gly Trp Thr Ala Gly Ala Ala Ala Tyr Tyr Val Gly Tyr Leu Gln Pro
            260                 265                 270

Arg Thr Phe Leu Leu Lys Tyr Asn Glu Asn Gly Thr Ile Thr Asp Ala
        275                 280                 285

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

Ser Phe Thr Val Glu Lys Gly Ile Tyr Gln Thr Ser Asn Phe Arg Val
305                 310                 315                 320

Gln Pro Thr Glu Ser Ile Val Arg Phe Pro Asn Ile Thr Asn Leu Cys
                325                 330                 335

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

Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser Val Leu
        355                 360                 365

Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser Pro
    370                 375                 380

Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp Ser Phe
385                 390                 395                 400

Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro Gly Gln Thr Gly
                405                 410                 415

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

Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys Val Gly Gly Asn
        435                 440                 445

Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys Pro Phe
    450                 455                 460
```

```
Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr Pro Cys
465                 470                 475                 480

Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser Tyr Gly
                485                 490                 495

Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val Val Val
            500                 505                 510

Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val Cys Gly Pro Lys
        515                 520                 525

Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn Phe Asn Phe Asn
    530                 535                 540

Gly Leu Thr Gly Thr Gly Val Leu Thr Glu Ser Asn Lys Lys Phe Leu
545                 550                 555                 560

Pro Phe Gln Gln Phe Gly Arg Asp Ile Ala Asp Thr Thr Asp Ala Val
                565                 570                 575

Arg Asp Pro Gln Thr Leu Glu Ile Leu Asp Ile Thr Pro Cys Ser Phe
            580                 585                 590

Gly Gly Val Ser Val Ile Thr Pro Gly Thr Asn Thr Ser Asn Gln Val
        595                 600                 605

Ala Val Leu Tyr Gln Asp Val Asn Cys Thr Glu Val Pro Val Ala Ile
    610                 615                 620

His Ala Asp Gln Leu Thr Pro Thr Trp Arg Val Tyr Ser Thr Gly Ser
625                 630                 635                 640

Asn Val Phe Gln Thr Arg Ala Gly Cys Leu Ile Gly Ala Glu His Val
                645                 650                 655

Asn Asn Ser Tyr Glu Cys Asp Ile Pro Ile Gly Ala Gly Ile Cys Ala
            660                 665                 670

Ser Tyr Gln Thr Gln Thr Asn Ser Pro Arg Arg Ala Arg Ser Val Ala
        675                 680                 685

Ser Gln Ser Ile Ile Ala Tyr Thr Met Ser Leu Gly Ala Glu Asn Ser
    690                 695                 700

Val Ala Tyr Ser Asn Asn Ser Ile Ala Ile Pro Thr Asn Phe Thr Ile
705                 710                 715                 720

Ser Val Thr Thr Glu Ile Leu Pro Val Ser Met Thr Lys Thr Ser Val
```

```
                725                 730                 735

Asp Cys Thr Met Tyr Ile Cys Gly Asp Ser Thr Glu Cys Ser Asn Leu
            740                 745                 750

Leu Leu Gln Tyr Gly Ser Phe Cys Thr Gln Leu Asn Arg Ala Leu Thr
        755                 760                 765

Gly Ile Ala Val Glu Gln Asp Lys Asn Thr Gln Glu Val Phe Ala Gln
    770                 775                 780

Val Lys Gln Ile Tyr Lys Thr Pro Pro Ile Lys Asp Phe Gly Gly Phe
785                 790                 795                 800

Asn Phe Ser Gln Ile Leu Pro Asp Pro Ser Lys Pro Ser Lys Arg Ser
                805                 810                 815

Phe Ile Glu Asp Leu Leu Phe Asn Lys Val Thr Leu Ala Asp Ala Gly
            820                 825                 830

Phe Ile Lys Gln Tyr Gly Asp Cys Leu Gly Asp Ile Ala Ala Arg Asp
        835                 840                 845

Leu Ile Cys Ala Gln Lys Phe Asn Gly Leu Thr Val Leu Pro Pro Leu
    850                 855                 860

Leu Thr Asp Glu Met Ile Ala Gln Tyr Thr Ser Ala Leu Leu Ala Gly
865                 870                 875                 880

Thr Ile Thr Ser Gly Trp Thr Phe Gly Ala Gly Ala Ala Leu Gln Ile
                885                 890                 895

Pro Phe Ala Met Gln Met Ala Tyr Arg Phe Asn Gly Ile Gly Val Thr
            900                 905                 910

Gln Asn Val Leu Tyr Glu Asn Gln Lys Leu Ile Ala Asn Gln Phe Asn
        915                 920                 925

Ser Ala Ile Gly Lys Ile Gln Asp Ser Leu Ser Ser Thr Ala Ser Ala
    930                 935                 940

Leu Gly Lys Leu Gln Asp Val Val Asn Gln Asn Ala Gln Ala Leu Asn
945                 950                 955                 960

Thr Leu Val Lys Gln Leu Ser Ser Asn Phe Gly Ala Ile Ser Ser Val
                965                 970                 975

Leu Asn Asp Ile Leu Ser Arg Leu Asp Lys Val Glu Ala Glu Val Gln
            980                 985                 990
```

```
Ile Asp Arg Leu Ile Thr Gly Arg  Leu Gln Ser Leu Gln  Thr Tyr Val
        995                 1000                1005

Thr Gln  Gln Leu Ile Arg Ala  Ala Glu Ile Arg Ala  Ser Ala Asn
    1010                1015                1020

Leu Ala  Ala Thr Lys Met Ser  Glu Cys Val Leu Gly  Gln Ser Lys
    1025                1030                1035

Arg Val  Asp Phe Cys Gly Lys  Gly Tyr His Leu Met  Ser Phe Pro
    1040                1045                1050

Gln Ser  Ala Pro His Gly Val  Val Phe Leu His Val  Thr Tyr Val
    1055                1060                1065

Pro Ala  Gln Glu Lys Asn Phe  Thr Thr Ala Pro Ala  Ile Cys His
    1070                1075                1080

Asp Gly  Lys Ala His Phe Pro  Arg Glu Gly Val Phe  Val Ser Asn
    1085                1090                1095

Gly Thr  His Trp Phe Val Thr  Gln Arg Asn Phe Tyr  Glu Pro Gln
    1100                1105                1110

Ile Ile  Thr Thr Asp Asn Thr  Phe Val Ser Gly Asn  Cys Asp Val
    1115                1120                1125

Val Ile  Gly Ile Val Asn Asn  Thr Val Tyr Asp Pro  Leu Gln Pro
    1130                1135                1140

Glu Leu  Asp Ser Phe Lys Glu  Glu Leu Asp Lys Tyr  Phe Lys Asn
    1145                1150                1155

His Thr  Ser Pro Asp Val Asp  Leu Gly Asp Ile Ser  Gly Ile Asn
    1160                1165                1170

Ala Ser  Val Val Asn Ile Gln  Lys Glu Ile Asp Arg  Leu Asn Glu
    1175                1180                1185

Val Ala  Lys Asn Leu Asn Glu  Ser Leu Ile Asp Leu  Gln Glu Leu
    1190                1195                1200

Gly Lys  Tyr Glu Gln Tyr Ile  Lys Trp Pro Trp Tyr  Ile Trp Leu
    1205                1210                1215

Gly Phe  Ile Ala Gly Leu Ile  Ala Ile Val Met Val  Thr Ile Met
    1220                1225                1230
```

```
Leu Cys  Cys Met Thr Ser Cys  Cys Ser Cys Leu Lys  Gly Cys Cys
    1235                1240                1245


Ser Cys  Gly Ser Cys Cys Lys  Phe Asp Glu Asp Asp  Ser Glu Pro
    1250                1255                1260


Val Leu  Lys Gly Val Lys Leu  His Tyr Thr
    1265                1270


<210>  231
<211>  253
<212>  PRT
<213>  Unknown

<220>
<223>  RBD of spike protein


<220>
<221>  SITE
<222>  (1)..(253)
<223>  RBD

<400>  231

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


Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val
            20                  25                  30


Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys
        35                  40                  45


Cys Tyr Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn
    50                  55                  60


Val Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile
65                  70                  75                  80


Ala Pro Gly Gln Thr Gly Lys Ile Ala Asp Tyr Asn Tyr Lys Leu Pro
                85                  90                  95


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


Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys
        115                 120                 125


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

```
Ala Gly Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe
145                 150                 155                 160


Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln
                165                 170                 175


Pro Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala
            180                 185                 190


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


Val Asn Phe Asn Phe Asn Gly Leu Thr Gly Thr Gly Val Leu Thr Glu
    210                 215                 220


Ser Asn Lys Lys Phe Leu Pro Phe Gln Gln Phe Gly Arg Asp Ile Ala
225                 230                 235                 240


Asp Thr Thr Asp Ala Val Arg Asp Pro Gln Thr Leu Glu
                245                 250


<210>  232
<211>  38
<212>  PRT
<213>  Unknown

<220>
<223>  HR2 domain of spike protein


<220>
<221>  SITE
<222>  (1)..(38)
<223>  HR2

<400>  232

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


Ile Gln Lys Glu Ile Asp Arg Leu Asn Glu Val Ala Lys Asn Leu Asn
            20                  25                  30


Glu Ser Leu Ile Asp Leu
        35


<210>  233
<211>  243
<212>  PRT
<213>  Unknown

<220>
<223>  AA sequence of B4001
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<220>
<221>  SITE
<223>  B4001

<400>  233

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Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1               5                   10                  15


Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
            20                  25                  30


Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
        35                  40                  45


Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
    50                  55                  60


Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65                  70                  75                  80


Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
                85                  90                  95


Thr Pro Leu Gly Asp Thr Thr His Thr Ile Glu Pro Lys Ser Cys Asp
            100                 105                 110


Thr Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly
        115                 120                 125


Gly Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro
    130                 135                 140


Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val
145                 150                 155                 160


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


Gln Pro Glu Asn Asn Tyr Asn Thr Thr Pro Pro Met Leu Asp Ser Asp
            180                 185                 190


Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp
        195                 200                 205


Gln Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His
    210                 215                 220


Asn Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu
225                 230                 235                 240
```

Gly Gly Leu

<210>  234
<211>  93
<212>  PRT
<213>  homo sapiens

<400>  234

Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1               5                   10                  15

Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
            20                  25                  30

Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
        35                  40                  45

Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
    50                  55                  60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65                  70                  75                  80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala
                85                  90

<210>  235
<211>  19
<212>  PRT
<213>  Unknown

<220>
<223>  Signal peptide

<220>
<221>  SIGNAL
<222>  (1)..(19)
<223>  Signal peptide

<400>  235

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

Val Gln Cys

<210>  236
<211>  22
<212>  PRT
<213>  Unknown

<220>
<223>  Signal peptide


<220>
<221>  SIGNAL
<222>  (1)..(22)
<223>  signal peptide

<400>  236

```
Met Asp Ala Met Lys Arg Gly Leu Cys Cys Val Leu Leu Leu Cys Gly
1               5                   10                  15


Ala Val Phe Val Ser Pro
            20
```

<210>  237
<211>  428
<212>  PRT
<213>  Unknown

<220>
<223>  antigenic unit


<220>
<221>  SITE
<222>  (1)..(428)
<223>  VB2040

<400>  237

```
Met Thr Tyr Arg Arg Leu Ile Ser Met Met Gly Phe Lys Met Asn Tyr
1               5                   10                  15


Gln Val Asn Gly Tyr Pro Asn Met Phe Gly Gly Gly Gly Ser Gly Gly
            20                  25                  30


Gly Gly Ser Phe Leu Asn Arg Phe Thr Thr Thr Leu Asn Asp Phe Asn
        35                  40                  45


Leu Val Ala Met Ser Ser Val Glu Leu Lys His Phe Phe Phe Ala Gln
    50                  55                  60


Asp Gly Asn Ala Ala Ile Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
65                  70                  75                  80


Arg Ser Phe Ile Glu Asp Leu Leu Phe Asn Lys Val Thr Leu Ala Leu
                85                  90                  95


Met Ile Glu Arg Phe Val Ser Leu Ala Ile Asp Ala Tyr Pro Gly Gly
            100                 105                 110


Gly Gly Ser Gly Gly Gly Gly Gly Ser Arg Ala Met Pro Asn Met Leu Arg
        115                 120                 125
```

```
Ile Met Ala Ser Leu Val Leu Met Val Tyr Met Pro Ala Ser Trp Val
    130                 135                 140

Met Arg Ile Met Thr Trp Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
145                 150                 155                 160

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

Tyr Thr Ala Cys Ser His Ala Ala Val Gly Gly Gly Gly Ser Gly Gly
            180                 185                 190

Gly Gly Ser Tyr Phe Ile Lys Gly Leu Asn Asn Leu Asn Arg Gly Met
        195                 200                 205

Val Leu Tyr Leu Asn Thr Leu Thr Leu Ala Val Pro Tyr Asn Met Arg
    210                 215                 220

Val Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Asn Ile Thr Asn Leu
225                 230                 235                 240

Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala Ser Val Tyr
                245                 250                 255

Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser Val
            260                 265                 270

Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser
        275                 280                 285

Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp Ser
    290                 295                 300

Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro Gly Gln Thr
305                 310                 315                 320

Gly Lys Ile Ala Asp Tyr Asn Tyr Lys Leu Pro Asp Asp Phe Thr Gly
                325                 330                 335

Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys Val Gly Gly
            340                 345                 350

Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys Pro
        355                 360                 365

Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr Pro
    370                 375                 380
```

```
Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser Tyr
385                 390                 395                 400


Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val Val
                405                 410                 415


Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr
            420                 425


<210>  238
<211>  534
<212>  PRT
<213>  Unknown

<220>
<223>  antigenic unit


<220>
<221>  SITE
<222>  (1)..(534)
<223>  VB2041

<400>  238

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


Gln Val Asn Gly Tyr Pro Asn Met Phe Gly Gly Gly Gly Ser Gly Gly
            20                  25                  30


Gly Gly Ser His Val Ile Ser Thr Ser His Lys Leu Val Leu Ser Val
        35                  40                  45


Asn Pro Tyr Val Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Phe Leu
    50                  55                  60


Asn Arg Phe Thr Thr Thr Leu Asn Asp Phe Asn Leu Val Ala Met Ser
65                  70                  75                  80


Ser Val Glu Leu Lys His Phe Phe Phe Ala Gln Asp Gly Asn Ala Ala
                85                  90                  95


Ile Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser His Phe Ala Ile Gly
            100                 105                 110


Leu Ala Leu Tyr Tyr Pro Ser Ala Arg Ile Val Tyr Thr Ala Cys Ser
        115                 120                 125


His Ala Ala Val Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Arg Ala
    130                 135                 140
```

```
Met Pro Asn Met Leu Arg Ile Met Ala Ser Leu Val Leu Met Val Tyr
145                 150                 155                 160

Met Pro Ala Ser Trp Val Met Arg Ile Met Thr Trp Gly Gly Gly Gly
                165                 170                 175

Ser Gly Gly Gly Gly Ser Arg Ser Phe Ile Glu Asp Leu Leu Phe Asn
            180                 185                 190

Lys Val Thr Leu Ala Leu Met Ile Glu Arg Phe Val Ser Leu Ala Ile
        195                 200                 205

Asp Ala Tyr Pro Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Ala Gln
    210                 215                 220

Phe Ala Pro Ser Ala Ser Ala Phe Phe Gly Met Ser Arg Ile Glu Ile
225                 230                 235                 240

Val Asp Thr Val Ser Ala Leu Val Tyr Asp Asn Lys Leu Ser Gly Gly
                245                 250                 255

Gly Gly Ser Gly Gly Gly Gly Gly Tyr Phe Ile Lys Gly Leu Asn Asn Leu
            260                 265                 270

Asn Arg Gly Met Val Leu Tyr Leu Asn Thr Leu Thr Leu Ala Val Pro
        275                 280                 285

Tyr Asn Met Arg Val Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
    290                 295                 300

Ser Gly Asp Ala Thr Thr Ala Tyr Ala Asn Ser Val Phe Asn Ile Cys
305                 310                 315                 320

Gln Ala Val Thr Ala Asn Val Asn Ala Leu Leu Gly Gly Gly Gly Ser
                325                 330                 335

Gly Gly Gly Gly Ser Asn Ile Thr Asn Leu Cys Pro Phe Gly Glu Val
            340                 345                 350

Phe Asn Ala Thr Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg
        355                 360                 365

Ile Ser Asn Cys Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser
    370                 375                 380

Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser Pro Thr Lys Leu Asn Asp
385                 390                 395                 400

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

```
                405                 410                 415

Glu Val Arg Gln Ile Ala Pro Gly Gln Thr Gly Lys Ile Ala Asp Tyr
            420                 425                 430

Asn Tyr Lys Leu Pro Asp Asp Phe Thr Gly Cys Val Ile Ala Trp Asn
        435                 440                 445

Ser Asn Asn Leu Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr
    450                 455                 460

Arg Leu Phe Arg Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser
465                 470                 475                 480

Thr Glu Ile Tyr Gln Ala Gly Ser Thr Pro Cys Asn Gly Val Glu Gly
                485                 490                 495

Phe Asn Cys Tyr Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr Asn
            500                 505                 510

Gly Val Gly Tyr Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu Leu
        515                 520                 525

Leu His Ala Pro Ala Thr
    530


<210>  239
<211>  672
<212>  PRT
<213>  Unknown

<220>
<223>  antigenic unit


<220>
<221>  SITE
<222>  (1)..(672)
<223>  VB2042

<400>  239

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

Gln Val Asn Gly Tyr Pro Asn Met Phe Gly Gly Gly Gly Ser Gly Gly
            20                  25                  30

Gly Gly Ser His Val Ile Ser Thr Ser His Lys Leu Val Leu Ser Val
        35                  40                  45

Asn Pro Tyr Val Ala Ser Ile Lys Asn Phe Lys Ser Val Leu Tyr Tyr
    50                  55                  60
```

```
Gln Asn Asn Val Phe Met Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
65                  70                  75                  80

Tyr Phe Ile Lys Gly Leu Asn Asn Leu Asn Arg Gly Met Val Leu Tyr
                85                  90                  95

Leu Asn Thr Leu Thr Leu Ala Val Pro Tyr Asn Met Arg Val Gly Gly
            100                 105                 110

Gly Gly Ser Gly Gly Gly Gly Ser Met Leu Ser Asp Thr Leu Lys Asn
        115                 120                 125

Leu Ser Asp Arg Val Val Phe Val Leu Trp Ala His Gly Phe Glu Leu
    130                 135                 140

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly His Phe Ala Ile Gly Leu
145                 150                 155                 160

Ala Leu Tyr Tyr Pro Ser Ala Arg Ile Val Tyr Thr Ala Cys Ser His
                165                 170                 175

Ala Ala Val Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Arg Ser Phe
            180                 185                 190

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

Arg Phe Val Ser Leu Ala Ile Asp Ala Tyr Pro Gly Gly Gly Gly Ser
    210                 215                 220

Gly Gly Gly Gly Ser Arg Ala Met Pro Asn Met Leu Arg Ile Met Ala
225                 230                 235                 240

Ser Leu Val Leu Met Val Tyr Met Pro Ala Ser Trp Val Met Arg Ile
                245                 250                 255

Met Thr Trp Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Arg Val Trp
            260                 265                 270

Thr Leu Met Asn Val Leu Thr Leu Val Tyr Lys Val Phe Ala Tyr Ala
        275                 280                 285

Asn Arg Asn Arg Phe Leu Tyr Ile Ile Lys Leu Ser Gly Gly Gly Gly
    290                 295                 300

Ser Gly Gly Gly Gly Ala Gln Phe Ala Pro Ser Ala Ser Ala Phe Phe
305                 310                 315                 320
```

```
Gly Met Ser Arg Ile Glu Ile Val Asp Thr Val Ser Ala Leu Val Tyr
                325                 330                 335

Asp Asn Lys Leu Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Phe Leu
            340                 345                 350

Asn Arg Phe Thr Thr Thr Leu Asn Asp Phe Asn Leu Val Ala Met Ser
        355                 360                 365

Ser Val Glu Leu Lys His Phe Phe Phe Ala Gln Asp Gly Asn Ala Ala
    370                 375                 380

Ile Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Ser Gly Asp Ala
385                 390                 395                 400

Thr Thr Ala Tyr Ala Asn Ser Val Phe Asn Ile Cys Gln Ala Val Thr
                405                 410                 415

Ala Asn Val Asn Ala Leu Leu Ser Gly Gly Gly Gly Ser Gly Gly Gly
            420                 425                 430

Gly Thr Ala Asn Pro Lys Thr Pro Lys Tyr Lys Phe Val Arg Ile Gln
        435                 440                 445

Pro Gly Gln Thr Phe Phe Val Asn Glu Phe Tyr Ala Tyr Leu Arg Lys
    450                 455                 460

His Phe Ser Met Met Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Asn
465                 470                 475                 480

Ile Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe
                485                 490                 495

Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala
            500                 505                 510

Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys
        515                 520                 525

Tyr Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val
    530                 535                 540

Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala
545                 550                 555                 560

Pro Gly Gln Thr Gly Lys Ile Ala Asp Tyr Asn Tyr Lys Leu Pro Asp
                565                 570                 575
```

```
Asp Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser
            580                 585                 590

Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser
        595                 600                 605

Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala
    610                 615                 620

Gly Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro
625                 630                 635                 640

Leu Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro
                645                 650                 655

Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr
            660                 665                 670
```

<210>  240
<211>  787
<212>  PRT
<213>  Unknown

<220>
<223>  antigenic unit

<220>
<221>  SITE
<222>  (1)..(787)
<223>  VB2043

<400>  240

```
Met Thr Tyr Arg Arg Leu Ile Ser Met Met Gly Phe Lys Met Asn Tyr
1               5                   10                  15

Gln Val Asn Gly Tyr Pro Asn Met Phe Gly Gly Gly Gly Ser Gly Gly
            20                  25                  30

Gly Gly Ser His Val Ile Ser Thr Ser His Lys Leu Val Leu Ser Val
        35                  40                  45

Asn Pro Tyr Val Ala Ser Ile Lys Asn Phe Lys Ser Val Leu Tyr Tyr
    50                  55                  60

Gln Asn Asn Val Phe Met Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly
65                  70                  75                  80

Ser Ser Gly Asp Ala Thr Thr Ala Tyr Ala Asn Ser Val Phe Asn Ile
                85                  90                  95

Cys Gln Ala Val Thr Ala Asn Val Asn Ala Leu Leu Ser Gly Gly Gly
```

```
            100                 105                 110

Gly Ser Gly Gly Gly Gly Phe Leu Asn Arg Phe Thr Thr Thr Leu Asn
        115                 120                 125

Asp Phe Asn Leu Val Ala Met Ser Ser Val Glu Leu Lys His Phe Phe
    130                 135                 140

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

Gly Gly Ser Met Leu Ser Asp Thr Leu Lys Asn Leu Ser Asp Arg Val
                165                 170                 175

Val Phe Val Leu Trp Ala His Gly Phe Glu Leu Ser Gly Gly Gly Gly
            180                 185                 190

Ser Gly Gly Gly Gly His Phe Ala Ile Gly Leu Ala Leu Tyr Tyr Pro
        195                 200                 205

Ser Ala Arg Ile Val Tyr Thr Ala Cys Ser His Ala Ala Val Gly Gly
    210                 215                 220

Gly Gly Ser Gly Gly Gly Gly Ser Arg Ser Phe Ile Glu Asp Leu Leu
225                 230                 235                 240

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

Ala Ile Asp Ala Tyr Pro Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
            260                 265                 270

Arg Ala Met Pro Asn Met Leu Arg Ile Met Ala Ser Leu Val Leu Met
        275                 280                 285

Val Tyr Met Pro Ala Ser Trp Val Met Arg Ile Met Thr Trp Gly Gly
    290                 295                 300

Gly Gly Ser Gly Gly Gly Gly Ser Val Gln Met Ala Pro Ile Ser Ala
305                 310                 315                 320

Met Val Arg Met Tyr Ile Phe Phe Ala Ser Phe Tyr Tyr Val Trp Lys
                325                 330                 335

Ser Tyr Val His Val Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Arg
            340                 345                 350

Val Trp Thr Leu Met Asn Val Leu Thr Leu Val Tyr Lys Val Phe Ala
        355                 360                 365
```

```
Tyr Ala Asn Arg Asn Arg Phe Leu Tyr Ile Ile Lys Leu Ser Gly Gly
    370                 375                 380

Gly Gly Ser Gly Gly Gly Gly Ala Gln Phe Ala Pro Ser Ala Ser Ala
385                 390                 395                 400

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

Val Tyr Asp Asn Lys Leu Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly
            420                 425                 430

Ser Leu Leu Met Pro Ile Leu Thr Leu Thr Arg Ala Leu Thr Ala Tyr
        435                 440                 445

Thr Val Glu Leu Gly Thr Glu Val Asn Glu Phe Ala Cys Val Gly Gly
    450                 455                 460

Gly Gly Ser Gly Gly Gly Gly Ser Tyr Phe Ile Lys Gly Leu Asn Asn
465                 470                 475                 480

Leu Asn Arg Gly Met Val Leu Tyr Leu Asn Thr Leu Thr Leu Ala Val
                485                 490                 495

Pro Tyr Asn Met Arg Val Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
            500                 505                 510

Thr Val Tyr Thr Lys Val Asp Gly Val Asp Val Glu Leu Phe Glu Asn
        515                 520                 525

Lys Thr Thr Leu Pro Val Asn Val Ala Phe Gly Gly Gly Gly Ser Gly
    530                 535                 540

Gly Gly Gly Ser Thr Ala Asn Pro Lys Thr Pro Lys Tyr Lys Phe Val
545                 550                 555                 560

Arg Ile Gln Pro Gly Gln Thr Phe Phe Val Asn Glu Phe Tyr Ala Tyr
                565                 570                 575

Leu Arg Lys His Phe Ser Met Met Gly Gly Gly Gly Ser Gly Gly Gly
            580                 585                 590

Gly Ser Asn Ile Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala
        595                 600                 605

Thr Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn
    610                 615                 620
```

```
Cys Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr
625                 630                 635                 640

Phe Lys Cys Tyr Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe
                645                 650                 655

Thr Asn Val Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg
            660                 665                 670

Gln Ile Ala Pro Gly Gln Thr Gly Lys Ile Ala Asp Tyr Asn Tyr Lys
        675                 680                 685

Leu Pro Asp Asp Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn
    690                 695                 700

Leu Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe
705                 710                 715                 720

Arg Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile
                725                 730                 735

Tyr Gln Ala Gly Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys
            740                 745                 750

Tyr Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly
        755                 760                 765

Tyr Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala
    770                 775                 780

Pro Ala Thr
785
```

<210>  241
<211>  940
<212>  PRT
<213>  Unknown

<220>
<223>  antigenic unit

<220>
<221>  SITE
<222>  (1)..(940)
<223>  VB2044

<400>  241

```
Lys Met Phe Asp Ala Tyr Val Asn Thr Phe Ser Ser Thr Phe Asn Val
1               5                   10                  15
```

```
Arg Val Tyr Ser Thr Gly Ser Asn Val Phe Gln Thr Arg Ala Gly Gly
            20                  25                  30

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

Ser Ile Ala Ile Pro Thr Asn Phe Thr Ile Ser Val Thr Thr Glu Ile
    50                  55                  60

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Thr Ala Asn Pro Lys Thr
65                  70                  75                  80

Pro Lys Tyr Lys Phe Val Arg Ile Gln Pro Gly Gln Thr Phe Phe Val
                85                  90                  95

Asn Glu Phe Tyr Ala Tyr Leu Arg Lys His Phe Ser Met Met Gly Gly
            100                 105                 110

Gly Gly Ser Gly Gly Gly Gly Ser Thr Val Tyr Thr Lys Val Asp Gly
        115                 120                 125

Val Asp Val Glu Leu Phe Glu Asn Lys Thr Thr Leu Pro Val Asn Val
    130                 135                 140

Ala Phe Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Tyr Phe Ile Lys
145                 150                 155                 160

Gly Leu Asn Asn Leu Asn Arg Gly Met Val Leu Tyr Leu Asn Thr Leu
                165                 170                 175

Thr Leu Ala Val Pro Tyr Asn Met Arg Val Gly Gly Gly Gly Ser Gly
            180                 185                 190

Gly Gly Gly Ser Leu Val Lys Pro Ser Phe Tyr Val Tyr Ser Arg Val
        195                 200                 205

Lys Asn Leu Val Gln Gln Glu Ser Pro Phe Val Met Met Ser Ala Pro
    210                 215                 220

Pro Ala Gln Tyr Glu Leu Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly
225                 230                 235                 240

Met Leu Ser Asp Thr Leu Lys Asn Leu Ser Asp Arg Val Val Phe Val
                245                 250                 255

Leu Trp Ala His Gly Phe Glu Leu Ser Gly Gly Gly Gly Ser Gly Gly
            260                 265                 270

Gly Gly His Phe Ala Ile Gly Leu Ala Leu Tyr Tyr Pro Ser Ala Arg
```

```
        275                 280                 285

Ile Val Tyr Thr Ala Cys Ser His Ala Ala Val Gly Gly Gly Gly Ser
    290                 295                 300

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

Val Thr Leu Ala Leu Met Ile Glu Arg Phe Val Ser Leu Ala Ile Asp
                325                 330                 335

Ala Tyr Pro Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Arg Ala Met
            340                 345                 350

Pro Asn Met Leu Arg Ile Met Ala Ser Leu Val Leu Met Val Tyr Met
        355                 360                 365

Pro Ala Ser Trp Val Met Arg Ile Met Thr Trp Gly Gly Gly Gly Ser
    370                 375                 380

Gly Gly Gly Gly Ser Val Gln Met Ala Pro Ile Ser Ala Met Val Arg
385                 390                 395                 400

Met Tyr Ile Phe Phe Ala Ser Phe Tyr Tyr Val Trp Lys Ser Tyr Val
                405                 410                 415

His Val Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Arg Val Trp Thr
            420                 425                 430

Leu Met Asn Val Leu Thr Leu Val Tyr Lys Val Phe Ala Tyr Ala Asn
        435                 440                 445

Arg Asn Arg Phe Leu Tyr Ile Ile Lys Leu Ser Gly Gly Gly Gly Ser
    450                 455                 460

Gly Gly Gly Gly Ala Gln Phe Ala Pro Ser Ala Ser Ala Phe Phe Gly
465                 470                 475                 480

Met Ser Arg Ile Glu Ile Val Asp Thr Val Ser Ala Leu Val Tyr Asp
                485                 490                 495

Asn Lys Leu Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Leu Leu
            500                 505                 510

Met Pro Ile Leu Thr Leu Thr Arg Ala Leu Thr Ala Tyr Thr Val Glu
        515                 520                 525

Leu Gly Thr Glu Val Asn Glu Phe Ala Cys Val Gly Gly Gly Gly Ser
    530                 535                 540
```

```
Gly Gly Gly Gly Ser Phe Leu Asn Arg Phe Thr Thr Thr Leu Asn Asp
545                 550                 555                 560

Phe Asn Leu Val Ala Met Ser Ser Val Glu Leu Lys His Phe Phe Phe
                565                 570                 575

Ala Gln Asp Gly Asn Ala Ala Ile Ser Gly Gly Gly Gly Ser Gly Gly
            580                 585                 590

Gly Gly Ser Ser Gly Asp Ala Thr Thr Ala Tyr Ala Asn Ser Val Phe
        595                 600                 605

Asn Ile Cys Gln Ala Val Thr Ala Asn Val Asn Ala Leu Leu Ser Gly
    610                 615                 620

Gly Gly Gly Ser Gly Gly Gly Gly His Val Ile Ser Thr Ser His Lys
625                 630                 635                 640

Leu Val Leu Ser Val Asn Pro Tyr Val Ala Ser Ile Lys Asn Phe Lys
                645                 650                 655

Ser Val Leu Tyr Tyr Gln Asn Asn Val Phe Met Gly Gly Gly Gly Ser
            660                 665                 670

Gly Gly Gly Gly Ser Met Thr Tyr Arg Arg Leu Ile Ser Met Met Gly
        675                 680                 685

Phe Lys Met Asn Tyr Gln Val Asn Gly Tyr Pro Asn Met Phe Gly Gly
    690                 695                 700

Gly Gly Ser Gly Gly Gly Gly Gly Ser Phe Gly Asp Asp Thr Val Ile Glu
705                 710                 715                 720

Val Gln Gly Tyr Lys Ser Val Asn Ile Thr Phe Glu Leu Asp Glu Arg
                725                 730                 735

Ile Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Asn Ile Thr Asn Leu
            740                 745                 750

Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala Ser Val Tyr
        755                 760                 765

Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser Val
    770                 775                 780

Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser
785                 790                 795                 800
```

```
Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp Ser
                805                 810                 815

Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro Gly Gln Thr
            820                 825                 830

Gly Lys Ile Ala Asp Tyr Asn Tyr Lys Leu Pro Asp Asp Phe Thr Gly
        835                 840                 845

Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys Val Gly Gly
    850                 855                 860

Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys Pro
865                 870                 875                 880

Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr Pro
                885                 890                 895

Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser Tyr
            900                 905                 910

Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val Val
        915                 920                 925

Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr
    930                 935                 940


<210>  242
<211>  672
<212>  PRT
<213>  Unknown

<220>
<223>  antigenic unit


<220>
<221>  SITE
<222>  (1)..(672)
<223>  VB2045

<400>  242

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

Gln Val Asn Gly Tyr Pro Asn Met Phe Gly Gly Gly Gly Ser Gly Gly
            20                  25                  30

Gly Gly Ser His Val Ile Ser Thr Ser His Lys Leu Val Leu Ser Val
        35                  40                  45
```

```
Asn Pro Tyr Val Ala Ser Ile Lys Asn Phe Lys Ser Val Leu Tyr Tyr
    50                  55                  60

Gln Asn Asn Val Phe Met Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
65                  70                  75                  80

Tyr Phe Ile Lys Gly Leu Asn Asn Leu Asn Arg Gly Met Val Leu Tyr
                85                  90                  95

Leu Asn Thr Leu Thr Leu Ala Val Pro Tyr Asn Met Arg Val Gly Gly
            100                 105                 110

Gly Gly Ser Gly Gly Gly Gly Ser Met Leu Ser Asp Thr Leu Lys Asn
        115                 120                 125

Leu Ser Asp Arg Val Val Phe Val Leu Trp Ala His Gly Phe Glu Leu
    130                 135                 140

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly His Phe Ala Ile Gly Leu
145                 150                 155                 160

Ala Leu Tyr Tyr Pro Ser Ala Arg Ile Val Tyr Thr Ala Cys Ser His
                165                 170                 175

Ala Ala Val Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Arg Ser Phe
            180                 185                 190

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

Arg Phe Val Ser Leu Ala Ile Asp Ala Tyr Pro Gly Gly Gly Gly Ser
    210                 215                 220

Gly Gly Gly Gly Ser Asn Ile Thr Asn Leu Cys Pro Phe Gly Glu Val
225                 230                 235                 240

Phe Asn Ala Thr Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg
                245                 250                 255

Ile Ser Asn Cys Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser
            260                 265                 270

Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser Pro Thr Lys Leu Asn Asp
        275                 280                 285

Leu Cys Phe Thr Asn Val Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp
    290                 295                 300

Glu Val Arg Gln Ile Ala Pro Gly Gln Thr Gly Lys Ile Ala Asp Tyr
```

```
305                 310                 315                 320

Asn Tyr Lys Leu Pro Asp Asp Phe Thr Gly Cys Val Ile Ala Trp Asn
                325                 330                 335

Ser Asn Asn Leu Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr
            340                 345                 350

Arg Leu Phe Arg Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser
        355                 360                 365

Thr Glu Ile Tyr Gln Ala Gly Ser Thr Pro Cys Asn Gly Val Glu Gly
    370                 375                 380

Phe Asn Cys Tyr Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr Asn
385                 390                 395                 400

Gly Val Gly Tyr Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu Leu
                405                 410                 415

Leu His Ala Pro Ala Thr Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
            420                 425                 430

Arg Ala Met Pro Asn Met Leu Arg Ile Met Ala Ser Leu Val Leu Met
        435                 440                 445

Val Tyr Met Pro Ala Ser Trp Val Met Arg Ile Met Thr Trp Gly Gly
    450                 455                 460

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

Leu Thr Leu Val Tyr Lys Val Phe Ala Tyr Ala Asn Arg Asn Arg Phe
                485                 490                 495

Leu Tyr Ile Ile Lys Leu Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly
            500                 505                 510

Ala Gln Phe Ala Pro Ser Ala Ser Ala Phe Phe Gly Met Ser Arg Ile
        515                 520                 525

Glu Ile Val Asp Thr Val Ser Ala Leu Val Tyr Asp Asn Lys Leu Ser
    530                 535                 540

Gly Gly Gly Gly Ser Gly Gly Gly Gly Phe Leu Asn Arg Phe Thr Thr
545                 550                 555                 560

Thr Leu Asn Asp Phe Asn Leu Val Ala Met Ser Ser Val Glu Leu Lys
                565                 570                 575
```

```
His Phe Phe Phe Ala Gln Asp Gly Asn Ala Ala Ile Ser Gly Gly Gly
            580                 585                 590

Gly Ser Gly Gly Gly Gly Ser Ser Gly Asp Ala Thr Thr Ala Tyr Ala
        595                 600                 605

Asn Ser Val Phe Asn Ile Cys Gln Ala Val Thr Ala Asn Val Asn Ala
    610                 615                 620

Leu Leu Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Thr Ala Asn Pro
625                 630                 635                 640

Lys Thr Pro Lys Tyr Lys Phe Val Arg Ile Gln Pro Gly Gln Thr Phe
                645                 650                 655

Phe Val Asn Glu Phe Tyr Ala Tyr Leu Arg Lys His Phe Ser Met Met
            660                 665                 670
```

<210>  243
<211>  672
<212>  PRT
<213>  Unknown

<220>
<223>  antigenic unit

<220>
<221>  SITE
<222>  (1)..(672)
<223>  VB2046

<400>  243

```
Asn Ile Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg
1               5                   10                  15

Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val
            20                  25                  30

Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys
        35                  40                  45

Cys Tyr Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn
    50                  55                  60

Val Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile
65                  70                  75                  80

Ala Pro Gly Gln Thr Gly Lys Ile Ala Asp Tyr Asn Tyr Lys Leu Pro
                85                  90                  95
```

```
Asp Asp Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp
            100                 105                 110

Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys
        115                 120                 125

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

Ala Gly Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe
145                 150                 155                 160

Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln
                165                 170                 175

Pro Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala
            180                 185                 190

Thr Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Met Thr Tyr Arg Arg
        195                 200                 205

Leu Ile Ser Met Met Gly Phe Lys Met Asn Tyr Gln Val Asn Gly Tyr
    210                 215                 220

Pro Asn Met Phe Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser His Val
225                 230                 235                 240

Ile Ser Thr Ser His Lys Leu Val Leu Ser Val Asn Pro Tyr Val Ala
                245                 250                 255

Ser Ile Lys Asn Phe Lys Ser Val Leu Tyr Tyr Gln Asn Asn Val Phe
            260                 265                 270

Met Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Tyr Phe Ile Lys Gly
        275                 280                 285

Leu Asn Asn Leu Asn Arg Gly Met Val Leu Tyr Leu Asn Thr Leu Thr
    290                 295                 300

Leu Ala Val Pro Tyr Asn Met Arg Val Gly Gly Gly Gly Ser Gly Gly
305                 310                 315                 320

Gly Gly Ser Met Leu Ser Asp Thr Leu Lys Asn Leu Ser Asp Arg Val
                325                 330                 335

Val Phe Val Leu Trp Ala His Gly Phe Glu Leu Ser Gly Gly Gly Gly
            340                 345                 350
```

```
Ser Gly Gly Gly Gly His Phe Ala Ile Gly Leu Ala Leu Tyr Tyr Pro
        355                 360                 365

Ser Ala Arg Ile Val Tyr Thr Ala Cys Ser His Ala Ala Val Gly Gly
    370                 375                 380

Gly Gly Ser Gly Gly Gly Gly Ser Arg Ser Phe Ile Glu Asp Leu Leu
385                 390                 395                 400

Phe Asn Lys Val Thr Leu Ala Leu Met Ile Glu Arg Phe Val Ser Leu
                405                 410                 415

Ala Ile Asp Ala Tyr Pro Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
            420                 425                 430

Arg Ala Met Pro Asn Met Leu Arg Ile Met Ala Ser Leu Val Leu Met
        435                 440                 445

Val Tyr Met Pro Ala Ser Trp Val Met Arg Ile Met Thr Trp Gly Gly
    450                 455                 460

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

Leu Thr Leu Val Tyr Lys Val Phe Ala Tyr Ala Asn Arg Asn Arg Phe
                485                 490                 495

Leu Tyr Ile Ile Lys Leu Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly
            500                 505                 510

Ala Gln Phe Ala Pro Ser Ala Ser Ala Phe Phe Gly Met Ser Arg Ile
        515                 520                 525

Glu Ile Val Asp Thr Val Ser Ala Leu Val Tyr Asp Asn Lys Leu Ser
    530                 535                 540

Gly Gly Gly Gly Ser Gly Gly Gly Gly Phe Leu Asn Arg Phe Thr Thr
545                 550                 555                 560

Thr Leu Asn Asp Phe Asn Leu Val Ala Met Ser Ser Val Glu Leu Lys
                565                 570                 575

His Phe Phe Phe Ala Gln Asp Gly Asn Ala Ala Ile Ser Gly Gly Gly
            580                 585                 590

Gly Ser Gly Gly Gly Gly Ser Ser Gly Asp Ala Thr Thr Ala Tyr Ala
        595                 600                 605

Asn Ser Val Phe Asn Ile Cys Gln Ala Val Thr Ala Asn Val Asn Ala
```

```
    610                 615                 620

Leu Leu Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Thr Ala Asn Pro
625                 630                 635                 640

Lys Thr Pro Lys Tyr Lys Phe Val Arg Ile Gln Pro Gly Gln Thr Phe
                645                 650                 655

Phe Val Asn Glu Phe Tyr Ala Tyr Leu Arg Lys His Phe Ser Met Met
            660                 665                 670


<210>  244
<211>  552
<212>  PRT
<213>  Unknown

<220>
<223>  antigenic unit


<220>
<221>  SITE
<222>  (1)..(552)
<223>  VB2047

<400>  244

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

Gln Val Asn Gly Tyr Pro Asn Met Phe His Val Ile Ser Thr Ser His
            20                  25                  30

Lys Leu Val Leu Ser Val Asn Pro Tyr Val Ala Ser Ile Lys Asn Phe
        35                  40                  45

Lys Ser Val Leu Tyr Tyr Gln Asn Asn Val Phe Met Tyr Phe Ile Lys
    50                  55                  60

Gly Leu Asn Asn Leu Asn Arg Gly Met Val Leu Tyr Leu Asn Thr Leu
65                  70                  75                  80

Thr Leu Ala Val Pro Tyr Asn Met Arg Val Met Leu Ser Asp Thr Leu
                85                  90                  95

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

Glu Leu His Phe Ala Ile Gly Leu Ala Leu Tyr Tyr Pro Ser Ala Arg
        115                 120                 125

Ile Val Tyr Thr Ala Cys Ser His Ala Ala Val Arg Ser Phe Ile Glu
    130                 135                 140
```

```
Asp Leu Leu Phe Asn Lys Val Thr Leu Ala Leu Met Ile Glu Arg Phe
145                 150                 155                 160

Val Ser Leu Ala Ile Asp Ala Tyr Pro Arg Ala Met Pro Asn Met Leu
                165                 170                 175

Arg Ile Met Ala Ser Leu Val Leu Met Val Tyr Met Pro Ala Ser Trp
            180                 185                 190

Val Met Arg Ile Met Thr Trp Arg Val Trp Thr Leu Met Asn Val Leu
        195                 200                 205

Thr Leu Val Tyr Lys Val Phe Ala Tyr Ala Asn Arg Asn Arg Phe Leu
    210                 215                 220

Tyr Ile Ile Lys Leu Ala Gln Phe Ala Pro Ser Ala Ser Ala Phe Phe
225                 230                 235                 240

Gly Met Ser Arg Ile Glu Ile Val Asp Thr Val Ser Ala Leu Val Tyr
                245                 250                 255

Asp Asn Lys Leu Phe Leu Asn Arg Phe Thr Thr Thr Leu Asn Asp Phe
            260                 265                 270

Asn Leu Val Ala Met Ser Ser Val Glu Leu Lys His Phe Phe Phe Ala
        275                 280                 285

Gln Asp Gly Asn Ala Ala Ile Ser Ser Gly Asp Ala Thr Thr Ala Tyr
    290                 295                 300

Ala Asn Ser Val Phe Asn Ile Cys Gln Ala Val Thr Ala Asn Val Asn
305                 310                 315                 320

Ala Leu Leu Thr Ala Asn Pro Lys Thr Pro Lys Tyr Lys Phe Val Arg
                325                 330                 335

Ile Gln Pro Gly Gln Thr Phe Phe Val Asn Glu Phe Tyr Ala Tyr Leu
            340                 345                 350

Arg Lys His Phe Ser Met Met Asn Ile Thr Asn Leu Cys Pro Phe Gly
        355                 360                 365

Glu Val Phe Asn Ala Thr Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg
    370                 375                 380

Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser
385                 390                 395                 400
```

```
Ala Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser Pro Thr Lys Leu
                405                 410                 415

Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp Ser Phe Val Ile Arg
            420                 425                 430

Gly Asp Glu Val Arg Gln Ile Ala Pro Gly Gln Thr Gly Lys Ile Ala
        435                 440                 445

Asp Tyr Asn Tyr Lys Leu Pro Asp Asp Phe Thr Gly Cys Val Ile Ala
    450                 455                 460

Trp Asn Ser Asn Asn Leu Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr
465                 470                 475                 480

Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp
                485                 490                 495

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

Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro
        515                 520                 525

Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val Val Val Leu Ser Phe
    530                 535                 540

Glu Leu Leu His Ala Pro Ala Thr
545                 550


<210>  245
<211>  469
<212>  PRT
<213>  Unknown

<220>
<223>  antigenic unit


<220>
<221>  SITE
<222>  (1)..(469)
<223>  VB2048

<400>  245

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

Gln Val Asn Gly Tyr Pro Asn Met Phe Gly Gly Gly Gly Ser Gly Gly
            20                  25                  30
```

```
Gly Gly Ser His Val Ile Ser Thr Ser His Lys Leu Val Leu Ser Val
        35                  40                  45

Asn Pro Tyr Val Ala Ser Ile Lys Asn Phe Lys Ser Val Leu Tyr Tyr
    50                  55                  60

Gln Asn Asn Val Phe Met Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
65                  70                  75                  80

Tyr Phe Ile Lys Gly Leu Asn Asn Leu Asn Arg Gly Met Val Leu Tyr
                85                  90                  95

Leu Asn Thr Leu Thr Leu Ala Val Pro Tyr Asn Met Arg Val Gly Gly
            100                 105                 110

Gly Gly Ser Gly Gly Gly Gly Ser Met Leu Ser Asp Thr Leu Lys Asn
        115                 120                 125

Leu Ser Asp Arg Val Val Phe Val Leu Trp Ala His Gly Phe Glu Leu
    130                 135                 140

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly His Phe Ala Ile Gly Leu
145                 150                 155                 160

Ala Leu Tyr Tyr Pro Ser Ala Arg Ile Val Tyr Thr Ala Cys Ser His
                165                 170                 175

Ala Ala Val Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Arg Ser Phe
            180                 185                 190

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

Arg Phe Val Ser Leu Ala Ile Asp Ala Tyr Pro Gly Gly Gly Gly Ser
    210                 215                 220

Gly Gly Gly Gly Ser Arg Ala Met Pro Asn Met Leu Arg Ile Met Ala
225                 230                 235                 240

Ser Leu Val Leu Met Val Tyr Met Pro Ala Ser Trp Val Met Arg Ile
                245                 250                 255

Met Thr Trp Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Arg Val Trp
            260                 265                 270

Thr Leu Met Asn Val Leu Thr Leu Val Tyr Lys Val Phe Ala Tyr Ala
        275                 280                 285

Asn Arg Asn Arg Phe Leu Tyr Ile Ile Lys Leu Ser Gly Gly Gly Gly
```

```
    290                 295                 300

Ser Gly Gly Gly Gly Ala Gln Phe Ala Pro Ser Ala Ser Ala Phe Phe
305                 310                 315                 320

Gly Met Ser Arg Ile Glu Ile Val Asp Thr Val Ser Ala Leu Val Tyr
                325                 330                 335

Asp Asn Lys Leu Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Phe Leu
            340                 345                 350

Asn Arg Phe Thr Thr Thr Leu Asn Asp Phe Asn Leu Val Ala Met Ser
        355                 360                 365

Ser Val Glu Leu Lys His Phe Phe Phe Ala Gln Asp Gly Asn Ala Ala
    370                 375                 380

Ile Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Ser Gly Asp Ala
385                 390                 395                 400

Thr Thr Ala Tyr Ala Asn Ser Val Phe Asn Ile Cys Gln Ala Val Thr
                405                 410                 415

Ala Asn Val Asn Ala Leu Leu Ser Gly Gly Gly Gly Ser Gly Gly Gly
            420                 425                 430

Gly Thr Ala Asn Pro Lys Thr Pro Lys Tyr Lys Phe Val Arg Ile Gln
        435                 440                 445

Pro Gly Gln Thr Phe Phe Val Asn Glu Phe Tyr Ala Tyr Leu Arg Lys
    450                 455                 460

His Phe Ser Met Met
465


<210>  246
<211>  193
<212>  PRT
<213>  Unknown

<220>
<223>  antigenic unit


<220>
<221>  SITE
<222>  (1)..(193)
<223>  VB2049

<400>  246

Asn Ile Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg
1               5                   10                  15
```

```
Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val
            20                  25                  30

Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys
        35                  40                  45

Cys Tyr Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn
    50                  55                  60

Val Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile
65                  70                  75                  80

Ala Pro Gly Gln Thr Gly Lys Ile Ala Asp Tyr Asn Tyr Lys Leu Pro
                85                  90                  95

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

Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys
        115                 120                 125

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

Ala Gly Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe
145                 150                 155                 160

Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln
                165                 170                 175

Pro Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala
            180                 185                 190

Thr
```

<210>  247
<211>  737
<212>  PRT
<213>  Unknown

<220>
<223>  antigenic unit

<220>
<221>  SITE
<222>  (1)..(737)
<223>  VB2050

<400>  247

```
Lys Met Phe Asp Ala Tyr Val Asn Thr Phe Ser Ser Thr Phe Asn Val
1               5                   10                  15

Arg Val Tyr Ser Thr Gly Ser Asn Val Phe Gln Thr Arg Ala Gly Gly
            20                  25                  30

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

Ser Ile Ala Ile Pro Thr Asn Phe Thr Ile Ser Val Thr Thr Glu Ile
    50                  55                  60

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Thr Ala Asn Pro Lys Thr
65                  70                  75                  80

Pro Lys Tyr Lys Phe Val Arg Ile Gln Pro Gly Gln Thr Phe Phe Val
                85                  90                  95

Asn Glu Phe Tyr Ala Tyr Leu Arg Lys His Phe Ser Met Met Gly Gly
            100                 105                 110

Gly Gly Ser Gly Gly Gly Gly Ser Thr Val Tyr Thr Lys Val Asp Gly
        115                 120                 125

Val Asp Val Glu Leu Phe Glu Asn Lys Thr Thr Leu Pro Val Asn Val
    130                 135                 140

Ala Phe Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Tyr Phe Ile Lys
145                 150                 155                 160

Gly Leu Asn Asn Leu Asn Arg Gly Met Val Leu Tyr Leu Asn Thr Leu
                165                 170                 175

Thr Leu Ala Val Pro Tyr Asn Met Arg Val Gly Gly Gly Gly Ser Gly
            180                 185                 190

Gly Gly Gly Ser Leu Val Lys Pro Ser Phe Tyr Val Tyr Ser Arg Val
        195                 200                 205

Lys Asn Leu Val Gln Gln Glu Ser Pro Phe Val Met Met Ser Ala Pro
    210                 215                 220

Pro Ala Gln Tyr Glu Leu Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly
225                 230                 235                 240

Met Leu Ser Asp Thr Leu Lys Asn Leu Ser Asp Arg Val Val Phe Val
                245                 250                 255
```

```
Leu Trp Ala His Gly Phe Glu Leu Ser Gly Gly Gly Gly Ser Gly Gly
            260                 265                 270

Gly Gly His Phe Ala Ile Gly Leu Ala Leu Tyr Tyr Pro Ser Ala Arg
        275                 280                 285

Ile Val Tyr Thr Ala Cys Ser His Ala Ala Val Gly Gly Gly Gly Ser
    290                 295                 300

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

Val Thr Leu Ala Leu Met Ile Glu Arg Phe Val Ser Leu Ala Ile Asp
                325                 330                 335

Ala Tyr Pro Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Arg Ala Met
            340                 345                 350

Pro Asn Met Leu Arg Ile Met Ala Ser Leu Val Leu Met Val Tyr Met
        355                 360                 365

Pro Ala Ser Trp Val Met Arg Ile Met Thr Trp Gly Gly Gly Gly Ser
    370                 375                 380

Gly Gly Gly Gly Ser Val Gln Met Ala Pro Ile Ser Ala Met Val Arg
385                 390                 395                 400

Met Tyr Ile Phe Phe Ala Ser Phe Tyr Tyr Val Trp Lys Ser Tyr Val
                405                 410                 415

His Val Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Arg Val Trp Thr
            420                 425                 430

Leu Met Asn Val Leu Thr Leu Val Tyr Lys Val Phe Ala Tyr Ala Asn
        435                 440                 445

Arg Asn Arg Phe Leu Tyr Ile Ile Lys Leu Ser Gly Gly Gly Gly Ser
    450                 455                 460

Gly Gly Gly Gly Ala Gln Phe Ala Pro Ser Ala Ser Ala Phe Phe Gly
465                 470                 475                 480

Met Ser Arg Ile Glu Ile Val Asp Thr Val Ser Ala Leu Val Tyr Asp
                485                 490                 495

Asn Lys Leu Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Leu Leu
            500                 505                 510

Met Pro Ile Leu Thr Leu Thr Arg Ala Leu Thr Ala Tyr Thr Val Glu
```

```
        515                 520                 525

Leu Gly Thr Glu Val Asn Glu Phe Ala Cys Val Gly Gly Gly Gly Ser
    530                 535                 540

Gly Gly Gly Gly Ser Phe Leu Asn Arg Phe Thr Thr Thr Leu Asn Asp
545                 550                 555                 560

Phe Asn Leu Val Ala Met Ser Ser Val Glu Leu Lys His Phe Phe Phe
                565                 570                 575

Ala Gln Asp Gly Asn Ala Ala Ile Ser Gly Gly Gly Gly Ser Gly Gly
            580                 585                 590

Gly Gly Ser Ser Gly Asp Ala Thr Thr Ala Tyr Ala Asn Ser Val Phe
        595                 600                 605

Asn Ile Cys Gln Ala Val Thr Ala Asn Val Asn Ala Leu Leu Ser Gly
    610                 615                 620

Gly Gly Gly Ser Gly Gly Gly Gly His Val Ile Ser Thr Ser His Lys
625                 630                 635                 640

Leu Val Leu Ser Val Asn Pro Tyr Val Ala Ser Ile Lys Asn Phe Lys
                645                 650                 655

Ser Val Leu Tyr Tyr Gln Asn Asn Val Phe Met Gly Gly Gly Gly Ser
            660                 665                 670

Gly Gly Gly Gly Ser Met Thr Tyr Arg Arg Leu Ile Ser Met Met Gly
        675                 680                 685

Phe Lys Met Asn Tyr Gln Val Asn Gly Tyr Pro Asn Met Phe Gly Gly
    690                 695                 700

Gly Gly Ser Gly Gly Gly Gly Gly Ser Phe Gly Asp Asp Thr Val Ile Glu
705                 710                 715                 720

Val Gln Gly Tyr Lys Ser Val Asn Ile Thr Phe Glu Leu Asp Glu Arg
                725                 730                 735

Ile
```

<210> 248
<211> 1273
<212> PRT
<213> Unknown

<220>

<223>  antigenic unit

<220>
<221>  SITE
<222>  (1)..(1273)
<223>  VB2051

<400>  248

```
Met Phe Val Phe Leu Val Leu Leu Pro Leu Val Ser Ser Gln Cys Val
1               5                   10                  15


Asn Leu Thr Thr Arg Thr Gln Leu Pro Pro Ala Tyr Thr Asn Ser Phe
            20                  25                  30


Thr Arg Gly Val Tyr Tyr Pro Asp Lys Val Phe Arg Ser Ser Val Leu
        35                  40                  45


His Ser Thr Gln Asp Leu Phe Leu Pro Phe Phe Ser Asn Val Thr Trp
    50                  55                  60


Phe His Ala Ile His Val Ser Gly Thr Asn Gly Thr Lys Arg Phe Asp
65                  70                  75                  80


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


Lys Ser Asn Ile Ile Arg Gly Trp Ile Phe Gly Thr Thr Leu Asp Ser
            100                 105                 110


Lys Thr Gln Ser Leu Leu Ile Val Asn Asn Ala Thr Asn Val Val Ile
        115                 120                 125


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


Tyr His Lys Asn Asn Lys Ser Trp Met Glu Ser Glu Phe Arg Val Tyr
145                 150                 155                 160


Ser Ser Ala Asn Asn Cys Thr Phe Glu Tyr Val Ser Gln Pro Phe Leu
                165                 170                 175


Met Asp Leu Glu Gly Lys Gln Gly Asn Phe Lys Asn Leu Arg Glu Phe
            180                 185                 190


Val Phe Lys Asn Ile Asp Gly Tyr Phe Lys Ile Tyr Ser Lys His Thr
        195                 200                 205


Pro Ile Asn Leu Val Arg Asp Leu Pro Gln Gly Phe Ser Ala Leu Glu
    210                 215                 220
```

```
Pro Leu Val Asp Leu Pro Ile Gly Ile Asn Ile Thr Arg Phe Gln Thr
225                 230                 235                 240

Leu Leu Ala Leu His Arg Ser Tyr Leu Thr Pro Gly Asp Ser Ser Ser
                245                 250                 255

Gly Trp Thr Ala Gly Ala Ala Ala Tyr Tyr Val Gly Tyr Leu Gln Pro
            260                 265                 270

Arg Thr Phe Leu Leu Lys Tyr Asn Glu Asn Gly Thr Ile Thr Asp Ala
        275                 280                 285

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

Ser Phe Thr Val Glu Lys Gly Ile Tyr Gln Thr Ser Asn Phe Arg Val
305                 310                 315                 320

Gln Pro Thr Glu Ser Ile Val Arg Phe Pro Asn Ile Thr Asn Leu Cys
                325                 330                 335

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

Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser Val Leu
        355                 360                 365

Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser Pro
    370                 375                 380

Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp Ser Phe
385                 390                 395                 400

Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro Gly Gln Thr Gly
                405                 410                 415

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

Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys Val Gly Gly Asn
        435                 440                 445

Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys Pro Phe
    450                 455                 460

Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr Pro Cys
465                 470                 475                 480
```

```
Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser Tyr Gly
                485                 490                 495

Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val Val Val
            500                 505                 510

Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val Cys Gly Pro Lys
        515                 520                 525

Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn Phe Asn Phe Asn
    530                 535                 540

Gly Leu Thr Gly Thr Gly Val Leu Thr Glu Ser Asn Lys Lys Phe Leu
545                 550                 555                 560

Pro Phe Gln Gln Phe Gly Arg Asp Ile Ala Asp Thr Thr Asp Ala Val
                565                 570                 575

Arg Asp Pro Gln Thr Leu Glu Ile Leu Asp Ile Thr Pro Cys Ser Phe
            580                 585                 590

Gly Gly Val Ser Val Ile Thr Pro Gly Thr Asn Thr Ser Asn Gln Val
        595                 600                 605

Ala Val Leu Tyr Gln Asp Val Asn Cys Thr Glu Val Pro Val Ala Ile
    610                 615                 620

His Ala Asp Gln Leu Thr Pro Thr Trp Arg Val Tyr Ser Thr Gly Ser
625                 630                 635                 640

Asn Val Phe Gln Thr Arg Ala Gly Cys Leu Ile Gly Ala Glu His Val
                645                 650                 655

Asn Asn Ser Tyr Glu Cys Asp Ile Pro Ile Gly Ala Gly Ile Cys Ala
            660                 665                 670

Ser Tyr Gln Thr Gln Thr Asn Ser Pro Arg Arg Ala Arg Ser Val Ala
        675                 680                 685

Ser Gln Ser Ile Ile Ala Tyr Thr Met Ser Leu Gly Ala Glu Asn Ser
    690                 695                 700

Val Ala Tyr Ser Asn Asn Ser Ile Ala Ile Pro Thr Asn Phe Thr Ile
705                 710                 715                 720

Ser Val Thr Thr Glu Ile Leu Pro Val Ser Met Thr Lys Thr Ser Val
                725                 730                 735

Asp Cys Thr Met Tyr Ile Cys Gly Asp Ser Thr Glu Cys Ser Asn Leu
```

```
            740                 745                 750

Leu Leu Gln Tyr Gly Ser Phe Cys Thr Gln Leu Asn Arg Ala Leu Thr
        755                 760                 765

Gly Ile Ala Val Glu Gln Asp Lys Asn Thr Gln Glu Val Phe Ala Gln
    770                 775                 780

Val Lys Gln Ile Tyr Lys Thr Pro Pro Ile Lys Asp Phe Gly Gly Phe
785                 790                 795                 800

Asn Phe Ser Gln Ile Leu Pro Asp Pro Ser Lys Pro Ser Lys Arg Ser
                805                 810                 815

Phe Ile Glu Asp Leu Leu Phe Asn Lys Val Thr Leu Ala Asp Ala Gly
            820                 825                 830

Phe Ile Lys Gln Tyr Gly Asp Cys Leu Gly Asp Ile Ala Ala Arg Asp
        835                 840                 845

Leu Ile Cys Ala Gln Lys Phe Asn Gly Leu Thr Val Leu Pro Pro Leu
    850                 855                 860

Leu Thr Asp Glu Met Ile Ala Gln Tyr Thr Ser Ala Leu Leu Ala Gly
865                 870                 875                 880

Thr Ile Thr Ser Gly Trp Thr Phe Gly Ala Gly Ala Ala Leu Gln Ile
                885                 890                 895

Pro Phe Ala Met Gln Met Ala Tyr Arg Phe Asn Gly Ile Gly Val Thr
            900                 905                 910

Gln Asn Val Leu Tyr Glu Asn Gln Lys Leu Ile Ala Asn Gln Phe Asn
        915                 920                 925

Ser Ala Ile Gly Lys Ile Gln Asp Ser Leu Ser Ser Thr Ala Ser Ala
    930                 935                 940

Leu Gly Lys Leu Gln Asp Val Val Asn Gln Asn Ala Gln Ala Leu Asn
945                 950                 955                 960

Thr Leu Val Lys Gln Leu Ser Ser Asn Phe Gly Ala Ile Ser Ser Val
                965                 970                 975

Leu Asn Asp Ile Leu Ser Arg Leu Asp Lys Val Glu Ala Glu Val Gln
            980                 985                 990

Ile Asp Arg Leu Ile Thr Gly Arg  Leu Gln Ser Leu Gln  Thr Tyr Val
        995                 1000                1005
```

```
Thr Gln  Gln Leu Ile Arg Ala  Ala Glu Ile Arg Ala  Ser Ala Asn
    1010                1015                1020

Leu Ala  Ala Thr Lys Met Ser  Glu Cys Val Leu Gly  Gln Ser Lys
    1025                1030                1035

Arg Val  Asp Phe Cys Gly Lys  Gly Tyr His Leu Met  Ser Phe Pro
    1040                1045                1050

Gln Ser  Ala Pro His Gly Val  Val Phe Leu His Val  Thr Tyr Val
    1055                1060                1065

Pro Ala  Gln Glu Lys Asn Phe  Thr Thr Ala Pro Ala  Ile Cys His
    1070                1075                1080

Asp Gly  Lys Ala His Phe Pro  Arg Glu Gly Val Phe  Val Ser Asn
    1085                1090                1095

Gly Thr  His Trp Phe Val Thr  Gln Arg Asn Phe Tyr  Glu Pro Gln
    1100                1105                1110

Ile Ile  Thr Thr Asp Asn Thr  Phe Val Ser Gly Asn  Cys Asp Val
    1115                1120                1125

Val Ile  Gly Ile Val Asn Asn  Thr Val Tyr Asp Pro  Leu Gln Pro
    1130                1135                1140

Glu Leu  Asp Ser Phe Lys Glu  Glu Leu Asp Lys Tyr  Phe Lys Asn
    1145                1150                1155

His Thr  Ser Pro Asp Val Asp  Leu Gly Asp Ile Ser  Gly Ile Asn
    1160                1165                1170

Ala Ser  Val Val Asn Ile Gln  Lys Glu Ile Asp Arg  Leu Asn Glu
    1175                1180                1185

Val Ala  Lys Asn Leu Asn Glu  Ser Leu Ile Asp Leu  Gln Glu Leu
    1190                1195                1200

Gly Lys  Tyr Glu Gln Tyr Ile  Lys Trp Pro Trp Tyr  Ile Trp Leu
    1205                1210                1215

Gly Phe  Ile Ala Gly Leu Ile  Ala Ile Val Met Val  Thr Ile Met
    1220                1225                1230

Leu Cys  Cys Met Thr Ser Cys  Cys Ser Cys Leu Lys  Gly Cys Cys
    1235                1240                1245
```

Ser Cys  Gly Ser Cys Cys Lys  Phe Asp Glu Asp Asp  Ser Glu Pro
    1250                1255                1260


Val Leu  Lys Gly Val Lys Leu  His Tyr Thr
    1265                1270


<210>  249
<211>  49
<212>  PRT
<213>  Unknown

<220>
<223>  Alternative HR2 domain


<220>
<221>  SITE
<222>  (1)..(49)
<223>  HR2

<400>  249

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


Ile Gln Lys Glu Ile Asp Arg Leu Asn Glu Val Ala Lys Asn Leu Asn
            20                  25                  30


Glu Ser Leu Ile Asp Leu Gln Glu Leu Gly Lys Tyr Glu Gln Tyr Ile
        35                  40                  45


Lys



<210>  250
<211>  796
<212>  PRT
<213>  Unknown

<220>
<223>  antigenic unit


<220>
<221>  SITE
<222>  (1)..(796)
<223>  VB2053

<400>  250

Lys Met Phe Asp Ala Tyr Val Asn Thr Phe Ser Ser Thr Phe Asn Val
1               5                   10                  15


Arg Val Tyr Ser Thr Gly Ser Asn Val Phe Gln Thr Arg Ala Gly Gly
            20                  25                  30

```
Ser Ser Gly Gly Gly Ser Ser Gly Gly Ser Val Ala Tyr Ser Asn Asn
        35                  40                  45

Ser Ile Ala Ile Pro Thr Asn Phe Thr Ile Ser Val Thr Thr Glu Ile
    50                  55                  60

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Thr Ala Asn Pro Lys Thr
65                  70                  75                  80

Pro Lys Tyr Lys Phe Val Arg Ile Gln Pro Gly Gln Thr Phe Phe Val
                85                  90                  95

Asn Glu Phe Tyr Ala Tyr Leu Arg Lys His Phe Ser Met Met Gly Gly
            100                 105                 110

Gly Gly Ser Gly Gly Gly Gly Ser Thr Val Tyr Thr Lys Val Asp Gly
        115                 120                 125

Val Asp Val Glu Leu Phe Glu Asn Lys Thr Thr Leu Pro Val Asn Val
    130                 135                 140

Ala Phe Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Tyr Phe Ile Lys
145                 150                 155                 160

Gly Leu Asn Asn Leu Asn Arg Gly Met Val Leu Tyr Leu Asn Thr Leu
                165                 170                 175

Thr Leu Ala Val Pro Tyr Asn Met Arg Val Gly Gly Gly Gly Ser Gly
            180                 185                 190

Gly Gly Gly Ser Leu Val Lys Pro Ser Phe Tyr Val Tyr Ser Arg Val
        195                 200                 205

Lys Asn Leu Val Gln Gln Glu Ser Pro Phe Val Met Met Ser Ala Pro
    210                 215                 220

Pro Ala Gln Tyr Glu Leu Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly
225                 230                 235                 240

Met Leu Ser Asp Thr Leu Lys Asn Leu Ser Asp Arg Val Val Phe Val
                245                 250                 255

Leu Trp Ala His Gly Phe Glu Leu Ser Gly Gly Gly Gly Ser Gly Gly
            260                 265                 270

Gly Gly His Phe Ala Ile Gly Leu Ala Leu Tyr Tyr Pro Ser Ala Arg
        275                 280                 285

Ile Val Tyr Thr Ala Cys Ser His Ala Ala Val Gly Gly Gly Gly Ser
```

```
    290                 295                 300

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

Val Thr Leu Ala Leu Met Ile Glu Arg Phe Val Ser Leu Ala Ile Asp
                325                 330                 335

Ala Tyr Pro Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Arg Ala Met
            340                 345                 350

Pro Asn Met Leu Arg Ile Met Ala Ser Leu Val Leu Met Val Tyr Met
        355                 360                 365

Pro Ala Ser Trp Val Met Arg Ile Met Thr Trp Gly Gly Gly Gly Ser
    370                 375                 380

Gly Gly Gly Gly Ser Val Gln Met Ala Pro Ile Ser Ala Met Val Arg
385                 390                 395                 400

Met Tyr Ile Phe Phe Ala Ser Phe Tyr Tyr Val Trp Lys Ser Tyr Val
                405                 410                 415

His Val Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Arg Val Trp Thr
            420                 425                 430

Leu Met Asn Val Leu Thr Leu Val Tyr Lys Val Phe Ala Tyr Ala Asn
        435                 440                 445

Arg Asn Arg Phe Leu Tyr Ile Ile Lys Leu Ser Gly Gly Gly Gly Ser
    450                 455                 460

Gly Gly Gly Gly Ala Gln Phe Ala Pro Ser Ala Ser Ala Phe Phe Gly
465                 470                 475                 480

Met Ser Arg Ile Glu Ile Val Asp Thr Val Ser Ala Leu Val Tyr Asp
                485                 490                 495

Asn Lys Leu Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Leu Leu
            500                 505                 510

Met Pro Ile Leu Thr Leu Thr Arg Ala Leu Thr Ala Tyr Thr Val Glu
        515                 520                 525

Leu Gly Thr Glu Val Asn Glu Phe Ala Cys Val Gly Gly Gly Gly Ser
    530                 535                 540

Gly Gly Gly Gly Ser Phe Leu Asn Arg Phe Thr Thr Thr Leu Asn Asp
545                 550                 555                 560
```

```
Phe Asn Leu Val Ala Met Ser Ser Val Glu Leu Lys His Phe Phe Phe
                565                 570                 575

Ala Gln Asp Gly Asn Ala Ala Ile Ser Gly Gly Gly Gly Ser Gly Gly
            580                 585                 590

Gly Gly Ser Ser Gly Asp Ala Thr Thr Ala Tyr Ala Asn Ser Val Phe
        595                 600                 605

Asn Ile Cys Gln Ala Val Thr Ala Asn Val Asn Ala Leu Leu Ser Gly
    610                 615                 620

Gly Gly Gly Ser Gly Gly Gly Gly His Val Ile Ser Thr Ser His Lys
625                 630                 635                 640

Leu Val Leu Ser Val Asn Pro Tyr Val Ala Ser Ile Lys Asn Phe Lys
                645                 650                 655

Ser Val Leu Tyr Tyr Gln Asn Asn Val Phe Met Gly Gly Gly Gly Ser
            660                 665                 670

Gly Gly Gly Gly Ser Met Thr Tyr Arg Arg Leu Ile Ser Met Met Gly
        675                 680                 685

Phe Lys Met Asn Tyr Gln Val Asn Gly Tyr Pro Asn Met Phe Gly Gly
    690                 695                 700

Gly Gly Ser Gly Gly Gly Gly Ser Phe Gly Asp Asp Thr Val Ile Glu
705                 710                 715                 720

Val Gln Gly Tyr Lys Ser Val Asn Ile Thr Phe Glu Leu Asp Glu Arg
                725                 730                 735

Ile Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Asp Val Asp Leu Gly
            740                 745                 750

Asp Ile Ser Gly Ile Asn Ala Ser Val Val Asn Ile Gln Lys Glu Ile
        755                 760                 765

Asp Arg Leu Asn Glu Val Ala Lys Asn Leu Asn Glu Ser Leu Ile Asp
    770                 775                 780

Leu Gln Glu Leu Gly Lys Tyr Glu Gln Tyr Ile Lys
785                 790                 795
```

<210>  251
<211>  999
<212>  PRT

<213>  Unknown

<220>
<223>  antigenic unit


<220>
<221>  SITE
<222>  (1)..(999)
<223>  VB2054

<400>  251

```
Asp Val Asp Leu Gly Asp Ile Ser Gly Ile Asn Ala Ser Val Val Asn
1               5                   10                  15


Ile Gln Lys Glu Ile Asp Arg Leu Asn Glu Val Ala Lys Asn Leu Asn
            20                  25                  30


Glu Ser Leu Ile Asp Leu Gln Glu Leu Gly Lys Tyr Glu Gln Tyr Ile
        35                  40                  45


Lys Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Lys Met Phe Asp Ala
    50                  55                  60


Tyr Val Asn Thr Phe Ser Ser Thr Phe Asn Val Arg Val Tyr Ser Thr
65                  70                  75                  80


Gly Ser Asn Val Phe Gln Thr Arg Ala Gly Gly Ser Ser Gly Gly Gly
                85                  90                  95


Ser Ser Gly Gly Ser Val Ala Tyr Ser Asn Asn Ser Ile Ala Ile Pro
            100                 105                 110


Thr Asn Phe Thr Ile Ser Val Thr Thr Glu Ile Gly Gly Gly Gly Ser
        115                 120                 125


Gly Gly Gly Gly Ser Thr Ala Asn Pro Lys Thr Pro Lys Tyr Lys Phe
    130                 135                 140


Val Arg Ile Gln Pro Gly Gln Thr Phe Phe Val Asn Glu Phe Tyr Ala
145                 150                 155                 160


Tyr Leu Arg Lys His Phe Ser Met Met Gly Gly Gly Gly Ser Gly Gly
                165                 170                 175


Gly Gly Ser Thr Val Tyr Thr Lys Val Asp Gly Val Asp Val Glu Leu
            180                 185                 190


Phe Glu Asn Lys Thr Thr Leu Pro Val Asn Val Ala Phe Gly Gly Gly
        195                 200                 205
```

```
Gly Ser Gly Gly Gly Gly Ser Tyr Phe Ile Lys Gly Leu Asn Asn Leu
    210                 215                 220

Asn Arg Gly Met Val Leu Tyr Leu Asn Thr Leu Thr Leu Ala Val Pro
225                 230                 235                 240

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

Val Lys Pro Ser Phe Tyr Val Tyr Ser Arg Val Lys Asn Leu Val Gln
            260                 265                 270

Gln Glu Ser Pro Phe Val Met Met Ser Ala Pro Pro Ala Gln Tyr Glu
        275                 280                 285

Leu Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Met Leu Ser Asp Thr
    290                 295                 300

Leu Lys Asn Leu Ser Asp Arg Val Val Phe Val Leu Trp Ala His Gly
305                 310                 315                 320

Phe Glu Leu Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly His Phe Ala
                325                 330                 335

Ile Gly Leu Ala Leu Tyr Tyr Pro Ser Ala Arg Ile Val Tyr Thr Ala
            340                 345                 350

Cys Ser His Ala Ala Val Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
        355                 360                 365

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

Met Ile Glu Arg Phe Val Ser Leu Ala Ile Asp Ala Tyr Pro Gly Gly
385                 390                 395                 400

Gly Gly Ser Gly Gly Gly Gly Ser Arg Ala Met Pro Asn Met Leu Arg
                405                 410                 415

Ile Met Ala Ser Leu Val Leu Met Val Tyr Met Pro Ala Ser Trp Val
            420                 425                 430

Met Arg Ile Met Thr Trp Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
        435                 440                 445

Val Gln Met Ala Pro Ile Ser Ala Met Val Arg Met Tyr Ile Phe Phe
    450                 455                 460

Ala Ser Phe Tyr Tyr Val Trp Lys Ser Tyr Val His Val Gly Gly Gly
```

```
465                 470                 475                 480

Gly Ser Gly Gly Gly Gly Ser Arg Val Trp Thr Leu Met Asn Val Leu
                485                 490                 495

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

Tyr Ile Ile Lys Leu Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ala
        515                 520                 525

Gln Phe Ala Pro Ser Ala Ser Ala Phe Phe Gly Met Ser Arg Ile Glu
    530                 535                 540

Ile Val Asp Thr Val Ser Ala Leu Val Tyr Asp Asn Lys Leu Ser Gly
545                 550                 555                 560

Gly Gly Gly Ser Gly Gly Gly Gly Ser Leu Leu Met Pro Ile Leu Thr
                565                 570                 575

Leu Thr Arg Ala Leu Thr Ala Tyr Thr Val Glu Leu Gly Thr Glu Val
            580                 585                 590

Asn Glu Phe Ala Cys Val Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
        595                 600                 605

Phe Leu Asn Arg Phe Thr Thr Thr Leu Asn Asp Phe Asn Leu Val Ala
    610                 615                 620

Met Ser Ser Val Glu Leu Lys His Phe Phe Phe Ala Gln Asp Gly Asn
625                 630                 635                 640

Ala Ala Ile Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Ser Gly
                645                 650                 655

Asp Ala Thr Thr Ala Tyr Ala Asn Ser Val Phe Asn Ile Cys Gln Ala
            660                 665                 670

Val Thr Ala Asn Val Asn Ala Leu Leu Ser Gly Gly Gly Gly Ser Gly
        675                 680                 685

Gly Gly Gly His Val Ile Ser Thr Ser His Lys Leu Val Leu Ser Val
    690                 695                 700

Asn Pro Tyr Val Ala Ser Ile Lys Asn Phe Lys Ser Val Leu Tyr Tyr
705                 710                 715                 720

Gln Asn Asn Val Phe Met Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
                725                 730                 735
```

```
Met Thr Tyr Arg Arg Leu Ile Ser Met Met Gly Phe Lys Met Asn Tyr
            740                 745                 750

Gln Val Asn Gly Tyr Pro Asn Met Phe Gly Gly Gly Gly Ser Gly Gly
        755                 760                 765

Gly Gly Ser Phe Gly Asp Asp Thr Val Ile Glu Val Gln Gly Tyr Lys
    770                 775                 780

Ser Val Asn Ile Thr Phe Glu Leu Asp Glu Arg Ile Gly Gly Gly Gly
785                 790                 795                 800

Ser Gly Gly Gly Gly Ser Asn Ile Thr Asn Leu Cys Pro Phe Gly Glu
                805                 810                 815

Val Phe Asn Ala Thr Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys
            820                 825                 830

Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala
        835                 840                 845

Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser Pro Thr Lys Leu Asn
    850                 855                 860

Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp Ser Phe Val Ile Arg Gly
865                 870                 875                 880

Asp Glu Val Arg Gln Ile Ala Pro Gly Gln Thr Gly Lys Ile Ala Asp
                885                 890                 895

Tyr Asn Tyr Lys Leu Pro Asp Asp Phe Thr Gly Cys Val Ile Ala Trp
            900                 905                 910

Asn Ser Asn Asn Leu Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu
        915                 920                 925

Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp Ile
    930                 935                 940

Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr Pro Cys Asn Gly Val Glu
945                 950                 955                 960

Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr
                965                 970                 975

Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu
            980                 985                 990
```

Leu Leu His Ala Pro Ala Thr
995

<210> 252
<211> 1305
<212> DNA
<213> Artificial sequence

<220>
<223> VB construct

<400> 252
atgcaggtct ccactgctgc ccttgccgtc ctcctctgca ccatggctct ctgcaaccag 60

gtcctctctg caccacttgc tgctgacacg ccgaccgcct gctgcttcag ctacacctcc 120

cgacagattc cacagaattt catagctgac tactttgaga cgagcagcca gtgctccaag 180

cccagtgtca tcttcctaac caagagaggc cggcaggtct gtgctgaccc cagtgaggag 240

tgggtccaga aatacgtcag tgacctggag ctgagtgccg agctcaaaac cccacttggt 300

gacacaactc acacagagcc caaatcttgt gacacacctc ccccgtgccc aaggtgccca 360

ggcggtggaa gcagcggagg tggaagtgga ggacagcccc gagaaccaca ggtgtacacc 420

ctgcccccat cccgggagga gatgaccaag aaccaggtca gcctgacctg cctggtcaaa 480

ggcttctacc ccagcgacat cgccgtggag tgggagagca gcgggcagcc ggagaacaac 540

tacaacacca cgcctcccat gctggactcc gacggctcct tcttcctcta cagcaagctc 600

accgtggaca agagcaggtg gcagcagggg aacatcttct catgctccgt gatgcatgag 660

gctctgcaca accgcttcac gcagaagagc ctctccctgt ctccgggtaa aggcctcggt 720

ggcctgaata ttactaacct gtgcccattc ggcgaggtgt tcaacgcaac ccggtttgca 780

agcgtgtacg catggaacag aaagcggatt agcaactgcg tcgccgacta cagcgtgctc 840

tacaacagcg catcattctc cacattcaag tgttacggag tgtcacccac taagctgaac 900

gacctctgct tcacaaatgt ctacgccgat tccttcgtga tccggggaga tgaagtcagg 960

cagattgcac caggacagac tggcaaaatc gctgactaca actataagct gccagacgat 1020

ttcactggct gcgtgattgc atggaacagc aataacctgg actcaaaggt cggcggtaat 1080

tataactacc tgtatcggct gttcagaaag agcaacctga agcccttcga gcgggacatc 1140

tccaccgaaa tctaccaggc aggctcaaca ccctgcaacg gagtggaagg cttcaactgc 1200

tatttccccc tgcagtctta cggttttcag ccaacaaacg gtgtgggcta tcagccatac 1260

agggtggtcg tgctgagctt cgaactgctc catgcccccg ctaca 1305

<210> 253
<211> 435
<212> PRT
<213> Artificial sequence

<220>

<223> VB construct

<400> 253

```
Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1               5                   10                  15


Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
            20                  25                  30


Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
        35                  40                  45


Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
    50                  55                  60


Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65                  70                  75                  80


Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
                85                  90                  95


Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
            100                 105                 110


Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
        115                 120                 125


Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140


Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160


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


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


Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205


Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220


Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240


Gly Leu Asn Ile Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala
```

```
                245                 250                 255

Thr Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn
            260                 265                 270

Cys Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr
        275                 280                 285

Phe Lys Cys Tyr Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe
    290                 295                 300

Thr Asn Val Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg
305                 310                 315                 320

Gln Ile Ala Pro Gly Gln Thr Gly Lys Ile Ala Asp Tyr Asn Tyr Lys
                325                 330                 335

Leu Pro Asp Asp Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn
            340                 345                 350

Leu Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe
        355                 360                 365

Arg Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile
    370                 375                 380

Tyr Gln Ala Gly Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys
385                 390                 395                 400

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

Tyr Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala
            420                 425                 430

Pro Ala Thr
        435


<210>  254
<211>  1395
<212>  DNA
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  254
atgcaggtct ccactgctgc ccttgccgtc ctcctctgca ccatggctct ctgcaaccag       60

gtcctctctg caccacttgc tgctgacacg ccgaccgcct gctgcttcag ctacacctcc      120

cgacagattc cacagaattt catagctgac tactttgaga cgagcagcca gtgctccaag      180
```

```
cccagtgtca tcttcctaac caagagaggc cggcaggtct gtgctgaccc cagtgaggag      240

tgggtccaga aatacgtcag tgacctggag ctgagtgccg agctcaaaac cccacttggt      300

gacacaactc acacagagcc caaatcttgt gacacacctc ccccgtgccc aaggtgccca      360

ggcggtggaa gcagcggagg tggaagtgga ggacagcccc gagaaccaca ggtgtacacc      420

ctgcccccat cccgggagga gatgaccaag aaccaggtca gcctgacctg cctggtcaaa      480

ggcttctacc ccagcgacat cgccgtggag tgggagagca gcgggcagcc ggagaacaac      540

tacaacacca cgcctcccat gctggactcc gacggctcct tcttcctcta cagcaagctc      600

accgtggaca agagcaggtg gcagcagggg aacatcttct catgctccgt gatgcatgag      660

gctctgcaca accgcttcac gcagaagagc ctctccctgt ctccgggtaa aggcctcggt      720

ggcctgcgag tccagcccac agaatcaatc gtgcggtttc caaacatcac caatctctgc      780

cccttcggag aagtgtttaa tgccacacgg tttgcctcag tgtatgcctg gaaccggaag      840

agaatctcca actgcgtggc agactattct gtgctgtaca acagcgcctc cttctctact      900

ttcaagtgct acggcgtgtc tcctactaag ctgaacgatc tctgcttcac aaacgtgtat      960

gccgattcct ttgtgatcag aggagacgaa gtgcgacaga ttgctcctgg acagaccggg     1020

aagattgccg actacaacta taagctgcca gacgatttca ctggctgcgt tattgcctgg     1080

aattcaaaca acctcgattc caaagtgggc gggaattata actacctcta tagactgttc     1140

cgtaagtcta acctgaagcc attcgagcgt gatattagca ccgaaatcta ccaggcaggt     1200

tcaactcctt gtaacggagt ggagggattc aactgctact tcccactgca gtcctatggg     1260

ttccagccta caaacggagt ggggtaccag ccttatcggg tcgttgtgct gtcctttgag     1320

ctgctccacg ctcctgcaac tgtttgcgga cctaagaaat ccaccaacct ggtgaagaac     1380

aagtgcgtga atttc                                                      1395
```

<210>  255
<211>  465
<212>  PRT
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  255

```
Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1               5                   10                  15


Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
            20                  25                  30


Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
        35                  40                  45
```

```
Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
    50                  55                  60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65                  70                  75                  80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
                85                  90                  95

Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
            100                 105                 110

Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
        115                 120                 125

Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160

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

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

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

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

Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala
            260                 265                 270

Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp
        275                 280                 285

Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr
    290                 295                 300
```

```
Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr
305                 310                 315                 320

Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro
                325                 330                 335

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

Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys
        355                 360                 365

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

Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly
385                 390                 395                 400

Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu
                405                 410                 415

Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr
            420                 425                 430

Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val
        435                 440                 445

Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn
    450                 455                 460

Phe
465
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<210>  256
<211>  4311
<212>  DNA
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  256

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cgacagattc cacagaattt catagctgac tactttgaga cgagcagcca gtgctccaag      180

cccagtgtca tcttcctaac caagagaggc cggcaggtct gtgctgaccc cagtgaggag      240

tgggtccaga aatacgtcag tgacctggag ctgagtgccg agctcaaaac cccacttggt      300

gacacaactc acacagagcc caaatcttgt gacacacctc ccccgtgccc aaggtgccca      360
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ggcggtggaa gcagcggagg tggaagtgga ggacagcccc gagaaccaca ggtgtacacc 420

ctgcccccat cccgggagga gatgaccaag aaccaggtca gcctgacctg cctggtcaaa 480

ggcttctacc ccagcgacat cgccgtggag tgggagagca gcgggcagcc ggagaacaac 540

tacaacacca cgcctcccat gctggactcc gacggctcct tcttcctcta cagcaagctc 600

accgtggaca agagcaggtg gcagcagggg aacatcttct catgctccgt gatgcatgag 660

gctctgcaca accgcttcac gcagaagagc ctctccctgt ctccgggtaa aggcctcggt 720

ggcctggtga acctgacaac cagaacccag ctgcctcctg cttataccaa tagttttact 780

cggggcgtct actaccctga caaagtgttt cggagcagtg tgctgcatag cacccaggac 840

ctgttcctcc ccttcttcag taatgtcact tggttccatg caatccacgt gtcaggtact 900

aatggtacaa aaaggttcga caacccagtt ctgcccttca atgacggcgt ttacttcgcc 960

agtaccgaaa agtctaatat cattcgtggt tggatcttcg gaacaaccct ggacagtaag 1020

acccagtctc tgctcattgt taataacgcc acaaatgtcg tgatcaaagt ttgtgaattt 1080

cagttttgta acgatccatt cctgggcgtc tactaccata agaataataa gagctggatg 1140

gaaagcgagt ttcgagtcta cagcagtgcc aataattgta cattcgagta cgtttctcag 1200

cctttcctga tggacctgga gggcaagcag ggaaatttca aaaatctccg tgaatttgtc 1260

tttaagaata ttgacggcta cttcaaaatc tacagcaagc acaccccgat taatctggtt 1320

cgagacctgc cacagggctt cagtgcactg gagcccctgg ttgatctgcc aatcggaatt 1380

aatatcacta ggttccagac cctgctggca ctgcatcgta gttacctcac acctggggat 1440

tctagttccg gctggactgc tggggcagcc gcctactatg tgggatatct ccagcctcgc 1500

acatttctgc tgaagtataa tgagaacggt actattaccg acgcagtgga ctgtgcactc 1560

gacccactga gtgagactaa atgcaccctc aaaagtttca ccgtcgagaa gggtatctac 1620

cagacatcca atttccgcgt gcagcctact gagtccatcg tgcgcttccc aaatatcacc 1680

aatctgtgcc cattcggtga agttttcaat gctactcgct ttgctagtgt ttacgcatgg 1740

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ttttctactt ttaaatgtta cggcgttagt cctaccaaac tgaacgacct ctgtttcacc 1860

aacgtctacg ctgactcttt cgtcatccgg ggcgatgaag ttcgacagat cgccccaggc 1920

cagacaggaa agatcgcaga ctacaattac aagctgccag atgacttcac cggctgcgtt 1980

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caggccggaa gcacaccgtg caatggagtc gaagggttca attgttactt tccgctccag 2160

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gacgccgtcc gggatcccca gacactggaa atcctcgaca tcacaccatg tagctttggg 2460

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cgcgtgtact ccacaggatc taacgtgttc cagacacgtg ccggctgcct gattggggct 2640

gagcacgtca acaattctta cgagtgtgac attcccatcg gagccggaat ctgtgcttct 2700

taccagaccc agacaaactc tccttcagga gccggatccg ttgcttctca gtcaatcatc 2760

gcctatacta tgagcctggg tgccgaaaac tctgttgctt attctaacaa tagcattgct 2820

atcccgacca atttcaccat ctctgtcacc actgagatcc tgccagtctc catgaccaag 2880

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aagcggagtt tcattgagga tctgctcttc aacaaggtca ccctcgctga cgctggcttc 3180

attaagcagt acggagactg tctgggggac atcgcagcaa gagacctgat ctgcgcccag 3240

aagttcaacg gactgacagt cctgccgccc ctgctcactg atgaaatgat cgcccagtat 3300

acaagtgctc tgctcgccgg aaccatcact tccgggtgga ccttcggagc aggcgcagcc 3360

ctgcagatcc ctttcgccat gcagatggcc taccggttca atggcatcgg cgtgacccag 3420

aatgtcctgt atgagaatca gaagctgatc gcaaatcagt tcaacagcgc catcggaaaa 3480

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cagaatgctc aggctctcaa cactctggtt aaacagctca gcagcaattt cggtgccatt 3600

agctccgtcc tgaatgacat cctcagccgt ctcgatccac cggaagctga agtccagatc 3660

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ctgggacagt ccaagagagt tgatttctgc gggaagggct atcatctcat gtctttccca 3840

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aactttacca ccgctccagc catttgtcat gacggcaaag cccattttcc gcgcgaagga 3960

gttttcgtca gcaatgggac tcactggttt gtcactcagc gcaatttcta tgaaccacag 4020

attattacaa ccgataatac cttcgtcagt ggtaattgtg acgtagtgat cggcatcgtt 4080

aacaatacag tctatgatcc gctgcagcct gagctcgaca gcttcaagga ggagctggac 4140

aagtacttca agaaccacac cagccctgac gtggatctcg gcgacatttc tggcattaat 4200

gcctctgtcg tcaatatcca gaaggaaatc gaccgactga atgaagtcgc aaagaatctg 4260

aacgagagtc tgattgatct gcaggagctg ggaaaatacg aacagtacat c 4311

<210> 257
<211> 1437
<212> PRT
<213> Artificial sequence

<220>
<223> VB construct

<400> 257

Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
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Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
20 25 30

Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
35 40 45

Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
50 55 60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65 70 75 80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
85 90 95

Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
100 105 110

Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
115 120 125

Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
130 135 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145 150 155 160

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

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

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
195 200 205

```
Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

Gly Leu Val Asn Leu Thr Thr Arg Thr Gln Leu Pro Pro Ala Tyr Thr
                245                 250                 255

Asn Ser Phe Thr Arg Gly Val Tyr Tyr Pro Asp Lys Val Phe Arg Ser
            260                 265                 270

Ser Val Leu His Ser Thr Gln Asp Leu Phe Leu Pro Phe Phe Ser Asn
        275                 280                 285

Val Thr Trp Phe His Ala Ile His Val Ser Gly Thr Asn Gly Thr Lys
    290                 295                 300

Arg Phe Asp Asn Pro Val Leu Pro Phe Asn Asp Gly Val Tyr Phe Ala
305                 310                 315                 320

Ser Thr Glu Lys Ser Asn Ile Ile Arg Gly Trp Ile Phe Gly Thr Thr
                325                 330                 335

Leu Asp Ser Lys Thr Gln Ser Leu Leu Ile Val Asn Asn Ala Thr Asn
            340                 345                 350

Val Val Ile Lys Val Cys Glu Phe Gln Phe Cys Asn Asp Pro Phe Leu
        355                 360                 365

Gly Val Tyr Tyr His Lys Asn Asn Lys Ser Trp Met Glu Ser Glu Phe
    370                 375                 380

Arg Val Tyr Ser Ser Ala Asn Asn Cys Thr Phe Glu Tyr Val Ser Gln
385                 390                 395                 400

Pro Phe Leu Met Asp Leu Glu Gly Lys Gln Gly Asn Phe Lys Asn Leu
                405                 410                 415

Arg Glu Phe Val Phe Lys Asn Ile Asp Gly Tyr Phe Lys Ile Tyr Ser
            420                 425                 430

Lys His Thr Pro Ile Asn Leu Val Arg Asp Leu Pro Gln Gly Phe Ser
        435                 440                 445

Ala Leu Glu Pro Leu Val Asp Leu Pro Ile Gly Ile Asn Ile Thr Arg
    450                 455                 460

Phe Gln Thr Leu Leu Ala Leu His Arg Ser Tyr Leu Thr Pro Gly Asp
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465                 470                 475                 480

Ser Ser Ser Gly Trp Thr Ala Gly Ala Ala Ala Tyr Tyr Val Gly Tyr
                485                 490                 495

Leu Gln Pro Arg Thr Phe Leu Leu Lys Tyr Asn Glu Asn Gly Thr Ile
            500                 505                 510

Thr Asp Ala Val Asp Cys Ala Leu Asp Pro Leu Ser Glu Thr Lys Cys
        515                 520                 525

Thr Leu Lys Ser Phe Thr Val Glu Lys Gly Ile Tyr Gln Thr Ser Asn
    530                 535                 540

Phe Arg Val Gln Pro Thr Glu Ser Ile Val Arg Phe Pro Asn Ile Thr
545                 550                 555                 560

Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala Ser
                565                 570                 575

Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr
            580                 585                 590

Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr Gly
        595                 600                 605

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

Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro Gly
625                 630                 635                 640

Gln Thr Gly Lys Ile Ala Asp Tyr Asn Tyr Lys Leu Pro Asp Asp Phe
                645                 650                 655

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

Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu
        675                 680                 685

Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser
    690                 695                 700

Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln
705                 710                 715                 720

Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg
                725                 730                 735
```

```
Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val Cys
            740                 745                 750

Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn Phe
        755                 760                 765

Asn Phe Asn Gly Leu Thr Gly Thr Gly Val Leu Thr Glu Ser Asn Lys
    770                 775                 780

Lys Phe Leu Pro Phe Gln Gln Phe Gly Arg Asp Ile Ala Asp Thr Thr
785                 790                 795                 800

Asp Ala Val Arg Asp Pro Gln Thr Leu Glu Ile Leu Asp Ile Thr Pro
                805                 810                 815

Cys Ser Phe Gly Gly Val Ser Val Ile Thr Pro Gly Thr Asn Thr Ser
            820                 825                 830

Asn Gln Val Ala Val Leu Tyr Gln Asp Val Asn Cys Thr Glu Val Pro
        835                 840                 845

Val Ala Ile His Ala Asp Gln Leu Thr Pro Thr Trp Arg Val Tyr Ser
    850                 855                 860

Thr Gly Ser Asn Val Phe Gln Thr Arg Ala Gly Cys Leu Ile Gly Ala
865                 870                 875                 880

Glu His Val Asn Asn Ser Tyr Glu Cys Asp Ile Pro Ile Gly Ala Gly
                885                 890                 895

Ile Cys Ala Ser Tyr Gln Thr Gln Thr Asn Ser Pro Ser Gly Ala Gly
            900                 905                 910

Ser Val Ala Ser Gln Ser Ile Ile Ala Tyr Thr Met Ser Leu Gly Ala
        915                 920                 925

Glu Asn Ser Val Ala Tyr Ser Asn Asn Ser Ile Ala Ile Pro Thr Asn
    930                 935                 940

Phe Thr Ile Ser Val Thr Thr Glu Ile Leu Pro Val Ser Met Thr Lys
945                 950                 955                 960

Thr Ser Val Asp Cys Thr Met Tyr Ile Cys Gly Asp Ser Thr Glu Cys
                965                 970                 975

Ser Asn Leu Leu Leu Gln Tyr Gly Ser Phe Cys Thr Gln Leu Asn Arg
            980                 985                 990
```

```
Ala Leu Thr Gly Ile Ala Val Glu  Gln Asp Lys Asn Thr  Gln Glu Val
        995                 1000                1005


Phe Ala  Gln Val Lys Gln Ile  Tyr Lys Thr Pro Pro  Ile Lys Asp
    1010                1015                1020


Phe Gly  Gly Phe Asn Phe Ser  Gln Ile Leu Pro Asp  Pro Ser Lys
    1025                1030                1035


Pro Ser  Lys Arg Ser Phe Ile  Glu Asp Leu Leu Phe  Asn Lys Val
    1040                1045                1050


Thr Leu  Ala Asp Ala Gly Phe  Ile Lys Gln Tyr Gly  Asp Cys Leu
    1055                1060                1065


Gly Asp  Ile Ala Ala Arg Asp  Leu Ile Cys Ala Gln  Lys Phe Asn
    1070                1075                1080


Gly Leu  Thr Val Leu Pro Pro  Leu Leu Thr Asp Glu  Met Ile Ala
    1085                1090                1095


Gln Tyr  Thr Ser Ala Leu Leu  Ala Gly Thr Ile Thr  Ser Gly Trp
    1100                1105                1110


Thr Phe  Gly Ala Gly Ala Ala  Leu Gln Ile Pro Phe  Ala Met Gln
    1115                1120                1125


Met Ala  Tyr Arg Phe Asn Gly  Ile Gly Val Thr Gln  Asn Val Leu
    1130                1135                1140


Tyr Glu  Asn Gln Lys Leu Ile  Ala Asn Gln Phe Asn  Ser Ala Ile
    1145                1150                1155


Gly Lys  Ile Gln Asp Ser Leu  Ser Ser Thr Ala Ser  Ala Leu Gly
    1160                1165                1170


Lys Leu  Gln Asp Val Val Asn  Gln Asn Ala Gln Ala  Leu Asn Thr
    1175                1180                1185


Leu Val  Lys Gln Leu Ser Ser  Asn Phe Gly Ala Ile  Ser Ser Val
    1190                1195                1200


Leu Asn  Asp Ile Leu Ser Arg  Leu Asp Pro Pro Glu  Ala Glu Val
    1205                1210                1215


Gln Ile  Asp Arg Leu Ile Thr  Gly Arg Leu Gln Ser  Leu Gln Thr
    1220                1225                1230
```

```
Tyr Val  Thr Gln Gln Leu Ile  Arg Ala Ala Glu Ile  Arg Ala Ser
    1235                1240                1245

Ala Asn  Leu Ala Ala Thr Lys  Met Ser Glu Cys Val  Leu Gly Gln
    1250                1255                1260

Ser Lys  Arg Val Asp Phe Cys  Gly Lys Gly Tyr His  Leu Met Ser
    1265                1270                1275

Phe Pro  Gln Ser Ala Pro His  Gly Val Val Phe Leu  His Val Thr
    1280                1285                1290

Tyr Val  Pro Ala Gln Glu Lys  Asn Phe Thr Thr Ala  Pro Ala Ile
    1295                1300                1305

Cys His  Asp Gly Lys Ala His  Phe Pro Arg Glu Gly  Val Phe Val
    1310                1315                1320

Ser Asn  Gly Thr His Trp Phe  Val Thr Gln Arg Asn  Phe Tyr Glu
    1325                1330                1335

Pro Gln  Ile Ile Thr Thr Asp  Asn Thr Phe Val Ser  Gly Asn Cys
    1340                1345                1350

Asp Val  Val Ile Gly Ile Val  Asn Asn Thr Val Tyr  Asp Pro Leu
    1355                1360                1365

Gln Pro  Glu Leu Asp Ser Phe  Lys Glu Glu Leu Asp  Lys Tyr Phe
    1370                1375                1380

Lys Asn  His Thr Ser Pro Asp  Val Asp Leu Gly Asp  Ile Ser Gly
    1385                1390                1395

Ile Asn  Ala Ser Val Val Asn  Ile Gln Lys Glu Ile  Asp Arg Leu
    1400                1405                1410

Asn Glu  Val Ala Lys Asn Leu  Asn Glu Ser Leu Ile  Asp Leu Gln
    1415                1420                1425

Glu Leu  Gly Lys Tyr Glu Gln  Tyr Ile
    1430                1435
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<210>  258
<211>  2133
<212>  DNA
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  258

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gtcctctctg caccacttgc tgctgacacg ccgaccgcct gctgcttcag ctacacctcc      120

cgacagattc cacagaattt catagctgac tactttgaga cgagcagcca gtgctccaag      180

cccagtgtca tcttcctaac caagagaggc cggcaggtct gtgctgaccc cagtgaggag      240

tgggtccaga aatacgtcag tgacctggag ctgagtgccg agctcaaaac cccacttggt      300

gacacaactc acacagagcc caaatcttgt gacacacctc ccccgtgccc aaggtgccca      360

ggcggtggaa gcagcggagg tggaagtgga ggacagcccc gagaaccaca ggtgtacacc      420

ctgcccccat cccgggagga gatgaccaag aaccaggtca gcctgacctg cctggtcaaa      480

ggcttctacc ccagcgacat cgccgtggag tgggagagca gcgggcagcc ggagaacaac      540

tacaacacca cgcctcccat gctggactcc gacggctcct tcttcctcta cagcaagctc      600

accgtggaca agagcaggtg gcagcagggg aacatcttct catgctccgt gatgcatgag      660

gctctgcaca accgcttcac gcagaagagc ctctccctgt ctccgggtaa aggcctcggt      720

ggcctgatga cttatcgcag actgatctcc atgatggggt tcaagatgaa ctaccaggtc      780

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gggtcatact ttattaaggg cctgaataac ctcaacaggg ggatggtgct gtatctcaac     1020

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gcacacggtt tcgagctgtc agggggtgga gggtctggcg gaggcgggca tttcgccatc     1200

ggtctcgccc tgtattaccc ttccgcacgg atcgtctata ctgcctgttc ccatgcagca     1260

gtcgggggtg gagggtccgg cggaggtggc tccaggtctt ttattgagga cctcctgttc     1320

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ccaggtggcg gagggtcagg tggaggcggg tcccgggcta tgcccaacat gctgagaatc     1440

atggcatctc tggtgctcat ggtgtacatg cctgcaagct gggtcatgcg aattatgaca     1500

tgggggggag gcggtagcgg tggcggaggc tcaagagtct ggacactcat gaacgtgctg     1560

actctcgtgt acaaagtgtt tgcttacgcc aatcgcaaca ggtttctgta cattatcaag     1620

ctctccggtg gcggaggttc cgggggaggg ggcgcccagt tcgctccatc cgcctcagca     1680

ttcttcggta tgagtcggat cgagattgtc gataccgtgt ctgcactggt ctatgacaat     1740

aagctgagcg gaggtggtgg gtccggcggt ggggggttcc tgaacaggtt cacaaccact     1800

ctcaacgact ttaatctggt cgccatgtca agcgtcgaac tcaagcattt cttctttgcc     1860

caggatggca acgcagctat ctccggtgga ggaggtagtg gcggcggtgg atcttccggc     1920

gatgctacca ccgcctacgc taattccgtg tttaacattt gccaggctgt gactgctaac     1980
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gtgaatgcac tgctgtctgg tggcgggggc agcgggggcg ggggtactgc caaccctaag 2040

actcccaagt acaaattcgt ccgcatccag cctggccaga ctttcttcgt gaacgagttt 2100

tacgcttatc tgcggaagca ctttagcatg atg 2133

<210> 259
<211> 711
<212> PRT
<213> Artificial sequence

<220>
<223> VB construct

<400> 259

Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1 5 10 15

Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
20 25 30

Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
35 40 45

Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
50 55 60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65 70 75 80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
85 90 95

Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
100 105 110

Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
115 120 125

Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
130 135 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145 150 155 160

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

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

```
Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

Gly Leu Met Thr Tyr Arg Arg Leu Ile Ser Met Met Gly Phe Lys Met
                245                 250                 255

Asn Tyr Gln Val Asn Gly Tyr Pro Asn Met Phe Gly Gly Gly Gly Ser
            260                 265                 270

Gly Gly Gly Gly Ser His Val Ile Ser Thr Ser His Lys Leu Val Leu
        275                 280                 285

Ser Val Asn Pro Tyr Val Ala Ser Ile Lys Asn Phe Lys Ser Val Leu
    290                 295                 300

Tyr Tyr Gln Asn Asn Val Phe Met Gly Gly Gly Gly Ser Gly Gly Gly
305                 310                 315                 320

Gly Ser Tyr Phe Ile Lys Gly Leu Asn Asn Leu Asn Arg Gly Met Val
                325                 330                 335

Leu Tyr Leu Asn Thr Leu Thr Leu Ala Val Pro Tyr Asn Met Arg Val
            340                 345                 350

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Met Leu Ser Asp Thr Leu
        355                 360                 365

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

Glu Leu Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly His Phe Ala Ile
385                 390                 395                 400

Gly Leu Ala Leu Tyr Tyr Pro Ser Ala Arg Ile Val Tyr Thr Ala Cys
                405                 410                 415

Ser His Ala Ala Val Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Arg
            420                 425                 430

Ser Phe Ile Glu Asp Leu Leu Phe Asn Lys Val Thr Leu Ala Leu Met
        435                 440                 445
```

```
Ile Glu Arg Phe Val Ser Leu Ala Ile Asp Ala Tyr Pro Gly Gly Gly
    450                 455                 460

Gly Ser Gly Gly Gly Gly Ser Arg Ala Met Pro Asn Met Leu Arg Ile
465                 470                 475                 480

Met Ala Ser Leu Val Leu Met Val Tyr Met Pro Ala Ser Trp Val Met
                485                 490                 495

Arg Ile Met Thr Trp Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Arg
            500                 505                 510

Val Trp Thr Leu Met Asn Val Leu Thr Leu Val Tyr Lys Val Phe Ala
        515                 520                 525

Tyr Ala Asn Arg Asn Arg Phe Leu Tyr Ile Ile Lys Leu Ser Gly Gly
    530                 535                 540

Gly Gly Ser Gly Gly Gly Gly Ala Gln Phe Ala Pro Ser Ala Ser Ala
545                 550                 555                 560

Phe Phe Gly Met Ser Arg Ile Glu Ile Val Asp Thr Val Ser Ala Leu
                565                 570                 575

Val Tyr Asp Asn Lys Leu Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly
            580                 585                 590

Phe Leu Asn Arg Phe Thr Thr Thr Leu Asn Asp Phe Asn Leu Val Ala
        595                 600                 605

Met Ser Ser Val Glu Leu Lys His Phe Phe Phe Ala Gln Asp Gly Asn
    610                 615                 620

Ala Ala Ile Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Ser Gly
625                 630                 635                 640

Asp Ala Thr Thr Ala Tyr Ala Asn Ser Val Phe Asn Ile Cys Gln Ala
                645                 650                 655

Val Thr Ala Asn Val Asn Ala Leu Leu Ser Gly Gly Gly Gly Ser Gly
            660                 665                 670

Gly Gly Gly Thr Ala Asn Pro Lys Thr Pro Lys Tyr Lys Phe Val Arg
        675                 680                 685

Ile Gln Pro Gly Gln Thr Phe Phe Val Asn Glu Phe Tyr Ala Tyr Leu
    690                 695                 700

Arg Lys His Phe Ser Met Met
```

705 710

<210> 260
<211> 1911
<212> DNA
<213> Artificial sequence

<220>
<223> VB construct

<400> 260
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gtccagctca ctcagagccc cgcctctctg gcagtgagcc tggggcagag agctactatt 120

agctgcaggg ctagtaaaag cgtgtcaacc agcggttatt catacatgca ttggtatcag 180

cagaaacccg gtcagccacc taagctcctc atctacctca cttccaacct ggaatctggt 240

gtgccagcac gcttttcagg ctccggaagt ggcacagact tcaccctgaa tatccaccca 300

gtggaagaag aggacgccgc tacatactat tgtcagcaca gccgggaact gccatggact 360

tttggtgggg gcactaagct ggagattaag agaggggggtg gaggttctgg cggaggggt 420

tcaggaggag gcgggtccca ggtccagctc cagcagtctg gtccagacct cgtgaaacct 480

ggtgcttcag tcaccatcag ttgcaaagct agtggctatg ctttctcaag tagctggatg 540

agctggctca aacagcgtcc cggcaaagga ctggagtgga ttgggtggat cttcccaaga 600

gacggtgaca ccaactataa cggtaaattc aaggggaaag ccactctgac cgccgacaag 660

tcaagcagta cagcttatat gcagctcagt agcctcacta gtgaggacag cgccgtgtat 720

ttttgcgcaa ggaggggcga ctatcactat gggatggact attggggaca gggcacctct 780

gtcaccgtga gttctgagct gaaaaccccc ctcggtgaca ctactcacac cgaacccaaa 840

tcctgtgaca cccctccccc ttgccctcgc tgtcctggtg gtggcagttc agggggtggg 900

agcgggggcc agcctagaga gccacaggtc tatacactcc ctccctctag agaagagatg 960

accaaaaatc aggtgtcact gacatgcctg gtcaagggtt tctacccaag cgacattgca 1020

gtggaatggg agtcaagtgg ccagccagag aacaattata acactacacc tccaatgctc 1080

gacagcgatg gtagtttctt tctctattcc aagctgacag tcgacaaatc tagatggcag 1140

cagggcaata tcttcagctg ttcagtgatg catgaggccc tgcacaaccg gttcactcag 1200

aagagcctgt cactctcccc cgggaagggc ctcggaggtc tgagggtcca gcctactgaa 1260

tccatcgtcc ggttcccaaa tattaccaac ctctgccctt tcggagaggt cttcaatgcc 1320

acacgctttg ccagtgtcta tgcctggaat cgcaagagga ttagtaactg cgtggcagac 1380

tatagtgtgc tgtacaactc agcttctttc tcaacattca aatgctatgg agtgtcacca 1440

accaaactca acgatctgtg cttcactaat gtctatgctg actcctttgt cattaggggg 1500

gatgaggtcc gccagattgc ccctggtcag accgggaaga ttgccgacta taactataag 1560

ctcccagatg acttcactgg ctgcgtgatc gcctggaata gcaacaacct cgattccaag 1620

gtgggcggca attacaacta cctctataga ctgtttcgaa agagtaatct caaaccattt 1680

gagcgggaca tcagcacaga aatctatcag gctggatcta caccttgcaa cggcgtcgaa 1740

gggttcaact gttacttccc actccagtct tacggttttc agcccactaa cggggtgggg 1800

taccagccct atcgggtggt cgtcctgagt ttcgaactcc tgcacgcccc cgcaacagtc 1860

tgcgggccca aaaagtccac taacctggtg aagaacaagt gcgtgaactt c 1911

<210> 261
<211> 637
<212> PRT
<213> Artificial sequence

<220>
<223> VB construct

<400> 261

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

Val Gln Cys Gln Val Gln Leu Thr Gln Ser Pro Ala Ser Leu Ala Val
20 25 30

Ser Leu Gly Gln Arg Ala Thr Ile Ser Cys Arg Ala Ser Lys Ser Val
35 40 45

Ser Thr Ser Gly Tyr Ser Tyr Met His Trp Tyr Gln Gln Lys Pro Gly
50 55 60

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

Val Pro Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu
85 90 95

Asn Ile His Pro Val Glu Glu Glu Asp Ala Ala Thr Tyr Tyr Cys Gln
100 105 110

His Ser Arg Glu Leu Pro Trp Thr Phe Gly Gly Gly Thr Lys Leu Glu
115 120 125

Ile Lys Arg Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly
130 135 140

Gly Ser Gln Val Gln Leu Gln Gln Ser Gly Pro Asp Leu Val Lys Pro
145 150 155 160

Gly Ala Ser Val Thr Ile Ser Cys Lys Ala Ser Gly Tyr Ala Phe Ser
165 170 175

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Ser Ser Trp Met Ser Trp Leu Lys Gln Arg Pro Gly Lys Gly Leu Glu
            180                 185                 190

Trp Ile Gly Trp Ile Phe Pro Arg Asp Gly Asp Thr Asn Tyr Asn Gly
        195                 200                 205

Lys Phe Lys Gly Lys Ala Thr Leu Thr Ala Asp Lys Ser Ser Ser Thr
    210                 215                 220

Ala Tyr Met Gln Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr
225                 230                 235                 240

Phe Cys Ala Arg Arg Gly Asp Tyr His Tyr Gly Met Asp Tyr Trp Gly
                245                 250                 255

Gln Gly Thr Ser Val Thr Val Ser Ser Glu Leu Lys Thr Pro Leu Gly
            260                 265                 270

Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr Pro Pro Pro Cys
        275                 280                 285

Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly Ser Gly Gly Gln
    290                 295                 300

Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met
305                 310                 315                 320

Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro
                325                 330                 335

Ser Asp Ile Ala Val Glu Trp Glu Ser Ser Gly Gln Pro Glu Asn Asn
            340                 345                 350

Tyr Asn Thr Thr Pro Pro Met Leu Asp Ser Asp Gly Ser Phe Phe Leu
        355                 360                 365

Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Ile
    370                 375                 380

Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn Arg Phe Thr Gln
385                 390                 395                 400

Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly Gly Leu Arg Val
                405                 410                 415

Gln Pro Thr Glu Ser Ile Val Arg Phe Pro Asn Ile Thr Asn Leu Cys
            420                 425                 430
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```
Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala Ser Val Tyr Ala
        435                 440                 445

Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser Val Leu
    450                 455                 460

Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser Pro
465                 470                 475                 480

Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp Ser Phe
                485                 490                 495

Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro Gly Gln Thr Gly
            500                 505                 510

Lys Ile Ala Asp Tyr Asn Tyr Lys Leu Pro Asp Asp Phe Thr Gly Cys
        515                 520                 525

Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys Val Gly Gly Asn
    530                 535                 540

Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys Pro Phe
545                 550                 555                 560

Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr Pro Cys
                565                 570                 575

Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser Tyr Gly
            580                 585                 590

Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val Val Val
        595                 600                 605

Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val Cys Gly Pro Lys
    610                 615                 620

Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn Phe
625                 630                 635
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<210>  262
<211>  4827
<212>  DNA
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  262
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tcatgcaggg cctctaaaag cgtgtcaact agcggatatt cctacatgca ttggtaccag 180

cagaaacccg gccagccacc taaactgctc atctatctca catccaacct ggaatccgga 240

gtgccagcca ggttcagtgg aagcggatcc ggtaccgact tcaccctgaa tatccaccca 300

gtcgaagagg aagatgcagc tacatattac tgccagcatt cacgggaact cccatggacc 360

tttggaggcg ggacaaaact ggaaatcaaa cggggcgggg gcggatctgg aggcggggga 420

agcgggggcg gaggtagtca ggtccagctc cagcagtcag gccctgacct cgtcaagccc 480

ggcgccagtg tcacaattag ttgcaaggct tccgggtacg cttttagctc ctcatggatg 540

tcctggctca agcagcgccc tggcaaaggc ctcgaatgga tcggctggat cttcccaagg 600

gacggcgata caaactataa tggcaagttt aaaggcaagg ccactctcac cgccgacaaa 660

tctagctcta ccgcatatat gcagctctct tccctgacct cagaagactc cgctgtctat 720

ttctgcgccc gaaggggaga ctaccactac gggatggatt actggggaca gggcaccagc 780

gtgacagtct ctagcgaact caagactcca ctgggcgata ccacccatac agagcctaag 840

agttgtgata ccccaccacc ctgcccacgg tgccctgggg gtggaagctc cgggggcggt 900

tccggtggac agcctcgtga accccaggtg tacaccctgc caccttcacg agaagagatg 960

acaaagaatc aggtctcact gacctgtctc gtcaaggggt tctacccttc agacattgca 1020

gtggagtggg agtcaagcgg acagcctgag aataactaca acaccacccc tccaatgctg 1080

gactctgatg gaagcttctt cctgtatagc aagctgactg tcgataaatc acgctggcag 1140

cagggcaata tcttcagttg ctcagtgatg cacgaagctc tgcacaatcg tttcactcag 1200

aaatctctct ctctgtcccc tggcaagggc ctcggtggcc tggtcaacct cactacaagg 1260

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cggggttgga tctttgggac tacactggat tccaaaactc agtctctcct cattgtcaat 1560

aatgcaacta atgttgttat taaggtctgt gagtttcagt tctgcaatga cccattcctg 1620

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ccaactgagt ctatcgtccg atttcctaac atcactaatc tctgtccatt tggcgaggtg 2220

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gtggctgatt attcagtcct gtacaacagc gccagttttt ctacttttaa atgctatgga 2340

gtgagtccca ccaagctgaa tgacctctgc ttcactaatg tttatgcaga ttcatttgtg 2400

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ggagtgggtt atcagcccta ccgcgtcgtg gtgctcagct ttgaactgct ccatgctcct 2760

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aactttaatg ggctgaccgg aacaggcgtc ctcacagaaa gcaacaaaaa attcctccct 2880

ttccagcagt tcggtaggga tatcgccgat acaaccgacg cagtgaggga tcctcagaca 2940

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ggggacatcg cagcccggga cctgatctgt gctcagaagt ttaacggtct gactgttctc 3780

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atggcctaca ggttcaatgg aatcggggtg acccagaatg tgctctacga aaatcagaag 3960

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gctagtgctc tcggaaaact gcaggacgtg gtgaaccaga acgctcaggc actgaacacc 4080

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cccgatgtgg acctcggaga tatctcagga attaatgcat ccgtcgtcaa catccagaag 4740

gagatcgatc ggctgaatga agttgctaaa aatctgaacg aatcactcat tgacctccag 4800

gaactcggca aatacgaaca gtacatt 4827

<210> 263
<211> 1609
<212> PRT
<213> Artificial sequence

<220>
<223> VB construct

<400> 263

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

Val Gln Cys Gln Val Gln Leu Thr Gln Ser Pro Ala Ser Leu Ala Val
20 25 30

Ser Leu Gly Gln Arg Ala Thr Ile Ser Cys Arg Ala Ser Lys Ser Val
35 40 45

Ser Thr Ser Gly Tyr Ser Tyr Met His Trp Tyr Gln Gln Lys Pro Gly
50 55 60

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

Val Pro Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu
85 90 95

Asn Ile His Pro Val Glu Glu Glu Asp Ala Ala Thr Tyr Tyr Cys Gln
100 105 110

```
His Ser Arg Glu Leu Pro Trp Thr Phe Gly Gly Gly Thr Lys Leu Glu
        115                 120                 125

Ile Lys Arg Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly
    130                 135                 140

Gly Ser Gln Val Gln Leu Gln Gln Ser Gly Pro Asp Leu Val Lys Pro
145                 150                 155                 160

Gly Ala Ser Val Thr Ile Ser Cys Lys Ala Ser Gly Tyr Ala Phe Ser
                165                 170                 175

Ser Ser Trp Met Ser Trp Leu Lys Gln Arg Pro Gly Lys Gly Leu Glu
            180                 185                 190

Trp Ile Gly Trp Ile Phe Pro Arg Asp Gly Asp Thr Asn Tyr Asn Gly
        195                 200                 205

Lys Phe Lys Gly Lys Ala Thr Leu Thr Ala Asp Lys Ser Ser Ser Thr
    210                 215                 220

Ala Tyr Met Gln Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr
225                 230                 235                 240

Phe Cys Ala Arg Arg Gly Asp Tyr His Tyr Gly Met Asp Tyr Trp Gly
                245                 250                 255

Gln Gly Thr Ser Val Thr Val Ser Ser Glu Leu Lys Thr Pro Leu Gly
            260                 265                 270

Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr Pro Pro Pro Cys
        275                 280                 285

Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly Ser Gly Gly Gln
    290                 295                 300

Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met
305                 310                 315                 320

Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro
                325                 330                 335

Ser Asp Ile Ala Val Glu Trp Glu Ser Ser Gly Gln Pro Glu Asn Asn
            340                 345                 350

Tyr Asn Thr Thr Pro Pro Met Leu Asp Ser Asp Gly Ser Phe Phe Leu
        355                 360                 365
```

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Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Ile
    370                 375                 380

Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn Arg Phe Thr Gln
385                 390                 395                 400

Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly Gly Leu Val Asn
                405                 410                 415

Leu Thr Thr Arg Thr Gln Leu Pro Pro Ala Tyr Thr Asn Ser Phe Thr
            420                 425                 430

Arg Gly Val Tyr Tyr Pro Asp Lys Val Phe Arg Ser Ser Val Leu His
        435                 440                 445

Ser Thr Gln Asp Leu Phe Leu Pro Phe Phe Ser Asn Val Thr Trp Phe
    450                 455                 460

His Ala Ile His Val Ser Gly Thr Asn Gly Thr Lys Arg Phe Asp Asn
465                 470                 475                 480

Pro Val Leu Pro Phe Asn Asp Gly Val Tyr Phe Ala Ser Thr Glu Lys
                485                 490                 495

Ser Asn Ile Ile Arg Gly Trp Ile Phe Gly Thr Thr Leu Asp Ser Lys
            500                 505                 510

Thr Gln Ser Leu Leu Ile Val Asn Asn Ala Thr Asn Val Val Ile Lys
        515                 520                 525

Val Cys Glu Phe Gln Phe Cys Asn Asp Pro Phe Leu Gly Val Tyr Tyr
    530                 535                 540

His Lys Asn Asn Lys Ser Trp Met Glu Ser Glu Phe Arg Val Tyr Ser
545                 550                 555                 560

Ser Ala Asn Asn Cys Thr Phe Glu Tyr Val Ser Gln Pro Phe Leu Met
                565                 570                 575

Asp Leu Glu Gly Lys Gln Gly Asn Phe Lys Asn Leu Arg Glu Phe Val
            580                 585                 590

Phe Lys Asn Ile Asp Gly Tyr Phe Lys Ile Tyr Ser Lys His Thr Pro
        595                 600                 605

Ile Asn Leu Val Arg Asp Leu Pro Gln Gly Phe Ser Ala Leu Glu Pro
    610                 615                 620
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```
Leu Val Asp Leu Pro Ile Gly Ile Asn Ile Thr Arg Phe Gln Thr Leu
625                 630                 635                 640

Leu Ala Leu His Arg Ser Tyr Leu Thr Pro Gly Asp Ser Ser Ser Gly
                645                 650                 655

Trp Thr Ala Gly Ala Ala Ala Tyr Tyr Val Gly Tyr Leu Gln Pro Arg
            660                 665                 670

Thr Phe Leu Leu Lys Tyr Asn Glu Asn Gly Thr Ile Thr Asp Ala Val
        675                 680                 685

Asp Cys Ala Leu Asp Pro Leu Ser Glu Thr Lys Cys Thr Leu Lys Ser
    690                 695                 700

Phe Thr Val Glu Lys Gly Ile Tyr Gln Thr Ser Asn Phe Arg Val Gln
705                 710                 715                 720

Pro Thr Glu Ser Ile Val Arg Phe Pro Asn Ile Thr Asn Leu Cys Pro
                725                 730                 735

Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala Ser Val Tyr Ala Trp
            740                 745                 750

Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser Val Leu Tyr
        755                 760                 765

Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser Pro Thr
    770                 775                 780

Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp Ser Phe Val
785                 790                 795                 800

Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro Gly Gln Thr Gly Lys
                805                 810                 815

Ile Ala Asp Tyr Asn Tyr Lys Leu Pro Asp Asp Phe Thr Gly Cys Val
            820                 825                 830

Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys Val Gly Gly Asn Tyr
        835                 840                 845

Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys Pro Phe Glu
    850                 855                 860

Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr Pro Cys Asn
865                 870                 875                 880

Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser Tyr Gly Phe
```

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               885                 890                 895

Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val Val Val Leu
            900                 905                 910

Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val Cys Gly Pro Lys Lys
        915                 920                 925

Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn Phe Asn Phe Asn Gly
    930                 935                 940

Leu Thr Gly Thr Gly Val Leu Thr Glu Ser Asn Lys Lys Phe Leu Pro
945                 950                 955                 960

Phe Gln Gln Phe Gly Arg Asp Ile Ala Asp Thr Thr Asp Ala Val Arg
                965                 970                 975

Asp Pro Gln Thr Leu Glu Ile Leu Asp Ile Thr Pro Cys Ser Phe Gly
            980                 985                 990

Gly Val Ser Val Ile Thr Pro Gly  Thr Asn Thr Ser Asn  Gln Val Ala
        995                 1000                1005

Val Leu  Tyr Gln Asp Val Asn  Cys Thr Glu Val Pro  Val Ala Ile
    1010                1015                1020

His Ala  Asp Gln Leu Thr Pro  Thr Trp Arg Val Tyr  Ser Thr Gly
    1025                1030                1035

Ser Asn  Val Phe Gln Thr Arg  Ala Gly Cys Leu Ile  Gly Ala Glu
    1040                1045                1050

His Val  Asn Asn Ser Tyr Glu  Cys Asp Ile Pro Ile  Gly Ala Gly
    1055                1060                1065

Ile Cys  Ala Ser Tyr Gln Thr  Gln Thr Asn Ser Pro  Ser Gly Ala
    1070                1075                1080

Gly Ser  Val Ala Ser Gln Ser  Ile Ile Ala Tyr Thr  Met Ser Leu
    1085                1090                1095

Gly Ala  Glu Asn Ser Val Ala  Tyr Ser Asn Asn Ser  Ile Ala Ile
    1100                1105                1110

Pro Thr  Asn Phe Thr Ile Ser  Val Thr Thr Glu Ile  Leu Pro Val
    1115                1120                1125

Ser Met  Thr Lys Thr Ser Val  Asp Cys Thr Met Tyr  Ile Cys Gly
    1130                1135                1140
```

```
Asp Ser  Thr Glu Cys Ser Asn  Leu Leu Leu Gln Tyr  Gly Ser Phe
    1145                1150                1155

Cys Thr  Gln Leu Asn Arg Ala  Leu Thr Gly Ile Ala  Val Glu Gln
    1160                1165                1170

Asp Lys  Asn Thr Gln Glu Val  Phe Ala Gln Val Lys  Gln Ile Tyr
    1175                1180                1185

Lys Thr  Pro Pro Ile Lys Asp  Phe Gly Gly Phe Asn  Phe Ser Gln
    1190                1195                1200

Ile Leu  Pro Asp Pro Ser Lys  Pro Ser Lys Arg Ser  Phe Ile Glu
    1205                1210                1215

Asp Leu  Leu Phe Asn Lys Val  Thr Leu Ala Asp Ala  Gly Phe Ile
    1220                1225                1230

Lys Gln  Tyr Gly Asp Cys Leu  Gly Asp Ile Ala Ala  Arg Asp Leu
    1235                1240                1245

Ile Cys  Ala Gln Lys Phe Asn  Gly Leu Thr Val Leu  Pro Pro Leu
    1250                1255                1260

Leu Thr  Asp Glu Met Ile Ala  Gln Tyr Thr Ser Ala  Leu Leu Ala
    1265                1270                1275

Gly Thr  Ile Thr Ser Gly Trp  Thr Phe Gly Ala Gly  Ala Ala Leu
    1280                1285                1290

Gln Ile  Pro Phe Ala Met Gln  Met Ala Tyr Arg Phe  Asn Gly Ile
    1295                1300                1305

Gly Val  Thr Gln Asn Val Leu  Tyr Glu Asn Gln Lys  Leu Ile Ala
    1310                1315                1320

Asn Gln  Phe Asn Ser Ala Ile  Gly Lys Ile Gln Asp  Ser Leu Ser
    1325                1330                1335

Ser Thr  Ala Ser Ala Leu Gly  Lys Leu Gln Asp Val  Val Asn Gln
    1340                1345                1350

Asn Ala  Gln Ala Leu Asn Thr  Leu Val Lys Gln Leu  Ser Ser Asn
    1355                1360                1365

Phe Gly  Ala Ile Ser Ser Val  Leu Asn Asp Ile Leu  Ser Arg Leu
    1370                1375                1380
```

```
Asp Pro  Pro Glu Ala Glu Val  Gln Ile Asp Arg Leu  Ile Thr Gly
    1385                1390                1395

Arg Leu  Gln Ser Leu Gln Thr  Tyr Val Thr Gln Gln  Leu Ile Arg
    1400                1405                1410

Ala Ala  Glu Ile Arg Ala Ser  Ala Asn Leu Ala Ala  Thr Lys Met
    1415                1420                1425

Ser Glu  Cys Val Leu Gly Gln  Ser Lys Arg Val Asp  Phe Cys Gly
    1430                1435                1440

Lys Gly  Tyr His Leu Met Ser  Phe Pro Gln Ser Ala  Pro His Gly
    1445                1450                1455

Val Val  Phe Leu His Val Thr  Tyr Val Pro Ala Gln  Glu Lys Asn
    1460                1465                1470

Phe Thr  Thr Ala Pro Ala Ile  Cys His Asp Gly Lys  Ala His Phe
    1475                1480                1485

Pro Arg  Glu Gly Val Phe Val  Ser Asn Gly Thr His  Trp Phe Val
    1490                1495                1500

Thr Gln  Arg Asn Phe Tyr Glu  Pro Gln Ile Ile Thr  Thr Asp Asn
    1505                1510                1515

Thr Phe  Val Ser Gly Asn Cys  Asp Val Val Ile Gly  Ile Val Asn
    1520                1525                1530

Asn Thr  Val Tyr Asp Pro Leu  Gln Pro Glu Leu Asp  Ser Phe Lys
    1535                1540                1545

Glu Glu  Leu Asp Lys Tyr Phe  Lys Asn His Thr Ser  Pro Asp Val
    1550                1555                1560

Asp Leu  Gly Asp Ile Ser Gly  Ile Asn Ala Ser Val  Val Asn Ile
    1565                1570                1575

Gln Lys  Glu Ile Asp Arg Leu  Asn Glu Val Ala Lys  Asn Leu Asn
    1580                1585                1590

Glu Ser  Leu Ile Asp Leu Gln  Glu Leu Gly Lys Tyr  Glu Gln Tyr
    1595                1600                1605

Ile
```

<210>  264
<211>  1500
<212>  DNA
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  264
atgcaggtct ccactgctgc ccttgccgtc ctcctctgca ccatggctct ctgcaaccag  60

gtcctctctg caccacttgc tgctgacacg ccgaccgcct gctgcttcag ctacacctcc  120

cgacagattc cacagaattt catagctgac tactttgaga cgagcagcca gtgctccaag  180

cccagtgtca tcttcctaac caagagaggc cggcaggtct gtgctgaccc cagtgaggag  240

tgggtccaga aatacgtcag tgacctggag ctgagtgccg agctcaaaac cccacttggt  300

gacacaactc acacagagcc caaatcttgt gacacacctc ccccgtgccc aaggtgccca  360

ggcggtggaa gcagcggagg tggaagtgga ggacagcccc gagaaccaca ggtgtacacc  420

ctgcccccat cccgggagga gatgaccaag aaccaggtca gcctgacctg cctggtcaaa  480

ggcttctacc ccagcgacat cgccgtggag tgggagagca gcgggcagcc ggagaacaac  540

tacaacacca cgcctcccat gctggactcc gacggctcct tcttcctcta cagcaagctc  600

accgtggaca agagcaggtg gcagcagggg aacatcttct catgctccgt gatgcatgag  660

gctctgcaca accgcttcac gcagaagagc ctctccctgt ctccgggtaa aggcctcggt  720

ggcctgcact ttgccatcgg actggccctc tactatccct ctgccagaat cgtgtacact  780

gcctgtagcc atgccgctgt gggtggcggg ggatcaggtg gcggagggtc ccgagtccag  840

cccacagaat caatcgtgcg gtttccaaac atcaccaatc tctgcccctt cggagaagtg  900

tttaatgcca cacggtttgc ctcagtgtat gcctggaacc ggaagagaat ctccaactgc  960

gtggcagact attctgtgct gtacaacagc gcctccttct ctactttcaa gtgctacggc  1020

gtgtctccta ctaagctgaa cgatctctgc ttcacaaacg tgtatgccga ttcctttgtg  1080

atcagaggag acgaagtgcg acagattgct cctggacaga ccgggaagat tgccgactac  1140

aactataagc tgccagacga tttcactggc tgcgttattg cctggaattc aaacaacctc  1200

gattccaaag tgggcgggaa ttataactac ctctatagac tgttccgtaa gtctaacctg  1260

aagccattcg agcgtgatat tagcaccgaa atctaccagg caggttcaac tccttgtaac  1320

ggagtggagg gattcaactg ctacttccca ctgcagtcct atgggttcca gcctacaaac  1380

ggagtggggt accagcctta tcgggtcgtt gtgctgtcct ttgagctgct ccacgctcct  1440

gcaactgttt gcggacctaa gaaatccacc aacctggtga agaacaagtg cgtgaatttc  1500

<210>  265
<211>  500
<212>  PRT
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  265

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Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1               5                   10                  15


Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
            20                  25                  30


Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
        35                  40                  45


Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
    50                  55                  60


Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65                  70                  75                  80


Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
                85                  90                  95


Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
            100                 105                 110


Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
        115                 120                 125


Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140


Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160


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


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


Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205


Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220


Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240
```

```
Gly Leu His Phe Ala Ile Gly Leu Ala Leu Tyr Tyr Pro Ser Ala Arg
                245                 250                 255

Ile Val Tyr Thr Ala Cys Ser His Ala Ala Val Gly Gly Gly Gly Ser
            260                 265                 270

Gly Gly Gly Gly Ser Arg Val Gln Pro Thr Glu Ser Ile Val Arg Phe
        275                 280                 285

Pro Asn Ile Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr
    290                 295                 300

Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys
305                 310                 315                 320

Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe
                325                 330                 335

Lys Cys Tyr Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr
            340                 345                 350

Asn Val Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln
        355                 360                 365

Ile Ala Pro Gly Gln Thr Gly Lys Ile Ala Asp Tyr Asn Tyr Lys Leu
    370                 375                 380

Pro Asp Asp Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu
385                 390                 395                 400

Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg
                405                 410                 415

Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr
            420                 425                 430

Gln Ala Gly Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr
        435                 440                 445

Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr
    450                 455                 460

Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro
465                 470                 475                 480

Ala Thr Val Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys
                485                 490                 495

Cys Val Asn Phe
```

500

<210> 266
<211> 1473
<212> DNA
<213> Artificial sequence

<220>
<223> VB construct

<400> 266
atgcaggtct ccactgctgc ccttgccgtc ctcctctgca ccatggctct ctgcaaccag 60

gtcctctctg caccacttgc tgctgacacg ccgaccgcct gctgcttcag ctacacctcc 120

cgacagattc cacagaattt catagctgac tactttgaga cgagcagcca gtgctccaag 180

cccagtgtca tcttcctaac caagagaggc cggcaggtct gtgctgaccc cagtgaggag 240

tgggtccaga aatacgtcag tgacctggag ctgagtgccg agctcaaaac cccacttggt 300

gacacaactc acacagagcc caaatcttgt gacacacctc ccccgtgccc aaggtgccca 360

ggcggtggaa gcagcggagg tggaagtgga ggacagcccc gagaaccaca ggtgtacacc 420

ctgcccccat cccgggagga gatgaccaag aaccaggtca gcctgacctg cctggtcaaa 480

ggcttctacc ccagcgacat cgccgtggag tgggagagca gcgggcagcc ggagaacaac 540

tacaacacca cgcctcccat gctggactcc gacggctcct tcttcctcta cagcaagctc 600

accgtggaca agagcaggtg gcagcagggg aacatcttct catgctccgt gatgcatgag 660

gctctgcaca accgcttcac gcagaagagc ctctccctgt ctccgggtaa aggcctcggt 720

ggcctgttcg tgaacgagtt ctacgcctat ctgagaaagc acttctccat gatgggggggc 780

ggaggtagtg gcggaggtgg ctcccgagtc cagcccacag aatcaatcgt gcggtttcca 840

aacatcacca atctctgccc cttcggagaa gtgtttaatg ccacacggtt tgcctcagtg 900

tatgcctgga accggaagag aatctccaac tgcgtggcag actattctgt gctgtacaac 960

agcgcctcct tctctacttt caagtgctac ggcgtgtctc ctactaagct gaacgatctc 1020

tgcttcacaa acgtgtatgc cgattccttt gtgatcagag gagacgaagt gcgacagatt 1080

gctcctggac agaccgggaa gattgccgac tacaactata agctgccaga cgatttcact 1140

ggctgcgtta ttgcctggaa ttcaaacaac ctcgattcca aagtgggcgg gaattataac 1200

tacctctata gactgttccg taagtctaac ctgaagccat tcgagcgtga tattagcacc 1260

gaaatctacc aggcaggttc aactccttgt aacggagtgg agggattcaa ctgctacttc 1320

ccactgcagt cctatgggtt ccagcctaca aacggagtgg ggtaccagcc ttatcgggtc 1380

gttgtgctgt cctttgagct gctccacgct cctgcaactg tttgcggacc taagaaatcc 1440

accaacctgg tgaagaacaa gtgcgtgaat ttc 1473

<210> 267
<211> 491

<212>  PRT
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  267

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Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1               5                   10                  15


Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
            20                  25                  30


Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
        35                  40                  45


Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
    50                  55                  60


Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65                  70                  75                  80


Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
                85                  90                  95


Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
            100                 105                 110


Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
        115                 120                 125


Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140


Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160


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


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


Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205


Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220


Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
```

```
225                 230                 235                 240

Gly Leu Phe Val Asn Glu Phe Tyr Ala Tyr Leu Arg Lys His Phe Ser
                245                 250                 255

Met Met Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Arg Val Gln Pro
            260                 265                 270

Thr Glu Ser Ile Val Arg Phe Pro Asn Ile Thr Asn Leu Cys Pro Phe
        275                 280                 285

Gly Glu Val Phe Asn Ala Thr Arg Phe Ala Ser Val Tyr Ala Trp Asn
    290                 295                 300

Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser Val Leu Tyr Asn
305                 310                 315                 320

Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser Pro Thr Lys
                325                 330                 335

Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp Ser Phe Val Ile
            340                 345                 350

Arg Gly Asp Glu Val Arg Gln Ile Ala Pro Gly Gln Thr Gly Lys Ile
        355                 360                 365

Ala Asp Tyr Asn Tyr Lys Leu Pro Asp Asp Phe Thr Gly Cys Val Ile
    370                 375                 380

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

Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys Pro Phe Glu Arg
                405                 410                 415

Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr Pro Cys Asn Gly
            420                 425                 430

Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser Tyr Gly Phe Gln
        435                 440                 445

Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val Val Val Leu Ser
    450                 455                 460

Phe Glu Leu Leu His Ala Pro Ala Thr Val Cys Gly Pro Lys Lys Ser
465                 470                 475                 480

Thr Asn Leu Val Lys Asn Lys Cys Val Asn Phe
                485                 490
```

<210> 268
<211> 1578
<212> DNA
<213> Artificial sequence

<220>
<223> VB construct

<400> 268
atgcaggtct ccactgctgc ccttgccgtc ctcctctgca ccatggctct ctgcaaccag 60

gtcctctctg caccacttgc tgctgacacg ccgaccgcct gctgcttcag ctacacctcc 120

cgacagattc cacagaattt catagctgac tactttgaga cgagcagcca gtgctccaag 180

cccagtgtca tcttcctaac caagagaggc cggcaggtct gtgctgaccc cagtgaggag 240

tgggtccaga aatacgtcag tgacctggag ctgagtgccg agctcaaaac cccacttggt 300

gacacaactc acacagagcc caaatcttgt gacacacctc ccccgtgccc aaggtgccca 360

ggcggtggaa gcagcggagg tggaagtgga ggacagcccc gagaaccaca ggtgtacacc 420

ctgcccccat cccgggagga gatgaccaag aaccaggtca gcctgacctg cctggtcaaa 480

ggcttctacc ccagcgacat cgccgtggag tgggagagca gcgggcagcc ggagaacaac 540

tacaacacca cgcctcccat gctggactcc gacggctcct tcttcctcta cagcaagctc 600

accgtggaca agagcaggtg gcagcagggg aacatcttct catgctccgt gatgcatgag 660

gctctgcaca accgcttcac gcagaagagc ctctccctgt ctccgggtaa aggcctcggt 720

ggcctgcact tcgcaatcgg gctcgcactg tactatccta gtgccaggat cgtgtatacc 780

gcttgtagtc acgcagctgt gggcggcgga ggttctggcg gtgggggatc tttcgtgaac 840

gagttctatg cttacctgcg caaacacttc tccatgatgg gcggtggagg gtctggcggg 900

ggaggctcac gggtccagcc tacagagtct attgtgcggt ttcccaatat caccaatctg 960

tgcccatttg gcgaggtgtt taacgcaacc aggttcgcct ctgtctatgc atggaatcgg 1020

aagcggatca gtaactgcgt cgctgattac tctgtcctgt ataacagcgc ctctttcagc 1080

acctttaagt gctacggcgt ctctcccacc aagctgaacg acctgtgctt cactaacgtg 1140

tacgccgata gctttgtgat ccggggcgac gaggtccgcc agattgctcc cggccagacc 1200

ggaaagatcg ctgactacaa ctacaaactg cctgacgatt tcaccggttg cgtgatcgct 1260

tggaatagta acaatctcga cagcaaagtc ggcgggaact ataactacct ctaccggctc 1320

tttagaaaga gcaacctgaa gccttttgaa cgggatatta gcaccgaaat ctaccaggca 1380

ggcagcaccc cttgcaatgg cgtcgagggc ttcaactgct atttcccact ccagtcttat 1440

ggcttccagc ctaccaatgg cgtgggatat cagccatatc gcgtggtggt cctctccttt 1500

gagctcctgc atgctccagc caccgtgtgc ggtccaaaaa agagcactaa cctcgtcaag 1560

aacaagtgcg tcaacttt 1578

<210>  269
<211>  526
<212>  PRT
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  269

```
Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1               5                   10                  15


Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
            20                  25                  30


Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
        35                  40                  45


Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
    50                  55                  60


Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65                  70                  75                  80


Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
                85                  90                  95


Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
            100                 105                 110


Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
        115                 120                 125


Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140


Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160


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


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


Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205


Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220
```

```
Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

Gly Leu His Phe Ala Ile Gly Leu Ala Leu Tyr Tyr Pro Ser Ala Arg
                245                 250                 255

Ile Val Tyr Thr Ala Cys Ser His Ala Ala Val Gly Gly Gly Gly Ser
            260                 265                 270

Gly Gly Gly Gly Ser Phe Val Asn Glu Phe Tyr Ala Tyr Leu Arg Lys
        275                 280                 285

His Phe Ser Met Met Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Arg
    290                 295                 300

Val Gln Pro Thr Glu Ser Ile Val Arg Phe Pro Asn Ile Thr Asn Leu
305                 310                 315                 320

Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala Ser Val Tyr
                325                 330                 335

Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser Val
            340                 345                 350

Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser
        355                 360                 365

Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp Ser
    370                 375                 380

Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro Gly Gln Thr
385                 390                 395                 400

Gly Lys Ile Ala Asp Tyr Asn Tyr Lys Leu Pro Asp Asp Phe Thr Gly
                405                 410                 415

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

Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys Pro
        435                 440                 445

Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr Pro
    450                 455                 460

Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser Tyr
465                 470                 475                 480
```

```
Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val Val
                485                 490                 495

Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val Cys Gly Pro
            500                 505                 510

Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn Phe
        515                 520                 525
```

<210> 270
<211> 1653
<212> DNA
<213> Artificial sequence

<220>
<223> VB construct

<400> 270

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atgcaggtct ccactgctgc ccttgccgtc ctcctctgca ccatggctct ctgcaaccag       60

gtcctctctg caccacttgc tgctgacacg ccgaccgcct gctgcttcag ctacacctcc      120

cgacagattc cacagaattt catagctgac tactttgaga cgagcagcca gtgctccaag      180

cccagtgtca tcttcctaac caagagaggc cggcaggtct gtgctgaccc cagtgaggag      240

tgggtccaga aatacgtcag tgacctggag ctgagtgccg agctcaaaac cccacttggt      300

gacacaactc acacagagcc caaatcttgt gacacacctc ccccgtgccc aaggtgccca      360

ggcggtggaa gcagcggagg tggaagtgga ggacagcccc gagaaccaca ggtgtacacc      420

ctgcccccat cccgggagga gatgaccaag aaccaggtca gcctgacctg cctggtcaaa      480

ggcttctacc ccagcgacat cgccgtggag tgggagagca gcgggcagcc ggagaacaac      540

tacaacacca cgcctcccat gctggactcc gacggctcct tcttcctcta cagcaagctc      600

accgtggaca agagcaggtg gcagcagggg aacatcttct catgctccgt gatgcatgag      660

gctctgcaca accgcttcac gcagaagagc ctctccctgt ctccgggtaa aggcctcggt      720

ggcctgcact tcgccattgg cctcgccctg tattaccctt ctgcccggat cgtgtataca      780

gcatgctctc acgctgcagt ggggggcggt ggctccggcg gtggcggaag ctttgtgaac      840

gagttctatg cctacctgag aaagcacttc tctatgatgg gtggcggagg ctccggaggg      900

ggtggctctc tggtgaagcc ttctttctac gtctactcca gagtgaagaa tctcggaggt      960

ggcggttctg gtggcggagg ttctagggtc agccaaccg aatccatcgt gcgattcccc     1020

aatatcacaa acctgtgccc ttttggggag gtgttcaatg ctaccagatt tgcctcagtg     1080

tacgcatgga acagaaagag gattagtaac tgcgtggccg actatagcgt gctgtataac     1140

agcgccagct tctctacctt caagtgctac ggcgtgtctc ctaccaagct caacgatctc     1200

tgcttcacca acgtgtatgc cgattccttc gtcattaggg gcgatgaggt gcgacagatc     1260

gcccctggac agaccggaaa gatcgccgat tataactaca aactgcctga tgacttcacc     1320
```

ggttgcgtga tcgcctggaa ctccaacaac ctggactcca aggtcggtgg caactataat 1380

tacctgtaca ggctgttcag gaagtccaat ctgaagcctt ttgaacgaga tatcagcacc 1440

gaaatctacc aggccggatc taccccatgc aacggtgtcg aaggctttaa ctgttacttt 1500

cctctccaga gttatggctt ccagccaacc aatggggtgg gctatcagcc ttatcgagtg 1560

gtcgtgctgt cctttgaact cctgcatgcc ccagctactg tctgtggccc caagaaatcc 1620

accaatctcg tgaaaaacaa gtgcgtcaat ttc 1653

<210> 271
<211> 551
<212> PRT
<213> Artificial sequence

<220>
<223> VB construct

<400> 271

Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1 5 10 15

Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
20 25 30

Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
35 40 45

Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
50 55 60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65 70 75 80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
85 90 95

Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
100 105 110

Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
115 120 125

Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
130 135 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145 150 155 160

Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Ser Gly Gln

```
                165                 170                 175

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

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

Gly Leu His Phe Ala Ile Gly Leu Ala Leu Tyr Tyr Pro Ser Ala Arg
                245                 250                 255

Ile Val Tyr Thr Ala Cys Ser His Ala Ala Val Gly Gly Gly Gly Ser
            260                 265                 270

Gly Gly Gly Gly Ser Phe Val Asn Glu Phe Tyr Ala Tyr Leu Arg Lys
        275                 280                 285

His Phe Ser Met Met Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Leu
    290                 295                 300

Val Lys Pro Ser Phe Tyr Val Tyr Ser Arg Val Lys Asn Leu Gly Gly
305                 310                 315                 320

Gly Gly Ser Gly Gly Gly Gly Ser Arg Val Gln Pro Thr Glu Ser Ile
                325                 330                 335

Val Arg Phe Pro Asn Ile Thr Asn Leu Cys Pro Phe Gly Glu Val Phe
            340                 345                 350

Asn Ala Thr Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile
        355                 360                 365

Ser Asn Cys Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe
    370                 375                 380

Ser Thr Phe Lys Cys Tyr Gly Val Ser Pro Thr Lys Leu Asn Asp Leu
385                 390                 395                 400

Cys Phe Thr Asn Val Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu
                405                 410                 415

Val Arg Gln Ile Ala Pro Gly Gln Thr Gly Lys Ile Ala Asp Tyr Asn
            420                 425                 430
```

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

Asn Asn Leu Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg
    450                 455                 460

Leu Phe Arg Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr
465                 470                 475                 480

Glu Ile Tyr Gln Ala Gly Ser Thr Pro Cys Asn Gly Val Glu Gly Phe
                485                 490                 495

Asn Cys Tyr Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly
            500                 505                 510

Val Gly Tyr Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu
        515                 520                 525

His Ala Pro Ala Thr Val Cys Gly Pro Lys Lys Ser Thr Asn Leu Val
    530                 535                 540

Lys Asn Lys Cys Val Asn Phe
545                 550
```

<210>  272
<211>  1485
<212>  DNA
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  272

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atgcaggtct ccactgctgc ccttgccgtc ctcctctgca ccatggctct ctgcaaccag       60

gtcctctctg caccacttgc tgctgacacg ccgaccgcct gctgcttcag ctacacctcc      120

cgacagattc cacagaattt catagctgac tactttgaga cgagcagcca gtgctccaag      180

cccagtgtca tcttcctaac caagagaggc cggcaggtct gtgctgaccc cagtgaggag      240

tgggtccaga aatacgtcag tgacctggag ctgagtgccg agctcaaaac cccacttggt      300

gacacaactc acacagagcc caaatcttgt gacacacctc ccccgtgccc aaggtgccca      360

ggcggtggaa gcagcggagg tggaagtgga ggacagcccc gagaaccaca ggtgtacacc      420

ctgcccccat cccgggagga gatgaccaag aaccaggtca gcctgacctg cctggtcaaa      480

ggcttctacc ccagcgacat cgccgtggag tgggagagca gcgggcagcc ggagaacaac      540

tacaacacca cgcctcccat gctggactcc gacggctcct tcttcctcta cagcaagctc      600

accgtggaca agagcaggtg gcagcagggg aacatcttct catgctccgt gatgcatgag      660
```

gctctgcaca accgcttcac gcagaagagc ctctccctgt ctccgggtaa aggcctcggt 720

ggcctgcact ttgccatcgg actggccctg tactatcctt ctgccagaat cgtgtacacc 780

gcctgttctc atgccgctgt gggtctgggc ggactgcgag tccagcccac agaatcaatc 840

gtgcggtttc caaacatcac caatctctgc cccttcggag aagtgtttaa tgccacacgg 900

tttgcctcag tgtatgcctg gaaccggaag agaatctcca actgcgtggc agactattct 960

gtgctgtaca acagcgcctc cttctctact ttcaagtgct acggcgtgtc tcctactaag 1020

ctgaacgatc tctgcttcac aaacgtgtat gccgattcct ttgtgatcag aggagacgaa 1080

gtgcgacaga ttgctcctgg acagaccggg aagattgccg actacaacta taagctgcca 1140

gacgatttca ctggctgcgt tattgcctgg aattcaaaca acctcgattc caaagtgggc 1200

gggaattata actacctcta tagactgttc cgtaagtcta acctgaagcc attcgagcgt 1260

gatattagca ccgaaatcta ccaggcaggt tcaactcctt gtaacggagt ggagggattc 1320

aactgctact tcccactgca gtcctatggg ttccagccta caaacggagt ggggtaccag 1380

ccttatcggg tcgttgtgct gtcctttgag ctgctccacg ctcctgcaac tgtttgcgga 1440

cctaagaaat ccaccaacct ggtgaagaac aagtgcgtga atttc 1485

<210> 273
<211> 495
<212> PRT
<213> Artificial sequence

<220>
<223> VB construct

<400> 273

Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1 5 10 15

Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
20 25 30

Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
35 40 45

Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
50 55 60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65 70 75 80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
85 90 95

Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
100 105 110

```
Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
        115                 120                 125

Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160

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

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

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

Gly Leu His Phe Ala Ile Gly Leu Ala Leu Tyr Tyr Pro Ser Ala Arg
                245                 250                 255

Ile Val Tyr Thr Ala Cys Ser His Ala Ala Val Gly Leu Gly Gly Leu
            260                 265                 270

Arg Val Gln Pro Thr Glu Ser Ile Val Arg Phe Pro Asn Ile Thr Asn
        275                 280                 285

Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala Ser Val
    290                 295                 300

Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser
305                 310                 315                 320

Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val
                325                 330                 335

Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp
            340                 345                 350

Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro Gly Gln
        355                 360                 365
```

```
Thr Gly Lys Ile Ala Asp Tyr Asn Tyr Lys Leu Pro Asp Asp Phe Thr
    370                 375                 380

Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys Val Gly
385                 390                 395                 400

Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys
                405                 410                 415

Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr
            420                 425                 430

Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser
        435                 440                 445

Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val
    450                 455                 460

Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val Cys Gly
465                 470                 475                 480

Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn Phe
                485                 490                 495
```

<210>  274
<211>  1500
<212>  DNA
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  274
atgcaggtct ccactgctgc ccttgccgtc ctcctctgca ccatggctct ctgcaaccag  60

gtcctctctg caccacttgc tgctgacacg ccgaccgcct gctgcttcag ctacacctcc  120

cgacagattc cacagaattt catagctgac tactttgaga cgagcagcca gtgctccaag  180

cccagtgtca tcttcctaac caagagaggc cggcaggtct gtgctgaccc cagtgaggag  240

tgggtccaga aatacgtcag tgacctggag ctgagtgccg agctcaaaac cccacttggt  300

gacacaactc acacagagcc caaatcttgt gacacacctc ccccgtgccc aaggtgccca  360

ggcggtggaa gcagcggagg tggaagtgga ggacagcccc gagaaccaca ggtgtacacc  420

ctgcccccat cccgggagga gatgaccaag aaccaggtca gcctgacctg cctggtcaaa  480

ggcttctacc ccagcgacat cgccgtggag tgggagagca gcgggcagcc ggagaacaac  540

tacaacacca cgcctcccat gctggactcc gacggctcct tcttcctcta cagcaagctc  600

accgtggaca agagcaggtg gcagcagggg aacatcttct catgctccgt gatgcatgag  660

gctctgcaca accgcttcac gcagaagagc ctctccctgt ctccgggtaa aggcctcggt  720

ggcctgcact tcgccattgg cctggccctg tactatccct ccgccagaat cgtgtacacc 780

gcttgtagtc acgccgcagt ggggctcgga ggcctgggtc tcggcggact gcgagtccag 840

cccacagaat caatcgtgcg gtttccaaac atcaccaatc tctgcccctt cggagaagtg 900

tttaatgcca cacggtttgc ctcagtgtat gcctggaacc ggaagagaat ctccaactgc 960

gtggcagact attctgtgct gtacaacagc gcctccttct ctactttcaa gtgctacggc 1020

gtgtctccta ctaagctgaa cgatctctgc ttcacaaacg tgtatgccga ttcctttgtg 1080

atcagaggag acgaagtgcg acagattgct cctggacaga ccgggaagat tgccgactac 1140

aactataagc tgccagacga tttcactggc tgcgttattg cctggaattc aaacaacctc 1200

gattccaaag tgggcgggaa ttataactac ctctatagac tgttccgtaa gtctaacctg 1260

aagccattcg agcgtgatat tagcaccgaa atctaccagg caggttcaac tccttgtaac 1320

ggagtggagg gattcaactg ctacttccca ctgcagtcct atgggttcca gcctacaaac 1380

ggagtggggt accagcctta tcgggtcgtt gtgctgtcct ttgagctgct ccacgctcct 1440

gcaactgttt gcggacctaa gaaatccacc aacctggtga agaacaagtg cgtgaatttc 1500

<210> 275
<211> 500
<212> PRT
<213> Artificial sequence

<220>
<223> VB construct

<400> 275

Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1 5 10 15

Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
20 25 30

Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
35 40 45

Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
50 55 60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65 70 75 80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
85 90 95

Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
100 105 110

```
Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
        115                 120                 125

Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160

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

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

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

Gly Leu His Phe Ala Ile Gly Leu Ala Leu Tyr Tyr Pro Ser Ala Arg
                245                 250                 255

Ile Val Tyr Thr Ala Cys Ser His Ala Ala Val Gly Leu Gly Gly Leu
            260                 265                 270

Gly Leu Gly Gly Leu Arg Val Gln Pro Thr Glu Ser Ile Val Arg Phe
        275                 280                 285

Pro Asn Ile Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr
    290                 295                 300

Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys
305                 310                 315                 320

Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe
                325                 330                 335

Lys Cys Tyr Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr
            340                 345                 350

Asn Val Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln
        355                 360                 365
```

```
Ile Ala Pro Gly Gln Thr Gly Lys Ile Ala Asp Tyr Asn Tyr Lys Leu
    370                 375                 380

Pro Asp Asp Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu
385                 390                 395                 400

Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg
                405                 410                 415

Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr
            420                 425                 430

Gln Ala Gly Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr
        435                 440                 445

Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr
    450                 455                 460

Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro
465                 470                 475                 480

Ala Thr Val Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys
                485                 490                 495

Cys Val Asn Phe
            500
```

<210> 276
<211> 1458
<212> DNA
<213> Artificial sequence

<220>
<223> VB construct

<400> 276

```
atgcaggtct ccactgctgc ccttgccgtc ctcctctgca ccatggctct ctgcaaccag       60

gtcctctctg caccacttgc tgctgacacg ccgaccgcct gctgcttcag ctacacctcc      120

cgacagattc cacagaattt catagctgac tactttgaga cgagcagcca gtgctccaag      180

cccagtgtca tcttcctaac caagagaggc cggcaggtct gtgctgaccc cagtgaggag      240

tgggtccaga aatacgtcag tgacctggag ctgagtgccg agctcaaaac cccacttggt      300

gacacaactc acacagagcc caaatcttgt gacacacctc ccccgtgccc aaggtgccca      360

ggcggtggaa gcagcggagg tggaagtgga ggacagcccc gagaaccaca ggtgtacacc      420

ctgcccccat cccgggagga gatgaccaag aaccaggtca gcctgacctg cctggtcaaa      480

ggcttctacc ccagcgacat cgccgtggag tgggagagca gcgggcagcc ggagaacaac      540

tacaacacca cgcctcccat gctggactcc gacggctcct tcttcctcta cagcaagctc      600
```

accgtggaca agagcaggtg gcagcagggg aacatcttct catgctccgt gatgcatgag 660

gctctgcaca accgcttcac gcagaagagc ctctccctgt ctccgggtaa aggcctcggt 720

ggcctgttcg tgaacgagtt ctacgcctat ctgagaaagc acttcagcat gatgggactg 780

ggcggtctgc gagtccagcc cacagaatca atcgtgcggt ttccaaacat caccaatctc 840

tgccccttcg gagaagtgtt taatgccaca cggtttgcct cagtgtatgc ctggaaccgg 900

aagagaatct ccaactgcgt ggcagactat tctgtgctgt acaacagcgc ctccttctct 960

actttcaagt gctacggcgt gtctcctact aagctgaacg atctctgctt cacaaacgtg 1020

tatgccgatt cctttgtgat cagaggagac gaagtgcgac agattgctcc tggacagacc 1080

gggaagattg ccgactacaa ctataagctg ccagacgatt tcactggctg cgttattgcc 1140

tggaattcaa acaacctcga ttccaaagtg ggcgggaatt ataactacct ctatagactg 1200

ttccgtaagt ctaacctgaa gccattcgag cgtgatatta gcaccgaaat ctaccaggca 1260

ggttcaactc cttgtaacgg agtggaggga ttcaactgct acttcccact gcagtcctat 1320

gggttccagc ctacaaacgg agtggggtac cagccttatc gggtcgttgt gctgtccttt 1380

gagctgctcc acgctcctgc aactgtttgc ggacctaaga aatccaccaa cctggtgaag 1440

aacaagtgcg tgaatttc 1458

<210> 277
<211> 486
<212> PRT
<213> Artificial sequence

<220>
<223> VB construct

<400> 277

Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1 5 10 15

Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
20 25 30

Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
35 40 45

Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
50 55 60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65 70 75 80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
85 90 95

```
Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
            100                 105                 110

Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
        115                 120                 125

Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160

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

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

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

Gly Leu Phe Val Asn Glu Phe Tyr Ala Tyr Leu Arg Lys His Phe Ser
                245                 250                 255

Met Met Gly Leu Gly Gly Leu Arg Val Gln Pro Thr Glu Ser Ile Val
            260                 265                 270

Arg Phe Pro Asn Ile Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn
        275                 280                 285

Ala Thr Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser
    290                 295                 300

Asn Cys Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser
305                 310                 315                 320

Thr Phe Lys Cys Tyr Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys
                325                 330                 335

Phe Thr Asn Val Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val
            340                 345                 350

Arg Gln Ile Ala Pro Gly Gln Thr Gly Lys Ile Ala Asp Tyr Asn Tyr
```

```
        355                 360                 365

Lys Leu Pro Asp Asp Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn
    370                 375                 380

Asn Leu Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu
385                 390                 395                 400

Phe Arg Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu
                405                 410                 415

Ile Tyr Gln Ala Gly Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn
            420                 425                 430

Cys Tyr Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val
        435                 440                 445

Gly Tyr Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu His
    450                 455                 460

Ala Pro Ala Thr Val Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys
465                 470                 475                 480

Asn Lys Cys Val Asn Phe
                485
```

<210>  278
<211>  1563
<212>  DNA
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  278

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atgcaggtct ccactgctgc ccttgccgtc ctcctctgca ccatggctct ctgcaaccag       60

gtcctctctg caccacttgc tgctgacacg ccgaccgcct gctgcttcag ctacacctcc      120

cgacagattc cacagaattt catagctgac tactttgaga cgagcagcca gtgctccaag      180

cccagtgtca tcttcctaac caagagaggc cggcaggtct gtgctgaccc cagtgaggag      240

tgggtccaga aatacgtcag tgacctggag ctgagtgccg agctcaaaac cccacttggt      300

gacacaactc acacagagcc caaatcttgt gacacacctc ccccgtgccc aaggtgccca      360

ggcggtggaa gcagcggagg tggaagtgga ggacagcccc gagaaccaca ggtgtacacc      420

ctgcccccat cccgggagga gatgaccaag aaccaggtca gcctgacctg cctggtcaaa      480

ggcttctacc ccagcgacat cgccgtggag tgggagagca gcgggcagcc ggagaacaac      540

tacaacacca cgcctcccat gctggactcc gacggctcct tcttcctcta cagcaagctc      600

accgtggaca agagcaggtg gcagcagggg aacatcttct catgctccgt gatgcatgag      660
```

gctctgcaca accgcttcac gcagaagagc ctctccctgt ctccgggtaa aggcctcggt 720

ggcctgcatt ttgccattgg actggcactc tattacccaa gtgccaggat cgtctacact 780

gcctgcagtc acgcagccgt cgggggaggc ggttctggag ggggtggctc tttcgtgaac 840

gagttttacg cctacctgag gaagcacttt agcatgatgg gcctcggggg tctccgcgtg 900

cagccaacag aatccattgt ccgcttcccc aatattacaa acctgtgccc attcggagaa 960

gtgtttaatg ccaccagatt cgcctccgtg tatgcttgga acagaaagcg catctctaac 1020

tgcgtcgccg actacagtgt gctgtacaac agcgcaagtt tttccacatt caagtgttat 1080

ggggtgtcac caaccaaact gaacgatctc tgcttcacaa acgtgtacgc cgactccttc 1140

gtcatccgcg gcgacgaagt gagacagatc gcacccgggc agactggaaa gatcgcagac 1200

tataactaca agctgccaga cgatttcacc gggtgcgtca ttgcctggaa cagcaataac 1260

ctcgacagca aagtgggggg caattacaac tatctgtata gactgttccg caagtccaac 1320

ctgaaaccct ttgagagaga catcagtaca gaaatctatc aggccggttc tacaccatgt 1380

aatggtgtcg aagggttcaa ctgctacttc cctctgcagt catatggctt ccagccaact 1440

aatggggtgg gataccagcc ttatagggtg gtcgtgctga gctttgagct gctgcacgca 1500

cccgccaccg tgtgcgggcc aaaaaagtcc actaacctgg tgaagaacaa gtgcgtcaat 1560

ttc 1563

<210> 279
<211> 521
<212> PRT
<213> Artificial sequence

<220>
<223> VB construct

<400> 279

Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1 5 10 15

Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
20 25 30

Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
35 40 45

Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
50 55 60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65 70 75 80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys

```
                85                  90                  95

Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
            100                 105                 110

Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
        115                 120                 125

Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160

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

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

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

Gly Leu His Phe Ala Ile Gly Leu Ala Leu Tyr Tyr Pro Ser Ala Arg
                245                 250                 255

Ile Val Tyr Thr Ala Cys Ser His Ala Ala Val Gly Gly Gly Gly Ser
            260                 265                 270

Gly Gly Gly Gly Ser Phe Val Asn Glu Phe Tyr Ala Tyr Leu Arg Lys
        275                 280                 285

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

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

Val Phe Asn Ala Thr Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys
                325                 330                 335

Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala
            340                 345                 350
```

```
Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser Pro Thr Lys Leu Asn
        355                 360                 365

Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp Ser Phe Val Ile Arg Gly
    370                 375                 380

Asp Glu Val Arg Gln Ile Ala Pro Gly Gln Thr Gly Lys Ile Ala Asp
385                 390                 395                 400

Tyr Asn Tyr Lys Leu Pro Asp Asp Phe Thr Gly Cys Val Ile Ala Trp
                405                 410                 415

Asn Ser Asn Asn Leu Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu
            420                 425                 430

Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp Ile
        435                 440                 445

Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr Pro Cys Asn Gly Val Glu
    450                 455                 460

Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr
465                 470                 475                 480

Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu
                485                 490                 495

Leu Leu His Ala Pro Ala Thr Val Cys Gly Pro Lys Lys Ser Thr Asn
            500                 505                 510

Leu Val Lys Asn Lys Cys Val Asn Phe
        515                 520


<210>  280
<211>  1638
<212>  DNA
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  280
atgcaggtct ccactgctgc ccttgccgtc ctcctctgca ccatggctct ctgcaaccag       60

gtcctctctg caccacttgc tgctgacacg ccgaccgcct gctgcttcag ctacacctcc      120

cgacagattc cacagaattt catagctgac tactttgaga cgagcagcca gtgctccaag      180

cccagtgtca tcttcctaac caagagaggc cggcaggtct gtgctgaccc cagtgaggag      240

tgggtccaga aatacgtcag tgacctggag ctgagtgccg agctcaaaac cccacttggt      300
```

gacacaactc acacagagcc caaatcttgt gacacacctc ccccgtgccc aaggtgccca 360

ggcggtggaa gcagcggagg tggaagtgga ggacagcccc gagaaccaca ggtgtacacc 420

ctgcccccat cccgggagga gatgaccaag aaccaggtca gcctgacctg cctggtcaaa 480

ggcttctacc ccagcgacat cgccgtggag tgggagagca gcgggcagcc ggagaacaac 540

tacaacacca cgcctcccat gctggactcc gacggctcct tcttcctcta cagcaagctc 600

accgtggaca agagcaggtg gcagcagggg aacatcttct catgctccgt gatgcatgag 660

gctctgcaca accgcttcac gcagaagagc ctctccctgt ctccgggtaa aggcctcggt 720

ggcctgcact tcgcaatcgg actcgcactg tattacccct cagccaggat cgtgtatact 780

gcatgcagtc acgctgccgt cggcggcggg ggtagtgggg gaggcggatc ctttgtgaat 840

gagttctatg cctacctgag aaagcacttc agcatgatgg gcggtggggg aagcggcggt 900

ggaggatccc tcgtgaaacc ctccttctat gtctactcac gggtgaagaa cctgggcctc 960

ggaggtctca gagtccagcc taccgagtct atcgtgaggt ttccaaacat cactaatctg 1020

tgccctttcg gagaagtgtt taacgccacc cggtttgcct cagtgtacgc ttggaatagg 1080

aagcggatct caaattgcgt ggcagattac agcgtgctgt acaactccgc ctcattcagt 1140

acattcaagt gctatggcgt gagcccaacc aagctgaacg atctgtgctt cacaaacgtg 1200

tacgcagatt ccttcgtcat cagaggggat gaagtcagac agatcgctcc aggccagaca 1260

ggaaagatcg cagattataa ttataaactc cctgacgatt tcaccggatg cgtgatcgcc 1320

tggaacagta ataacctgga ttcaaaagtg ggcggtaact ataattacct gtacagactg 1380

ttcaggaaga gcaacctgaa gccatttgaa cgcgacattt ccaccgaaat ctaccaggca 1440

ggaagcacac cctgtaatgg cgtggagggc tttaactgct atttcccct gcagtcctat 1500

ggttttcagc ccacaaatgg ggtggggtac cagccctacc gggtcgtggt gctgagcttc 1560

gaactcctgc acgcaccagc cactgtctgt ggacccaaga aatccactaa cctcgtgaag 1620

aacaagtgcg tgaacttc 1638

<210> 281
<211> 546
<212> PRT
<213> Artificial sequence

<220>
<223> VB construct

<400> 281

Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1 5 10 15

Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
20 25 30

```
Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
        35                  40                  45

Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
    50                  55                  60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65                  70                  75                  80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
                85                  90                  95

Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
            100                 105                 110

Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
        115                 120                 125

Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160

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

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

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

Gly Leu His Phe Ala Ile Gly Leu Ala Leu Tyr Tyr Pro Ser Ala Arg
                245                 250                 255

Ile Val Tyr Thr Ala Cys Ser His Ala Ala Val Gly Gly Gly Gly Ser
            260                 265                 270

Gly Gly Gly Gly Ser Phe Val Asn Glu Phe Tyr Ala Tyr Leu Arg Lys
        275                 280                 285

His Phe Ser Met Met Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Leu
```

```
    290                 295                 300

Val Lys Pro Ser Phe Tyr Val Tyr Ser Arg Val Lys Asn Leu Gly Leu
305                 310                 315                 320

Gly Gly Leu Arg Val Gln Pro Thr Glu Ser Ile Val Arg Phe Pro Asn
                325                 330                 335

Ile Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe
            340                 345                 350

Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala
        355                 360                 365

Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys
    370                 375                 380

Tyr Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val
385                 390                 395                 400

Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala
                405                 410                 415

Pro Gly Gln Thr Gly Lys Ile Ala Asp Tyr Asn Tyr Lys Leu Pro Asp
            420                 425                 430

Asp Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser
        435                 440                 445

Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser
    450                 455                 460

Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala
465                 470                 475                 480

Gly Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro
                485                 490                 495

Leu Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro
            500                 505                 510

Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr
        515                 520                 525

Val Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val
    530                 535                 540

Asn Phe
545
```

<210>  282
<211>  1518
<212>  DNA
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  282
atgcaggtct ccactgctgc ccttgccgtc ctcctctgca ccatggctct ctgcaaccag  60

gtcctctctg caccacttgc tgctgacacg ccgaccgcct gctgcttcag ctacacctcc  120

cgacagattc cacagaattt catagctgac tactttgaga cgagcagcca gtgctccaag  180

cccagtgtca tcttcctaac caagagaggc cggcaggtct gtgctgaccc cagtgaggag  240

tgggtccaga aatacgtcag tgacctggag ctgagtgccg agctcaaaac cccacttggt  300

gacacaactc acacagagcc caaatcttgt gacacacctc ccccgtgccc aaggtgccca  360

ggcggtggaa gcagcggagg tggaagtgga ggacagcccc gagaaccaca ggtgtacacc  420

ctgcccccat cccgggagga gatgaccaag aaccaggtca gcctgacctg cctggtcaaa  480

ggcttctacc ccagcgacat cgccgtggag tgggagagca gcgggcagcc ggagaacaac  540

tacaacacca cgcctcccat gctggactcc gacggctcct tcttcctcta cagcaagctc  600

accgtggaca agagcaggtg gcagcagggg aacatcttct catgctccgt gatgcatgag  660

gctctgcaca accgcttcac gcagaagagc ctctccctgt ctccgggtaa aggcctcggt  720

ggcctgcact tcgctatcgg actggccctc tactatcctt ccgctcggat tgtctacact  780

gcctgcagcc atgctgcagt gacccagaaa tcactgagcc tcagccctgg caaaggtctg  840

ggaggcctca gagtccagcc tactgagagc atcgtgcgct tcccaaacat cacaaacctg  900

tgccctttg gagaagtctt caatgccact cggtttgctt cagtctatgc ttggaatagg  960

aagcggatta gcaattgcgt ggccgactac tcagtgctgt acaatagcgc aagtttcagc  1020

accttcaagt gctatggagt ctccccaacc aaactcaatg acctgtgctt caccaacgtg  1080

tacgctgata gctttgtgat cagaggtgac gaagtgcgcc agattgcccc tggtcagacc  1140

ggaaagattg ccgactacaa ttacaaactg ccagacgatt tcacaggatg cgtgatcgct  1200

tggaatagca acaacctgga ctctaaagtg gggggcaact acaattacct gtaccggctc  1260

tttcgcaagt ctaacctgaa gccttttgag agagacatta gcaccgaaat ctaccaggct  1320

ggaagcacac catgcaacgg agtggagggc ttcaattgct acttccctct ccagagctat  1380

ggttttcagc ccactaacgg tgtcggttac cagccataca gagtggtcgt gctgtcattt  1440

gagctgctcc atgcccccgc tacagtctgt ggacctaaaa agagcaccaa tctggtgaag  1500

aacaaatgcg tcaacttc  1518

<210>  283

<211> 506
<212> PRT
<213> Artificial sequence

<220>
<223> VB construct

<400> 283

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Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1               5                  10                  15


Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
            20                  25                  30


Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
        35                  40                  45


Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
    50                  55                  60


Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65                  70                  75                  80


Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
                85                  90                  95


Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
            100                 105                 110


Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
        115                 120                 125


Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140


Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160


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


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


Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205


Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220
```

```
Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

Gly Leu His Phe Ala Ile Gly Leu Ala Leu Tyr Tyr Pro Ser Ala Arg
                245                 250                 255

Ile Val Tyr Thr Ala Cys Ser His Ala Ala Val Thr Gln Lys Ser Leu
            260                 265                 270

Ser Leu Ser Pro Gly Lys Gly Leu Gly Gly Leu Arg Val Gln Pro Thr
        275                 280                 285

Glu Ser Ile Val Arg Phe Pro Asn Ile Thr Asn Leu Cys Pro Phe Gly
    290                 295                 300

Glu Val Phe Asn Ala Thr Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg
305                 310                 315                 320

Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser
                325                 330                 335

Ala Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser Pro Thr Lys Leu
            340                 345                 350

Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp Ser Phe Val Ile Arg
        355                 360                 365

Gly Asp Glu Val Arg Gln Ile Ala Pro Gly Gln Thr Gly Lys Ile Ala
    370                 375                 380

Asp Tyr Asn Tyr Lys Leu Pro Asp Asp Phe Thr Gly Cys Val Ile Ala
385                 390                 395                 400

Trp Asn Ser Asn Asn Leu Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr
                405                 410                 415

Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp
            420                 425                 430

Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr Pro Cys Asn Gly Val
        435                 440                 445

Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro
    450                 455                 460

Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val Val Val Leu Ser Phe
465                 470                 475                 480

Glu Leu Leu His Ala Pro Ala Thr Val Cys Gly Pro Lys Lys Ser Thr
```

485 490 495

Asn Leu Val Lys Asn Lys Cys Val Asn Phe
500 505

<210> 284
<211> 1671
<212> DNA
<213> Artificial sequence

<220>
<223> VB construct

<400> 284
atgcaggtct ccactgctgc ccttgccgtc ctcctctgca ccatggctct ctgcaaccag 60

gtcctctctg caccacttgc tgctgacacg ccgaccgcct gctgcttcag ctacacctcc 120

cgacagattc cacagaattt catagctgac tactttgaga cgagcagcca gtgctccaag 180

cccagtgtca tcttcctaac caagagaggc cggcaggtct gtgctgaccc cagtgaggag 240

tgggtccaga aatacgtcag tgacctggag ctgagtgccg agctcaaaac cccacttggt 300

gacacaactc acacagagcc caaatcttgt gacacacctc ccccgtgccc aaggtgccca 360

ggcggtggaa gcagcggagg tggaagtgga ggacagcccc gagaaccaca ggtgtacacc 420

ctgcccccat cccgggagga gatgaccaag aaccaggtca gcctgacctg cctggtcaaa 480

ggcttctacc ccagcgacat cgccgtggag tgggagagca gcgggcagcc ggagaacaac 540

tacaacacca cgcctcccat gctggactcc gacggctcct tcttcctcta cagcaagctc 600

accgtggaca agagcaggtg gcagcagggg aacatcttct catgctccgt gatgcatgag 660

gctctgcaca accgcttcac gcagaagagc ctctccctgt ctccgggtaa aggcctcggt 720

ggcctgcatt tcgccattgg tctggcactc tactacccat cagccagaat cgtgtacacc 780

gcctgctccc atgctgcagt gggtggaggg ggaagcggag gcgggggatc tttcgtcaac 840

gaattctacg cctacctgcg gaagcacttc agcatgatgg gcggcggggg cagcggaggg 900

ggtgggtcac tcgtgaagcc aagcttctac gtctactcta gagtgaagaa cctgacccag 960

aagtcactgt ccctgtcacc tggcaagggt ctcggaggcc tcagggtgca gccaaccgaa 1020

agcattgtgc gatttcccaa catcactaat ctctgtccct ttggcgaagt gttcaacgca 1080

acccggtttg catcagtgta tgcctggaat cggaagagga tctccaactg cgtggccgat 1140

tacagcgtgc tgtataattc agccagcttc tccactttca agtgctacgg ggtctctcct 1200

accaaactca acgacctctg ctttaccaat gtctacgctg acagctttgt gatccggggc 1260

gatgaagtcc ggcagattgc accaggacag accgggaaaa tcgccgatta caactataag 1320

ctgcccgacg atttcacagg ctgcgtgatc gcctggaatt ctaacaatct ggatagcaag 1380

gtgggcggaa attacaacta tctgtaccga ctgttccgga agtcaaatct gaagcccttt 1440

gaacgggata tctccaccga aatctatcag gccggaagta ctccctgcaa cggggtggaa 1500

gggttcaact gttactttcc cctccagtct tacggattcc agcctaccaa cggagtgggc 1560

taccagccct atagagtggt cgtgctgtcc tttgagctgc tgcacgcccc agctacagtg 1620

tgcggcccta agaagtcaac caacctcgtg aaaaataagt gcgtcaattt t 1671

<210> 285
<211> 557
<212> PRT
<213> Artificial sequence

<220>
<223> VB construct

<400> 285

Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1 5 10 15

Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
20 25 30

Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
35 40 45

Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
50 55 60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65 70 75 80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
85 90 95

Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
100 105 110

Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
115 120 125

Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
130 135 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145 150 155 160

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

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

```
Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

Gly Leu His Phe Ala Ile Gly Leu Ala Leu Tyr Tyr Pro Ser Ala Arg
                245                 250                 255

Ile Val Tyr Thr Ala Cys Ser His Ala Ala Val Gly Gly Gly Gly Ser
            260                 265                 270

Gly Gly Gly Gly Ser Phe Val Asn Glu Phe Tyr Ala Tyr Leu Arg Lys
        275                 280                 285

His Phe Ser Met Met Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Leu
    290                 295                 300

Val Lys Pro Ser Phe Tyr Val Tyr Ser Arg Val Lys Asn Leu Thr Gln
305                 310                 315                 320

Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly Gly Leu Arg Val
                325                 330                 335

Gln Pro Thr Glu Ser Ile Val Arg Phe Pro Asn Ile Thr Asn Leu Cys
            340                 345                 350

Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala Ser Val Tyr Ala
        355                 360                 365

Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser Val Leu
    370                 375                 380

Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser Pro
385                 390                 395                 400

Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp Ser Phe
                405                 410                 415

Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro Gly Gln Thr Gly
            420                 425                 430

Lys Ile Ala Asp Tyr Asn Tyr Lys Leu Pro Asp Asp Phe Thr Gly Cys
        435                 440                 445
```

```
Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys Val Gly Gly Asn
    450                 455                 460

Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys Pro Phe
465                 470                 475                 480

Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr Pro Cys
                485                 490                 495

Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser Tyr Gly
            500                 505                 510

Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val Val Val
        515                 520                 525

Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val Cys Gly Pro Lys
    530                 535                 540

Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn Phe
545                 550                 555
```

<210> 286
<211> 1509
<212> DNA
<213> Artificial sequence

<220>
<223> VB construct

<400> 286

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atgcaggtct ccactgctgc ccttgccgtc ctcctctgca ccatggctct ctgcaaccag       60

gtcctctctg caccacttgc tgctgacacg ccgaccgcct gctgcttcag ctacacctcc      120

cgacagattc cacagaattt catagctgac tactttgaga cgagcagcca gtgctccaag      180

cccagtgtca tcttcctaac caagagaggc cggcaggtct gtgctgaccc cagtgaggag      240

tgggtccaga aatacgtcag tgacctggag ctgagtgccg agctcaaaac cccacttggt      300

gacacaactc acacagagcc caaatcttgt gacacacctc ccccgtgccc aaggtgccca      360

ggcggtggaa gcagcggagg tggaagtgga ggacagcccc gagaaccaca ggtgtacacc      420

ctgcccccat cccgggagga gatgaccaag aaccaggtca gcctgacctg cctggtcaaa      480

ggcttctacc ccagcgacat cgccgtggag tgggagagca gcgggcagcc ggagaacaac      540

tacaacacca cgcctcccat gctggactcc gacggctcct tcttcctcta cagcaagctc      600

accgtggaca agagcaggtg gcagcagggg aacatcttct catgctccgt gatgcatgag      660

gctctgcaca accgcttcac gcagaagagc ctctccctgt ctccgggtaa aggcctcggt      720

ggcctgcact ttgccatcgg cctggccctg tactatccct ctgccagaat cgtgtacact      780

gcctgctctc atgctgccgt gagcctgtct ctgagccctg gcaaaggact gggtggcctc      840
```

cgagtccagc ccacagaatc aatcgtgcgg tttccaaaca tcaccaatct ctgccccttc 900

ggagaagtgt ttaatgccac acggtttgcc tcagtgtatg cctggaaccg gaagagaatc 960

tccaactgcg tggcagacta ttctgtgctg tacaacagcg cctccttctc tactttcaag 1020

tgctacggcg tgtctcctac taagctgaac gatctctgct tcacaaacgt gtatgccgat 1080

tcctttgtga tcagaggaga cgaagtgcga cagattgctc ctggacagac cgggaagatt 1140

gccgactaca actataagct gccagacgat ttcactggct gcgttattgc ctggaattca 1200

aacaacctcg attccaaagt gggcgggaat tataactacc tctatagact gttccgtaag 1260

tctaacctga agccattcga gcgtgatatt agcaccgaaa tctaccaggc aggttcaact 1320

ccttgtaacg gagtggaggg attcaactgc tacttcccac tgcagtccta tgggttccag 1380

cctacaaacg gagtggggta ccagccttat cgggtcgttg tgctgtcctt tgagctgctc 1440

cacgctcctg caactgtttg cggacctaag aaatccacca acctggtgaa gaacaagtgc 1500

gtgaatttc 1509

<210> 287
<211> 503
<212> PRT
<213> Artificial sequence

<220>
<223> VB construct

<400> 287

Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1 5 10 15

Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
20 25 30

Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
35 40 45

Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
50 55 60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65 70 75 80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
85 90 95

Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
100 105 110

Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
115 120 125

```
Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160

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

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

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

Gly Leu His Phe Ala Ile Gly Leu Ala Leu Tyr Tyr Pro Ser Ala Arg
                245                 250                 255

Ile Val Tyr Thr Ala Cys Ser His Ala Ala Val Ser Leu Ser Leu Ser
            260                 265                 270

Pro Gly Lys Gly Leu Gly Gly Leu Arg Val Gln Pro Thr Glu Ser Ile
        275                 280                 285

Val Arg Phe Pro Asn Ile Thr Asn Leu Cys Pro Phe Gly Glu Val Phe
    290                 295                 300

Asn Ala Thr Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile
305                 310                 315                 320

Ser Asn Cys Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe
                325                 330                 335

Ser Thr Phe Lys Cys Tyr Gly Val Ser Pro Thr Lys Leu Asn Asp Leu
            340                 345                 350

Cys Phe Thr Asn Val Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu
        355                 360                 365

Val Arg Gln Ile Ala Pro Gly Gln Thr Gly Lys Ile Ala Asp Tyr Asn
    370                 375                 380
```

```
Tyr Lys Leu Pro Asp Asp Phe Thr Gly Cys Val Ile Ala Trp Asn Ser
385                 390                 395                 400

Asn Asn Leu Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg
                405                 410                 415

Leu Phe Arg Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr
            420                 425                 430

Glu Ile Tyr Gln Ala Gly Ser Thr Pro Cys Asn Gly Val Glu Gly Phe
        435                 440                 445

Asn Cys Tyr Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly
    450                 455                 460

Val Gly Tyr Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu
465                 470                 475                 480

His Ala Pro Ala Thr Val Cys Gly Pro Lys Lys Ser Thr Asn Leu Val
                485                 490                 495

Lys Asn Lys Cys Val Asn Phe
            500
```

<210>  288
<211>  1662
<212>  DNA
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  288

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atgcaggtct ccactgctgc ccttgccgtc ctcctctgca ccatggctct ctgcaaccag       60

gtcctctctg caccacttgc tgctgacacg ccgaccgcct gctgcttcag ctacacctcc      120

cgacagattc cacagaattt catagctgac tactttgaga cgagcagcca gtgctccaag      180

cccagtgtca tcttcctaac caagagaggc cggcaggtct gtgctgaccc cagtgaggag      240

tgggtccaga aatacgtcag tgacctggag ctgagtgccg agctcaaaac cccacttggt      300

gacacaactc acacagagcc caaatcttgt gacacacctc ccccgtgccc aaggtgccca      360

ggcggtggaa gcagcggagg tggaagtgga ggacagcccc gagaaccaca ggtgtacacc      420

ctgcccccat cccgggagga gatgaccaag aaccaggtca gcctgacctg cctggtcaaa      480

ggcttctacc ccagcgacat cgccgtggag tgggagagca gcgggcagcc ggagaacaac      540

tacaacacca cgcctcccat gctggactcc gacggctcct tcttcctcta cagcaagctc      600

accgtggaca agagcaggtg gcagcagggg aacatcttct catgctccgt gatgcatgag      660

gctctgcaca accgcttcac gcagaagagc ctctccctgt ctccgggtaa aggcctcggt      720
```

ggcctgcact tcgccattgg gctggctctg tattacccct cagccagaat cgtctatacc 780

gcatgctccc atgcagctgt cgggggtggc ggtagtgggg ggggcggtag cttcgtcaat 840

gagttctacg cctacctgag gaaacatttc tccatgatgg gtggcggggg aagtggcggg 900

ggtggcagtc tggtgaagcc ctccttctac gtgtattctc gagtgaagaa tctctccctc 960

agtctgtccc ctggcaaagg tctgggggggc ctcagggtgc agcccaccga gtccatcgtc 1020

aggttcccca acatcacaaa cctgtgcccc tttggggagg tcttcaacgc cactcgcttt 1080

gcttctgtct acgcttggaa caggaagcga atcagtaact gcgtcgccga ttactccgtg 1140

ctgtataatt ccgcctcatt cagcaccttc aagtgctacg gcgtgtctcc taccaagctc 1200

aacgatctct gcttcaccaa tgtctacgca gacagtttcg tgatcagagg cgatgaggtc 1260

cgccagattg ccccagggca gaccggaaaa atcgccgact ataattacaa gctgcctgat 1320

gacttcaccg ggtgcgtgat cgcatggaat tccaacaacc tcgactccaa agtgggaggg 1380

aactacaact atctgtaccg cctgttcaga aagagcaacc tgaaaccttt tgagagggat 1440

atctcaactg aaatctatca ggccgggtcc accccatgta atggggtgga agggttcaac 1500

tgctatttcc ctctgcagtc ctacgggttc cagcctacca atggagtcgg ctaccagccc 1560

tacagagtcg tggtgctgtc tttcgaactc ctgcacgccc ctgccaccgt ctgcggccca 1620

aagaaatcca ccaatctggt gaaaaataag tgcgtcaact tt 1662

<210> 289
<211> 554
<212> PRT
<213> Artificial sequence

<220>
<223> VB construct

<400> 289

Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1 5 10 15

Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
20 25 30

Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
35 40 45

Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
50 55 60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65 70 75 80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys

```
                85                  90                  95

Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
            100                 105                 110

Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
        115                 120                 125

Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160

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

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

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

Gly Leu His Phe Ala Ile Gly Leu Ala Leu Tyr Tyr Pro Ser Ala Arg
                245                 250                 255

Ile Val Tyr Thr Ala Cys Ser His Ala Ala Val Gly Gly Gly Gly Ser
            260                 265                 270

Gly Gly Gly Gly Ser Phe Val Asn Glu Phe Tyr Ala Tyr Leu Arg Lys
        275                 280                 285

His Phe Ser Met Met Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Leu
    290                 295                 300

Val Lys Pro Ser Phe Tyr Val Tyr Ser Arg Val Lys Asn Leu Ser Leu
305                 310                 315                 320

Ser Leu Ser Pro Gly Lys Gly Leu Gly Gly Leu Arg Val Gln Pro Thr
                325                 330                 335

Glu Ser Ile Val Arg Phe Pro Asn Ile Thr Asn Leu Cys Pro Phe Gly
            340                 345                 350
```

```
Glu Val Phe Asn Ala Thr Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg
        355                 360                 365

Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser
    370                 375                 380

Ala Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser Pro Thr Lys Leu
385                 390                 395                 400

Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp Ser Phe Val Ile Arg
                405                 410                 415

Gly Asp Glu Val Arg Gln Ile Ala Pro Gly Gln Thr Gly Lys Ile Ala
            420                 425                 430

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

Trp Asn Ser Asn Asn Leu Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr
    450                 455                 460

Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp
465                 470                 475                 480

Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr Pro Cys Asn Gly Val
                485                 490                 495

Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro
            500                 505                 510

Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val Val Val Leu Ser Phe
        515                 520                 525

Glu Leu Leu His Ala Pro Ala Thr Val Cys Gly Pro Lys Lys Ser Thr
    530                 535                 540

Asn Leu Val Lys Asn Lys Cys Val Asn Phe
545                 550


<210>  290
<211>  1731
<212>  DNA
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  290
atgcaggtct ccactgctgc ccttgccgtc ctcctctgca ccatggctct ctgcaaccag       60
```

gtcctctctg caccacttgc tgctgacacg ccgaccgcct gctgcttcag ctacacctcc 120

cgacagattc cacagaattt catagctgac tactttgaga cgagcagcca gtgctccaag 180

cccagtgtca tcttcctaac caagagaggc cggcaggtct gtgctgaccc cagtgaggag 240

tgggtccaga aatacgtcag tgacctggag ctgagtgccg agctcaaaac cccacttggt 300

gacacaactc acacagagcc caaatcttgt gacacacctc ccccgtgccc aaggtgccca 360

ggcggtggaa gcagcggagg tggaagtgga ggacagcccc gagaaccaca ggtgtacacc 420

ctgcccccat cccgggagga gatgaccaag aaccaggtca gcctgacctg cctggtcaaa 480

ggcttctacc ccagcgacat cgccgtggag tgggagagca gcgggcagcc ggagaacaac 540

tacaacacca cgcctcccat gctggactcc gacggctcct tcttcctcta cagcaagctc 600

accgtggaca agagcaggtg gcagcagggg aacatcttct catgctccgt gatgcatgag 660

gctctgcaca accgcttcac gcagaagagc ctctccctgt ctccgggtaa aggcctcggt 720

ggcctgcact ttgcaatcgg actcgccctg tactacccta gcgccaggat tgtctatacc 780

gcatgcagcc acgccgctgt ggggggaggc ggtagcgggg gaggcggtag ttttgtcaac 840

gagttctacg catatctgcg gaagcacttc agcatgatgg gagggggtgg cagcggaggg 900

ggaggttctc tggtcaagcc tagcttttac gtgtacagtc gagtcaagaa cctcggtgga 960

tcagccggtg ggtcaggatc tggctctagc ggtggaagca gtggtgcatc tggaaccggt 1020

acagctggcg gtactggatc tggaagcggg accggaagcg ggagagtgca gcccacagag 1080

tcaatcgtgc ggtttcctaa catcacaaac ctctgcccat ttggggaggt gttcaacgcc 1140

accaggtttg cttccgtcta tgcctggaat aggaagcgca ttagcaattg cgtggccgac 1200

tattcagtgc tgtacaactc tgcttccttc agcacattca agtgttacgg cgtgagcccc 1260

accaagctca atgacctgtg ctttaccaac gtgtatgccg actctttcgt gatcaggggg 1320

gacgaggtcc gacagattgc ccctggccag acagggaaga ttgctgacta taactacaaa 1380

ctgcccgacg atttcactgg ctgcgtcatc gcatggaaca gcaacaatct ggacagcaaa 1440

gtgggcggga attacaatta cctgtatagg ctcttccgca aaagtaatct gaagcccttc 1500

gagagggata tcagcactga aatctatcag gccggctcaa ctccttgcaa tggagtcgaa 1560

gggttcaact gctatttccc tctgcagagc tatggttttc agcccactaa cggggtggga 1620

tatcagccat atcgggtcgt ggtgctgtca ttcgagctgc tgcatgcacc tgccacagtg 1680

tgcggaccta agaagagcac taacctggtc aagaacaagt gcgtgaattt t 1731

<210> 291
<211> 577
<212> PRT
<213> Artificial sequence

<220>
<223> VB construct

<400> 291

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Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1               5                   10                  15

Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
            20                  25                  30

Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
        35                  40                  45

Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
    50                  55                  60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65                  70                  75                  80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
                85                  90                  95

Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
            100                 105                 110

Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
        115                 120                 125

Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160

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

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

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

Gly Leu His Phe Ala Ile Gly Leu Ala Leu Tyr Tyr Pro Ser Ala Arg
                245                 250                 255
```

```
Ile Val Tyr Thr Ala Cys Ser His Ala Ala Val Gly Gly Gly Gly Ser
            260                 265                 270

Gly Gly Gly Gly Ser Phe Val Asn Glu Phe Tyr Ala Tyr Leu Arg Lys
        275                 280                 285

His Phe Ser Met Met Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Leu
    290                 295                 300

Val Lys Pro Ser Phe Tyr Val Tyr Ser Arg Val Lys Asn Leu Gly Gly
305                 310                 315                 320

Ser Ala Gly Gly Ser Gly Ser Gly Ser Ser Gly Gly Ser Ser Gly Ala
                325                 330                 335

Ser Gly Thr Gly Thr Ala Gly Gly Thr Gly Ser Gly Ser Gly Thr Gly
            340                 345                 350

Ser Gly Arg Val Gln Pro Thr Glu Ser Ile Val Arg Phe Pro Asn Ile
        355                 360                 365

Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala
    370                 375                 380

Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp
385                 390                 395                 400

Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr
                405                 410                 415

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

Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro
        435                 440                 445

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

Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys
465                 470                 475                 480

Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn
                485                 490                 495

Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly
            500                 505                 510
```

```
Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu
        515                 520                 525

Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr
    530                 535                 540

Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val
545                 550                 555                 560

Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn
                565                 570                 575

Phe
```

<210>  292
<211>  1731
<212>  DNA
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  292

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atgcaggtct ccactgctgc ccttgccgtc ctcctctgca ccatggctct ctgcaaccag       60

gtcctctctg caccacttgc tgctgacacg ccgaccgcct gctgcttcag ctacacctcc      120

cgacagattc cacagaattt catagctgac tactttgaga cgagcagcca gtgctccaag      180

cccagtgtca tcttcctaac caagagaggc cggcaggtct gtgctgaccc cagtgaggag      240

tgggtccaga aatacgtcag tgacctggag ctgagtgccg agctcaaaac cccacttggt      300

gacacaactc acacagagcc caaatcttgt gacacacctc ccccgtgccc aaggtgccca      360

ggcggtggaa gcagcggagg tggaagtgga ggacagcccc gagaaccaca ggtgtacacc      420

ctgcccccat cccgggagga gatgaccaag aaccaggtca gcctgacctg cctggtcaaa      480

ggcttctacc ccagcgacat cgccgtggag tgggagagca gcgggcagcc ggagaacaac      540

tacaacacca cgcctcccat gctggactcc gacggctcct tcttcctcta cagcaagctc      600

accgtggaca agagcaggtg gcagcagggg aacatcttct catgctccgt gatgcatgag      660

gctctgcaca accgcttcac gcagaagagc ctctccctgt ctccgggtaa aggcctcggt      720

ggcctgcatt tcgctattgg cctggctctc tactacccaa gcgcaaggat tgtctacacc      780

gcctgtagcc atgcagccgt cggtgggggc gggagtgggg gcggcgggag ctttgtgaac      840

gaattctacg cctatctgag gaagcacttt agcatgatgg gcggcggggg aagcggcggg      900

gggggatccc tggtcaaacc tagcttttac gtgtactcac gggtcaagaa tctgggcggg      960

tctggagggg gctccgaagg tggagggagc gagggaggcg ggagcgaagg gggcgggtcc     1020

gagggtgggg gcagcgaggg agggggcagc ggcggcggaa gtagggtcca gcccacagag     1080
```

tccattgtga ggttcccaaa catcaccaat ctctgccctt tcggcgaagt cttcaacgcc 1140

actaggtttg ccagtgtcta cgcttggaat agaaagcgca ttagcaactg cgtggccgat 1200

tactccgtcc tgtacaatag cgccagcttt tccaccttca agtgctacgg agtgagccct 1260

accaagctga acgacctctg tttcacaaac gtgtacgccg atagcttcgt gattagagga 1320

gacgaggtgc ggcagattgc ccctgggcag accggcaaga tcgccgacta caattacaag 1380

ctgcccgacg actttaccgg ctgcgtcatc gcctggaata gcaacaacct cgacagtaaa 1440

gtgggggggca attataacta cctctataga ctgttccgaa agagcaatct gaagccattt 1500

gagcgggata tcagcaccga aatctaccag gctggaagca ccccatgcaa cggggtggaa 1560

gggttcaact gctactttcc actgcagagc tacggcttcc agcccactaa tggagtgggc 1620

tatcagccct atagagtggt ggtcctcagc ttcgaactgc tgcatgctcc cgccaccgtg 1680

tgcgggccta agaaatccac caatctggtg aagaacaagt gcgtgaattt c 1731

<210> 293
<211> 577
<212> PRT
<213> Artificial sequence

<220>
<223> VB construct

<400> 293

Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1 5 10 15

Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
20 25 30

Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
35 40 45

Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
50 55 60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65 70 75 80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
85 90 95

Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
100 105 110

Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
115 120 125

```
Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160

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

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

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

Gly Leu His Phe Ala Ile Gly Leu Ala Leu Tyr Tyr Pro Ser Ala Arg
                245                 250                 255

Ile Val Tyr Thr Ala Cys Ser His Ala Ala Val Gly Gly Gly Gly Ser
            260                 265                 270

Gly Gly Gly Gly Ser Phe Val Asn Glu Phe Tyr Ala Tyr Leu Arg Lys
        275                 280                 285

His Phe Ser Met Met Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Leu
    290                 295                 300

Val Lys Pro Ser Phe Tyr Val Tyr Ser Arg Val Lys Asn Leu Gly Gly
305                 310                 315                 320

Ser Gly Gly Gly Ser Glu Gly Gly Gly Ser Glu Gly Gly Gly Ser Glu
                325                 330                 335

Gly Gly Gly Ser Glu Gly Gly Gly Ser Glu Gly Gly Gly Ser Gly Gly
            340                 345                 350

Gly Ser Arg Val Gln Pro Thr Glu Ser Ile Val Arg Phe Pro Asn Ile
        355                 360                 365

Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala
    370                 375                 380

Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp
```

385 390 395 400

Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr
405 410 415

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

Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro
435 440 445

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

Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys
465 470 475 480

Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn
485 490 495

Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly
500 505 510

Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu
515 520 525

Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr
530 535 540

Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val
545 550 555 560

Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn
565 570 575

Phe

<210> 294
<211> 1395
<212> DNA
<213> Artificial sequence

<220>
<223> VB construct

<400> 294
atgcaggtct ccactgctgc ccttgccgtc ctcctctgca ccatggctct ctgcaaccag 60

gtcctctctg caccacttgc tgctgacacg ccgaccgcct gctgcttcag ctacacctcc 120

cgacagattc cacagaattt catagctgac tactttgaga cgagcagcca gtgctccaag 180

```
cccagtgtca tcttcctaac caagagaggc cggcaggtct gtgctgaccc cagtgaggag      240

tgggtccaga aatacgtcag tgacctggag ctgagtgccg agctcaaaac cccacttggt      300

gacacaactc acacagagcc caaatcttgt gacacacctc ccccgtgccc aaggtgccca      360

ggcggtggaa gcagcggagg tggaagtgga ggacagcccc gagaaccaca ggtgtacacc      420

ctgcccccat cccgggagga gatgaccaag aaccaggtca gcctgacctg cctggtcaaa      480

ggcttctacc ccagcgacat cgccgtggag tgggagagca gcgggcagcc ggagaacaac      540

tacaacacca cgcctcccat gctggactcc gacggctcct tcttcctcta cagcaagctc      600

accgtggaca agagcaggtg gcagcagggg aacatcttct catgctccgt gatgcatgag      660

gctctgcaca accgcttcac gcagaagagc ctctccctgt ctccgggtaa aggcctcggt      720

ggcctgcgag tccagcccac agaatcaatc gtgcggtttc caaacatcac caatctctgc      780

cccttcggag aagtgtttaa tgccacacgg tttgcctcag tgtatgcctg gaaccggaag      840

agaatctcca actgcgtggc agactattct gtgctgtaca acagcgcctc cttctctact      900

ttcaagtgct acggcgtgtc tcctactaag ctgaacgatc tctgcttcac aaacgtgtat      960

gccgattcct ttgtgatcag aggagacgaa gtgcgacaga ttgctcctgg acagaccggg     1020

aacattgccg actacaacta taagctgcca gacgatttca ctggctgcgt tattgcctgg     1080

aattcaaaca acctcgattc caaagtgggc gggaattata actacctcta tagactgttc     1140

cgtaagtcta acctgaagcc attcgagcgt gatattagca ccgaaatcta ccaggcaggt     1200

tcaactcctt gtaacggagt gaagggattc aactgctact tcccactgca gtcctatggg     1260

ttccagccta catatggagt ggggtaccag ccttatcggg tcgttgtgct gtcctttgag     1320

ctgctccacg ctcctgcaac tgtttgcgga cctaagaaat ccaccaacct ggtgaagaac     1380

aagtgcgtga atttc                                                      1395
```

<210> 295
<211> 465
<212> PRT
<213> Artificial sequence

<220>
<223> VB construct

<400> 295

```
Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1               5                  10                  15

Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
            20                  25                  30

Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
        35                  40                  45
```

```
Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
    50                  55                  60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65                  70                  75                  80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
                85                  90                  95

Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
            100                 105                 110

Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
        115                 120                 125

Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160

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

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

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

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

Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala
            260                 265                 270

Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp
        275                 280                 285

Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr
    290                 295                 300
```

```
Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr
305                 310                 315                 320


Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro
                325                 330                 335


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


Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys
        355                 360                 365


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


Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly
385                 390                 395                 400


Ser Thr Pro Cys Asn Gly Val Lys Gly Phe Asn Cys Tyr Phe Pro Leu
                405                 410                 415


Gln Ser Tyr Gly Phe Gln Pro Thr Tyr Gly Val Gly Tyr Gln Pro Tyr
            420                 425                 430


Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val
        435                 440                 445


Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn
    450                 455                 460


Phe
465


<210>  296
<211>  724
<212>  PRT
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  296

Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1               5                   10                  15


Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
            20                  25                  30


Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
        35                  40                  45
```

```
Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
    50                  55                  60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65                  70                  75                  80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
                85                  90                  95

Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
            100                 105                 110

Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
        115                 120                 125

Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160

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

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

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

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

Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala
            260                 265                 270

Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp
        275                 280                 285

Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr
    290                 295                 300
```

```
Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr
305                 310                 315                 320

Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro
                325                 330                 335

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

Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys
        355                 360                 365

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

Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly
385                 390                 395                 400

Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu
                405                 410                 415

Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr
            420                 425                 430

Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val
        435                 440                 445

Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn
    450                 455                 460

Phe Gly Gly Ser Gly Gly Gly Ser Glu Gly Gly Gly Ser Glu Gly Gly
465                 470                 475                 480

Gly Ser Glu Gly Gly Gly Ser Glu Gly Gly Gly Ser Glu Gly Gly Gly
                485                 490                 495

Ser Gly Gly Gly Ser Arg Val Gln Pro Thr Glu Ser Ile Val Arg Phe
            500                 505                 510

Pro Asn Ile Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr
        515                 520                 525

Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys
    530                 535                 540

Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe
545                 550                 555                 560

Lys Cys Tyr Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr
```

```
               565                 570                 575

Asn Val Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln
            580                 585                 590

Ile Ala Pro Gly Gln Thr Gly Asn Ile Ala Asp Tyr Asn Tyr Lys Leu
        595                 600                 605

Pro Asp Asp Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu
    610                 615                 620

Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg
625                 630                 635                 640

Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr
                645                 650                 655

Gln Ala Gly Ser Thr Pro Cys Asn Gly Val Lys Gly Phe Asn Cys Tyr
            660                 665                 670

Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr Tyr Gly Val Gly Tyr
        675                 680                 685

Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro
    690                 695                 700

Ala Thr Val Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys
705                 710                 715                 720

Cys Val Asn Phe
```

<210>  297
<211>  724
<212>  PRT
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  297

```
Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1               5                   10                  15

Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
            20                  25                  30

Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
        35                  40                  45
```

```
Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
    50                  55                  60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65                  70                  75                  80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
                85                  90                  95

Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
            100                 105                 110

Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
        115                 120                 125

Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160

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

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

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

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

Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala
            260                 265                 270

Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp
        275                 280                 285

Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr
    290                 295                 300

Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr
```

```
305                 310                 315                 320

Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro
                325                 330                 335

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

Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys
        355                 360                 365

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

Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly
385                 390                 395                 400

Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu
                405                 410                 415

Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr
            420                 425                 430

Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val
        435                 440                 445

Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn
    450                 455                 460

Phe Gly Gly Ser Ala Gly Gly Ser Gly Ser Gly Ser Ser Gly Gly Ser
465                 470                 475                 480

Ser Gly Ala Ser Gly Thr Gly Thr Ala Gly Gly Thr Gly Ser Gly Ser
                485                 490                 495

Gly Thr Gly Ser Gly Arg Val Gln Pro Thr Glu Ser Ile Val Arg Phe
            500                 505                 510

Pro Asn Ile Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr
        515                 520                 525

Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys
    530                 535                 540

Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe
545                 550                 555                 560

Lys Cys Tyr Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr
                565                 570                 575
```

```
Asn Val Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln
            580                 585                 590

Ile Ala Pro Gly Gln Thr Gly Asn Ile Ala Asp Tyr Asn Tyr Lys Leu
        595                 600                 605

Pro Asp Asp Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu
    610                 615                 620

Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg
625                 630                 635                 640

Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr
                645                 650                 655

Gln Ala Gly Ser Thr Pro Cys Asn Gly Val Lys Gly Phe Asn Cys Tyr
            660                 665                 670

Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr Tyr Gly Val Gly Tyr
        675                 680                 685

Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro
    690                 695                 700

Ala Thr Val Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys
705                 710                 715                 720

Cys Val Asn Phe
```

<210>  298
<211>  704
<212>  PRT
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  298

```
Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1               5                   10                  15

Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
            20                  25                  30

Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
        35                  40                  45

Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
```

```
    50                  55                  60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65                  70                  75                  80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
                85                  90                  95

Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
            100                 105                 110

Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
        115                 120                 125

Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160

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

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

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

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

Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala
            260                 265                 270

Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp
        275                 280                 285

Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr
    290                 295                 300

Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr
305                 310                 315                 320
```

```
Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro
                325                 330                 335

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

Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys
        355                 360                 365

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

Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly
385                 390                 395                 400

Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu
                405                 410                 415

Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr
            420                 425                 430

Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val
        435                 440                 445

Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn
    450                 455                 460

Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly Gly
465                 470                 475                 480

Leu Arg Val Gln Pro Thr Glu Ser Ile Val Arg Phe Pro Asn Ile Thr
                485                 490                 495

Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala Ser
            500                 505                 510

Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr
        515                 520                 525

Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr Gly
    530                 535                 540

Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala
545                 550                 555                 560

Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro Gly
                565                 570                 575
```

```
Gln Thr Gly Asn Ile Ala Asp Tyr Asn Tyr Lys Leu Pro Asp Asp Phe
            580                 585                 590

Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys Val
        595                 600                 605

Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu
    610                 615                 620

Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser
625                 630                 635                 640

Thr Pro Cys Asn Gly Val Lys Gly Phe Asn Cys Tyr Phe Pro Leu Gln
                645                 650                 655

Ser Tyr Gly Phe Gln Pro Thr Tyr Gly Val Gly Tyr Gln Pro Tyr Arg
            660                 665                 670

Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val Cys
        675                 680                 685

Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn Phe
    690                 695                 700


<210>  299
<211>  701
<212>  PRT
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  299

Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1               5                   10                  15

Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
            20                  25                  30

Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
        35                  40                  45

Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
    50                  55                  60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65                  70                  75                  80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
                85                  90                  95
```

```
Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
            100                 105                 110

Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
        115                 120                 125

Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160

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

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

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

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

Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala
            260                 265                 270

Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp
        275                 280                 285

Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr
    290                 295                 300

Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr
305                 310                 315                 320

Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro
                325                 330                 335

Gly Gln Thr Gly Lys Ile Ala Asp Tyr Asn Tyr Lys Leu Pro Asp Asp
            340                 345                 350
```

```
Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys
        355                 360                 365

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

Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly
385                 390                 395                 400

Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu
                405                 410                 415

Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr
            420                 425                 430

Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val
        435                 440                 445

Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn
    450                 455                 460

Phe Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly Gly Leu Arg Val
465                 470                 475                 480

Gln Pro Thr Glu Ser Ile Val Arg Phe Pro Asn Ile Thr Asn Leu Cys
                485                 490                 495

Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala Ser Val Tyr Ala
            500                 505                 510

Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser Val Leu
        515                 520                 525

Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser Pro
    530                 535                 540

Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp Ser Phe
545                 550                 555                 560

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

Asn Ile Ala Asp Tyr Asn Tyr Lys Leu Pro Asp Asp Phe Thr Gly Cys
            580                 585                 590

Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys Val Gly Gly Asn
        595                 600                 605
```

```
Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys Pro Phe
    610                 615                 620

Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr Pro Cys
625                 630                 635                 640

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

Phe Gln Pro Thr Tyr Gly Val Gly Tyr Gln Pro Tyr Arg Val Val Val
            660                 665                 670

Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val Cys Gly Pro Lys
        675                 680                 685

Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn Phe
    690                 695                 700
```

<210>  300
<211>  724
<212>  PRT
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  300

```
Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1               5                   10                  15

Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
            20                  25                  30

Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
        35                  40                  45

Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
    50                  55                  60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65                  70                  75                  80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
                85                  90                  95

Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
            100                 105                 110

Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
        115                 120                 125
```

```
Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160

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

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

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

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

Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala
            260                 265                 270

Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp
        275                 280                 285

Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr
    290                 295                 300

Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr
305                 310                 315                 320

Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro
                325                 330                 335

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

Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys
        355                 360                 365

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

```
Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly
385                 390                 395                 400

Ser Thr Pro Cys Asn Gly Val Lys Gly Phe Asn Cys Tyr Phe Pro Leu
                405                 410                 415

Gln Ser Tyr Gly Phe Gln Pro Thr Tyr Gly Val Gly Tyr Gln Pro Tyr
            420                 425                 430

Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val
        435                 440                 445

Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn
    450                 455                 460

Phe Gly Gly Ser Gly Gly Gly Ser Glu Gly Gly Gly Ser Glu Gly Gly
465                 470                 475                 480

Gly Ser Glu Gly Gly Gly Ser Glu Gly Gly Gly Ser Glu Gly Gly Gly
                485                 490                 495

Ser Gly Gly Gly Ser Arg Val Gln Pro Thr Glu Ser Ile Val Arg Phe
            500                 505                 510

Pro Asn Ile Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr
        515                 520                 525

Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys
    530                 535                 540

Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe
545                 550                 555                 560

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

Asn Val Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln
            580                 585                 590

Ile Ala Pro Gly Gln Thr Gly Lys Ile Ala Asp Tyr Asn Tyr Lys Leu
        595                 600                 605

Pro Asp Asp Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu
    610                 615                 620

Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg
625                 630                 635                 640

Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr
```

645 650 655

Gln Ala Gly Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr
660 665 670

Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr Tyr Gly Val Gly Tyr
675 680 685

Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro
690 695 700

Ala Thr Val Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys
705 710 715 720

Cys Val Asn Phe

<210> 301
<211> 724
<212> PRT
<213> Artificial sequence

<220>
<223> VB construct

<400> 301

Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1 5 10 15

Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
20 25 30

Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
35 40 45

Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
50 55 60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65 70 75 80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
85 90 95

Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
100 105 110

Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
115 120 125

```
Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160

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

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

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

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

Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala
            260                 265                 270

Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp
        275                 280                 285

Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr
    290                 295                 300

Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr
305                 310                 315                 320

Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro
                325                 330                 335

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

Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys
        355                 360                 365

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

Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly
```

385 390 395 400

Ser Thr Pro Cys Asn Gly Val Lys Gly Phe Asn Cys Tyr Phe Pro Leu
405 410 415

Gln Ser Tyr Gly Phe Gln Pro Thr Tyr Gly Val Gly Tyr Gln Pro Tyr
420 425 430

Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val
435 440 445

Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn
450 455 460

Phe Gly Gly Ser Ala Gly Gly Ser Gly Ser Gly Ser Ser Gly Gly Ser
465 470 475 480

Ser Gly Ala Ser Gly Thr Gly Thr Ala Gly Gly Thr Gly Ser Gly Ser
485 490 495

Gly Thr Gly Ser Gly Arg Val Gln Pro Thr Glu Ser Ile Val Arg Phe
500 505 510

Pro Asn Ile Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr
515 520 525

Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys
530 535 540

Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe
545 550 555 560

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

Asn Val Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln
580 585 590

Ile Ala Pro Gly Gln Thr Gly Lys Ile Ala Asp Tyr Asn Tyr Lys Leu
595 600 605

Pro Asp Asp Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu
610 615 620

Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg
625 630 635 640

Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr
645 650 655

```
Gln Ala Gly Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr
            660                 665                 670

Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr Tyr Gly Val Gly Tyr
        675                 680                 685

Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro
    690                 695                 700

Ala Thr Val Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys
705                 710                 715                 720

Cys Val Asn Phe
```

<210> 302
<211> 724
<212> PRT
<213> Artificial sequence

<220>
<223> VB construct

<400> 302

```
Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1               5                   10                  15

Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
            20                  25                  30

Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
        35                  40                  45

Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
    50                  55                  60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65                  70                  75                  80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
                85                  90                  95

Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
            100                 105                 110

Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
        115                 120                 125

Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
```

```
    130                 135                 140

Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160

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

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

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

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

Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala
            260                 265                 270

Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp
        275                 280                 285

Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr
    290                 295                 300

Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr
305                 310                 315                 320

Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro
                325                 330                 335

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

Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys
        355                 360                 365

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

Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly
385                 390                 395                 400
```

```
Ser Thr Pro Cys Asn Gly Val Lys Gly Phe Asn Cys Tyr Phe Pro Leu
                405                 410                 415

Gln Ser Tyr Gly Phe Gln Pro Thr Tyr Gly Val Gly Tyr Gln Pro Tyr
            420                 425                 430

Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val
        435                 440                 445

Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn
    450                 455                 460

Phe Gly Gly Ser Gly Gly Gly Ser Glu Gly Gly Gly Ser Glu Gly Gly
465                 470                 475                 480

Gly Ser Glu Gly Gly Gly Ser Glu Gly Gly Gly Ser Glu Gly Gly Gly
                485                 490                 495

Ser Gly Gly Gly Ser Arg Val Gln Pro Thr Glu Ser Ile Val Arg Phe
            500                 505                 510

Pro Asn Ile Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr
        515                 520                 525

Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys
    530                 535                 540

Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe
545                 550                 555                 560

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

Asn Val Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln
            580                 585                 590

Ile Ala Pro Gly Gln Thr Gly Lys Ile Ala Asp Tyr Asn Tyr Lys Leu
        595                 600                 605

Pro Asp Asp Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu
    610                 615                 620

Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr Arg Tyr Arg Leu Phe Arg
625                 630                 635                 640

Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr
                645                 650                 655
```

```
Gln Ala Gly Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr
            660                 665                 670

Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr
        675                 680                 685

Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro
    690                 695                 700

Ala Thr Val Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys
705                 710                 715                 720

Cys Val Asn Phe
```

<210>  303
<211>  724
<212>  PRT
<213>  Artificial sequence

<220>
<223>  VB construct

<400>  303

```
Met Gln Val Ser Thr Ala Ala Leu Ala Val Leu Leu Cys Thr Met Ala
1               5                   10                  15

Leu Cys Asn Gln Val Leu Ser Ala Pro Leu Ala Ala Asp Thr Pro Thr
            20                  25                  30

Ala Cys Cys Phe Ser Tyr Thr Ser Arg Gln Ile Pro Gln Asn Phe Ile
        35                  40                  45

Ala Asp Tyr Phe Glu Thr Ser Ser Gln Cys Ser Lys Pro Ser Val Ile
    50                  55                  60

Phe Leu Thr Lys Arg Gly Arg Gln Val Cys Ala Asp Pro Ser Glu Glu
65                  70                  75                  80

Trp Val Gln Lys Tyr Val Ser Asp Leu Glu Leu Ser Ala Glu Leu Lys
                85                  90                  95

Thr Pro Leu Gly Asp Thr Thr His Thr Glu Pro Lys Ser Cys Asp Thr
            100                 105                 110

Pro Pro Pro Cys Pro Arg Cys Pro Gly Gly Gly Ser Ser Gly Gly Gly
        115                 120                 125

Ser Gly Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser
    130                 135                 140
```

```
Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys
145                 150                 155                 160

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

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

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln
        195                 200                 205

Gln Gly Asn Ile Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn
    210                 215                 220

Arg Phe Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly
225                 230                 235                 240

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

Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala
            260                 265                 270

Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp
        275                 280                 285

Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr
    290                 295                 300

Gly Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr
305                 310                 315                 320

Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro
                325                 330                 335

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

Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys
        355                 360                 365

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

Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly
385                 390                 395                 400
```

```
Ser Thr Pro Cys Asn Gly Val Lys Gly Phe Asn Cys Tyr Phe Pro Leu
                405                 410                 415

Gln Ser Tyr Gly Phe Gln Pro Thr Tyr Gly Val Gly Tyr Gln Pro Tyr
            420                 425                 430

Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val
        435                 440                 445

Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn
    450                 455                 460

Phe Gly Gly Ser Ala Gly Gly Ser Gly Ser Gly Ser Ser Gly Gly Ser
465                 470                 475                 480

Ser Gly Ala Ser Gly Thr Gly Thr Ala Gly Gly Thr Gly Ser Gly Ser
                485                 490                 495

Gly Thr Gly Ser Gly Arg Val Gln Pro Thr Glu Ser Ile Val Arg Phe
            500                 505                 510

Pro Asn Ile Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr
        515                 520                 525

Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys
    530                 535                 540

Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe
545                 550                 555                 560

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

Asn Val Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln
            580                 585                 590

Ile Ala Pro Gly Gln Thr Gly Lys Ile Ala Asp Tyr Asn Tyr Lys Leu
        595                 600                 605

Pro Asp Asp Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu
    610                 615                 620

Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr Arg Tyr Arg Leu Phe Arg
625                 630                 635                 640

Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr
                645                 650                 655
```

```
Gln Ala Gly Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr
            660                 665                 670


Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr
        675                 680                 685


Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro
    690                 695                 700


Ala Thr Val Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys
705                 710                 715                 720


Cys Val Asn Phe
```

<210>  304
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  304

```
Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser
1               5                   10                  15
```

<210>  305
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  305

```
Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser Val Leu Tyr
1               5                   10                  15
```

<210>  306
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  306

```
Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser Pro Thr Lys Leu
1               5                   10                  15
```

<210>  307
<211>  15
<212>  PRT

<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  307

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


<210>  308
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  308

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


<210>  309
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  309

Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr
1               5                   10                  15


<210>  310
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  310

Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp Ser
1               5                   10                  15


<210>  311
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  311

Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser
1               5                   10                  15

<210>  312
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  312

Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys
1               5                   10                  15


<210>  313
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  313

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


<210>  314
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  314

Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr Pro Cys Asn Gly Val
1               5                   10                  15


<210>  315
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  315

Ile Tyr Gln Ala Gly Ser Thr Pro Cys Asn Gly Val Glu Gly Phe
1               5                   10                  15


<210>  316
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400> 316

Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser Tyr Gly Phe Gln
1 5 10 15

<210> 317
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 317

Asn Cys Tyr Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr Asn
1 5 10 15

<210> 318
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 318

Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val Val Val Leu
1 5 10 15

<210> 319
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 319

Gly Val Gly Tyr Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu
1 5 10 15

<210> 320
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 320

Tyr Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu His
1 5 10 15

<210> 321
<211> 260

<212> PRT
<213> Artificial sequence

<220>
<223> Pan Hla targeting sequence

<400> 321

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

Val Gln Cys Asp Ile Gln Met Thr Gln Thr Thr Ser Ser Leu Ser Ala
20 25 30

Ser Leu Gly Asp Arg Val Thr Ile Ser Cys Ser Ala Ser Gln Asp Ile
35 40 45

Asn Asn Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly Thr Val Lys
50 55 60

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

Phe Ser Gly Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Ser Asn
85 90 95

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

Phe Pro Arg Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg Gly
115 120 125

Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gln Ile
130 135 140

Gln Leu Val Gln Ser Gly Pro Glu Leu Lys Lys Pro Gly Glu Thr Val
145 150 155 160

Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe Ile Asn Tyr Gly Met
165 170 175

Asn Trp Val Lys Gln Thr Pro Gly Lys Gly Leu Lys Trp Met Gly Trp
180 185 190

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

Arg Phe Ala Phe Ser Leu Glu Thr Ser Ala Ser Thr Ala Tyr Leu Gln
210 215 220

Leu Asn Asn Leu Lys Asn Glu Asp Met Ala Thr Tyr Phe Cys Ala Arg

225 230 235 240

Gly Asp Tyr Tyr Gly Pro Phe Asp Asn Trp Gly Gln Gly Thr Thr Leu
245 250 255

Thr Val Ser Ser
260

<210> 322
<211> 20
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 322

Asp Leu Phe Met Arg Ile Phe Thr Ile Gly Thr Val Thr Leu Lys Gln
1 5 10 15

Gly Glu Ile Lys
20

<210> 323
<211> 40
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 323

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

Val Ala Leu Leu Ala Val Phe Gln Ser Ala Ser Lys Ile Ile Thr Leu
20 25 30

Lys Lys Arg Trp Gln Leu Ala Leu
35 40

<210> 324
<211> 24
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 324

Val Ala Ala Gly Leu Glu Ala Pro Phe Leu Tyr Leu Tyr Ala Leu Val
1 5 10 15

Tyr Phe Leu Gln Ser Ile Asn Phe
            20


<210>  325
<211>  35
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  325

Ile Pro Tyr Asn Ser Val Thr Ser Ser Ile Val Ile Thr Ser Gly Asp
1               5                   10                  15


Gly Thr Thr Ser Pro Ile Ser Glu His Asp Tyr Gln Ile Gly Gly Tyr
            20                  25                  30


Thr Glu Lys
        35


<210>  326
<211>  18
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  326

Val Leu His Ser Tyr Phe Thr Ser Asp Tyr Tyr Gln Leu Tyr Ser Thr
1               5                   10                  15


Gln Leu



<210>  327
<211>  16
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  327

Ser Thr Asp Thr Gly Val Glu His Val Thr Phe Phe Ile Tyr Asn Lys
1               5                   10                  15


<210>  328
<211>  30
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  328

Leu Pro Asn Asn Thr Ala Ser Trp Phe Thr Ala Leu Thr Gln His Gly
1               5                   10                  15


Lys Glu Asp Leu Lys Phe Pro Arg Gly Gln Gly Val Pro Ile
            20                  25                  30


<210>  329
<211>  14
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  329

Lys Met Lys Asp Leu Ser Pro Arg Trp Tyr Phe Tyr Tyr Leu
1               5                   10


<210>  330
<211>  19
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  330

Asn Ala Ala Ile Val Leu Gln Leu Pro Gln Gly Thr Thr Leu Pro Lys
1               5                   10                  15


Gly Phe Tyr



<210>  331
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  331

Asp Ala Ala Leu Ala Leu Leu Leu Leu Asp Arg Leu Asn Gln Leu
1               5                   10                  15


<210>  332
<211>  26
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  332

Lys Ser Ala Ala Glu Ala Ser Lys Lys Pro Arg Gln Lys Arg Thr Ala
1               5                   10                  15


Thr Lys Ala Tyr Asn Val Thr Gln Ala Phe
            20                  25


<210>  333
<211>  37
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  333

Asp Tyr Lys His Trp Pro Gln Ile Ala Gln Phe Ala Pro Ser Ala Ser
1               5                   10                  15


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


Thr Trp Leu Thr Tyr
        35


<210>  334
<211>  16
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  334

Lys Leu Asp Asp Lys Asp Pro Asn Phe Lys Asp Gln Val Ile Leu Leu
1               5                   10                  15


<210>  335
<211>  26
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  335

Asn Phe Lys Asp Gln Val Ile Leu Leu Asn Lys His Ile Asp Ala Tyr
1               5                   10                  15


Lys Thr Phe Pro Pro Thr Glu Pro Lys Lys
            20                  25


<210>  336

<211>  33
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  336

Thr Gln Ala Leu Pro Gln Arg Gln Lys Lys Gln Gln Thr Val Thr Leu
1               5                   10                  15


Leu Pro Ala Ala Asp Leu Asp Asp Phe Ser Lys Gln Leu Gln Gln Ser
            20                  25                  30


Met



<210>  337
<211>  14
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  337

Leu Leu Met Pro Leu Lys Ala Pro Lys Glu Ile Ile Phe Leu
1               5                   10


<210>  338
<211>  19
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  338

Phe Gly Asp Asp Thr Val Ile Glu Val Gln Gly Tyr Lys Ser Val Asn
1               5                   10                  15


Ile Thr Phe



<210>  339
<211>  25
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  339

Val Tyr Leu Ala Val Phe Asp Lys Asn Leu Tyr Asp Lys Leu Val Ser
1               5                   10                  15

Ser Phe Leu Glu Met Lys Ser Glu Lys
            20                  25


<210>  340
<211>  29
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  340

Lys Ile Lys Pro His Asn Ser His Glu Gly Lys Thr Phe Tyr Val Leu
1               5                   10                  15


Pro Asn Asp Asp Thr Leu Arg Val Glu Ala Phe Glu Tyr
            20                  25


<210>  341
<211>  19
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  341

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


Leu Lys Ile



<210>  342
<211>  12
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  342

Thr Asn Tyr Met Pro Tyr Phe Phe Thr Leu Leu Leu
1               5                   10


<210>  343
<211>  24
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  343

Leu Val Gln Met Ala Pro Ile Ser Ala Met Val Arg Met Tyr Ile Phe
1               5                   10                  15

Phe Ala Ser Phe Tyr Tyr Val Trp
            20

<210>  344
<211>  33
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  344

Arg Pro Ile Asn Pro Thr Asp Gln Ser Ser Tyr Ile Val Asp Ser Val
1               5                   10                  15

Thr Val Lys Asn Gly Ser Ile His Leu Tyr Phe Asp Lys Ala Gly Gln
            20                  25                  30

Lys

<210>  345
<211>  32
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  345

Asp Ser Ala Glu Val Ala Val Lys Met Phe Asp Ala Tyr Val Asn Thr
1               5                   10                  15

Phe Ser Ser Thr Phe Asn Val Pro Met Glu Lys Leu Lys Thr Leu Val
            20                  25                  30

<210>  346
<211>  29
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  346

Phe Leu His Phe Leu Pro Arg Val Phe Ser Ala Val Gly Asn Ile Cys
1               5                   10                  15

Tyr Thr Pro Ser Lys Leu Ile Glu Tyr Thr Asp Phe Ala
            20                  25

<210>  347
<211>  31
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  347

Tyr Glu Ser Leu Arg Pro Asp Thr Arg Tyr Val Leu Met Asp Gly Ser
1               5                   10                  15


Ile Ile Gln Phe Pro Asn Thr Tyr Leu Glu Gly Ser Val Arg Val
            20                  25                  30


<210>  348
<211>  17
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  348

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


Leu



<210>  349
<211>  20
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  349

Phe Pro Lys Ser Asp Gly Thr Gly Thr Ile Tyr Thr Glu Leu Glu Pro
1               5                   10                  15


Pro Cys Arg Phe
            20


<210>  350
<211>  18
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  350

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

Thr Met

<210>  351
<211>  20
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  351

His Val Asp Thr Asp Leu Thr Lys Pro Tyr Ile Lys Trp Asp Leu Leu
1               5                   10                  15

Lys Tyr Asp Phe
            20

<210>  352
<211>  23
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  352

Asp Arg Ala Met Pro Asn Met Leu Arg Ile Met Ala Ser Leu Val Leu
1               5                   10                  15

Ala Arg Lys His Thr Thr Cys
            20

<210>  353
<211>  48
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  353

Thr Leu Met Ile Glu Arg Phe Val Ser Leu Ala Ile Asp Ala Tyr Pro
1               5                   10                  15

Leu Thr Lys His Pro Asn Gln Glu Tyr Ala Asp Val Phe His Leu Tyr
            20                  25                  30

Leu Gln Tyr Ile Arg Lys Leu His Asp Glu Leu Thr Gly His Met Leu
        35                  40                  45

<210>  354
<211>  29
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  354

Arg Leu Lys Leu Phe Ala Ala Glu Thr Leu Lys Ala Thr Glu Glu Thr
1               5                   10                  15


Phe Lys Leu Ser Tyr Gly Ile Ala Thr Val Arg Glu Val
            20                  25


<210>  355
<211>  21
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  355

Met Pro Leu Ser Ala Pro Thr Leu Val Pro Gln Glu His Tyr Val Arg
1               5                   10                  15


Ile Thr Gly Leu Tyr
            20


<210>  356
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  356

Ala Gln Leu Pro Ala Pro Arg Thr Leu Leu Thr Lys Gly Thr Leu
1               5                   10                  15


<210>  357
<211>  17
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  357

Arg Pro Gln Ile Gly Val Val Arg Glu Phe Leu Thr Arg Asn Pro Ala
1               5                   10                  15

Trp

<210>  358
<211>  11
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  358

Thr Thr Leu Pro Val Asn Val Ala Phe Glu Leu
1               5                   10


<210>  359
<211>  23
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  359

Lys Val Asp Gly Val Val Gln Gln Leu Pro Glu Thr Tyr Phe Thr Gln
1               5                   10                  15


Ser Arg Asn Leu Gln Glu Phe
            20


<210>  360
<211>  36
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  360

Phe Tyr Pro Lys Leu Gln Ser Ser Gln Ala Trp Gln Pro Gly Val Ala
1               5                   10                  15


Met Pro Asn Leu Tyr Lys Met Gln Arg Met Leu Leu Glu Lys Cys Asp
            20                  25                  30


Leu Gln Asn Tyr
        35


<210>  361
<211>  18
<212>  PRT
<213>  Artificial sequence

<220>

<223>  betacoronavirus epitope

<400>  361

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


Asp Lys



<210>  362
<211>  11
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  362

Thr Leu Asp Ser Lys Thr Gln Ser Leu Leu Ile
1               5                   10


<210>  363
<211>  21
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  363

Phe Val Phe Lys Asn Ile Asp Gly Tyr Phe Lys Ile Tyr Ser Lys His
1               5                   10                  15


Thr Pro Ile Asn Leu
            20


<210>  364
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  364

Tyr Tyr Val Gly Tyr Leu Gln Pro Arg Thr Phe Leu Leu Lys Tyr
1               5                   10                  15


<210>  365
<211>  29
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  365

Ala Leu Asp Pro Leu Ser Glu Thr Lys Cys Thr Leu Lys Ser Phe Thr
1               5                   10                  15


Val Glu Lys Gly Ile Tyr Gln Thr Ser Asn Phe Arg Val
            20                  25


<210>  366
<211>  19
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  366

Val Gln Pro Thr Glu Ser Ile Val Arg Phe Pro Asn Ile Thr Asn Leu
1               5                   10                  15


Cys Pro Phe



<210>  367
<211>  16
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  367

Phe Asn Ala Thr Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg
1               5                   10                  15


<210>  368
<211>  22
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  368

Ser Asn Cys Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe
1               5                   10                  15


Ser Thr Phe Lys Cys Tyr
            20


<210>  369
<211>  18
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  369

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


Lys Leu



<210>  370
<211>  40
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  370

Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn Phe
1               5                   10                  15


Asn Phe Asn Gly Leu Thr Gly Thr Gly Val Leu Thr Glu Ser Asn Lys
            20                  25                  30


Lys Phe Leu Pro Phe Gln Gln Phe
        35                  40


<210>  371
<211>  12
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  371

His Ala Asp Gln Leu Thr Pro Thr Trp Arg Val Tyr
1               5                   10


<210>  372
<211>  30
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  372

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


Pro Val Ser Met Thr Lys Thr Ser Val Asp Cys Thr Met Tyr

20 25 30

<210> 373
<211> 19
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 373

Gln Glu Val Phe Ala Gln Val Lys Gln Ile Tyr Lys Thr Pro Pro Ile
1 5 10 15

Lys Asp Phe

<210> 374
<211> 27
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 374

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

Ala Gly Phe Ile Lys Gln Tyr Gly Asp Cys Leu
20 25

<210> 375
<211> 42
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 375

Ala Ala Leu Gln Ile Pro Phe Ala Met Gln Met Ala Tyr Arg Phe Asn
1 5 10 15

Gly Ile Gly Val Thr Gln Asn Val Leu Tyr Glu Asn Gln Lys Leu Ile
20 25 30

Ala Asn Gln Phe Asn Ser Ala Ile Gly Lys
35 40

<210> 376
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  376

Ala Gln Ala Leu Asn Thr Leu Val Lys Gln Leu Ser Ser Asn Phe
1               5                   10                  15


<210>  377
<211>  17
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  377

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


Val



<210>  378
<211>  13
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  378

Leu Ile Thr Gly Arg Leu Gln Ser Leu Gln Thr Tyr Val
1               5                   10


<210>  379
<211>  29
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  379

Tyr His Leu Met Ser Phe Pro Gln Ser Ala Pro His Gly Val Val Phe
1               5                   10                  15


Leu His Val Thr Tyr Val Pro Ala Gln Glu Lys Asn Phe
            20                  25


<210>  380
<211>  12
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  380

Val Tyr Asp Pro Leu Gln Pro Glu Leu Asp Ser Phe
1               5                   10


<210>  381
<211>  21
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  381

Val Ser Leu Val Lys Pro Ser Phe Tyr Val Tyr Ser Arg Val Lys Asn
1               5                   10                  15


Leu Asn Ser Ser Arg
            20


<210>  382
<211>  21
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  382

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


Gln Trp Asn Leu Val
            20


<210>  383
<211>  18
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  383

Phe Ala Tyr Ala Asn Arg Asn Arg Phe Leu Tyr Ile Ile Lys Leu Ile
1               5                   10                  15


Phe Leu



<210>  384
<211>  28

<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  384

Gly Leu Met Trp Leu Ser Tyr Phe Ile Ala Ser Phe Arg Leu Phe Ala
1               5                   10                  15


Arg Thr Arg Ser Met Trp Ser Phe Asn Pro Glu Thr
            20                  25


<210>  385
<211>  33
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  385

His Leu Arg Ile Ala Gly His His Leu Gly Arg Cys Asp Ile Lys Asp
1               5                   10                  15


Leu Pro Lys Glu Ile Thr Val Ala Thr Ser Arg Thr Leu Ser Tyr Tyr
            20                  25                  30


Lys



<210>  386
<211>  102
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  386

Pro Leu Val Ser Ser Gln Cys Val Asn Leu Thr Thr Arg Thr Gln Leu
1               5                   10                  15


Pro Pro Ala Tyr Thr Asn Ser Phe Thr Arg Gly Val Tyr Tyr Pro Asp
            20                  25                  30


Lys Val Phe Arg Ser Ser Val Leu His Ser Thr Gln Asp Leu Phe Leu
        35                  40                  45


Pro Phe Phe Ser Asn Val Thr Trp Phe His Ala Ile His Val Ser Gly
    50                  55                  60


Thr Asn Gly Thr Lys Arg Phe Asp Asn Pro Val Leu Pro Phe Asn Asp

65 70 75 80

Gly Val Tyr Phe Ala Ser Thr Glu Lys Ser Asn Ile Ile Arg Gly Trp
85 90 95

Ile Phe Gly Thr Thr Leu
100

<210> 387
<211> 109
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 387

Asp Ala Val Asp Cys Ala Leu Asp Pro Leu Ser Glu Thr Lys Cys Thr
1 5 10 15

Leu Lys Ser Phe Thr Val Glu Lys Gly Ile Tyr Gln Thr Ser Asn Phe
20 25 30

Arg Val Gln Pro Thr Glu Ser Ile Val Arg Phe Pro Asn Ile Thr Asn
35 40 45

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

Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser
65 70 75 80

Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val
85 90 95

Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val
100 105

<210> 388
<211> 69
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 388

Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro
1 5 10 15

Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val Val Val Leu Ser Phe
20 25 30

Glu Leu Leu His Ala Pro Ala Thr Val Cys Gly Pro Lys Lys Ser Thr
        35                  40                  45

Asn Leu Val Lys Asn Lys Cys Val Asn Phe Asn Phe Asn Gly Leu Thr
    50                  55                  60

Gly Thr Gly Val Leu
65

<210>  389
<211>  99
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  389

Gln Glu Leu Ile Arg Gln Gly Thr Asp Tyr Lys His Trp Pro Gln Ile
1               5                   10                  15

Ala Gln Phe Ala Pro Ser Ala Ser Ala Phe Phe Gly Met Ser Arg Ile
            20                  25                  30

Gly Met Glu Val Thr Pro Ser Gly Thr Trp Leu Thr Tyr Thr Gly Ala
        35                  40                  45

Ile Lys Leu Asp Asp Lys Asp Pro Asn Phe Lys Asp Gln Val Ile Leu
    50                  55                  60

Leu Asn Lys His Ile Asp Ala Tyr Lys Thr Phe Pro Pro Thr Glu Pro
65                  70                  75                  80

Lys Lys Asp Lys Lys Lys Lys Ala Asp Glu Thr Gln Ala Leu Pro Gln
                85                  90                  95

Arg Gln Lys

<210>  390
<211>  79
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  390

Ala Ser Tyr Gln Thr Gln Thr Asn Ser Pro Arg Arg Ala Arg Ser Val
1               5                   10                  15

```
Ala Ser Gln Ser Ile Ile Ala Tyr Thr Met Ser Leu Gly Ala Glu Asn
            20                  25                  30

Ser Val Ala Tyr Ser Asn Asn Ser Ile Ala Ile Pro Thr Asn Phe Thr
        35                  40                  45

Ile Ser Val Thr Thr Glu Ile Leu Pro Val Ser Met Thr Lys Thr Ser
    50                  55                  60

Val Asp Cys Thr Met Tyr Ile Cys Gly Asp Ser Thr Glu Cys Ser
65                  70                  75
```

<210>  391
<211>  54
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  391

```
Ser Lys Arg Val Asp Phe Cys Gly Lys Gly Tyr His Leu Met Ser Phe
1               5                   10                  15

Pro Gln Ser Ala Pro His Gly Val Val Phe Leu His Val Thr Tyr Val
            20                  25                  30

Pro Ala Gln Glu Lys Asn Phe Thr Thr Ala Pro Ala Ile Cys His Asp
        35                  40                  45

Gly Lys Ala His Phe Pro
    50
```

<210>  392
<211>  43
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  392

```
Asp Ser Ser Ser Gly Trp Thr Ala Gly Ala Ala Ala Tyr Tyr Val Gly
1               5                   10                  15

Tyr Leu Gln Pro Arg Thr Phe Leu Leu Lys Tyr Asn Glu Asn Gly Thr
            20                  25                  30

Ile Thr Asp Ala Val Asp Cys Ala Leu Asp Pro
        35                  40
```

<210>  393
<211>  48
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  393

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


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


Gly Asp Cys Leu Gly Asp Ile Ala Ala Arg Asp Leu Ile Cys Ala Gln
        35                  40                  45


<210>  394
<211>  52
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  394

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


Leu Ile Asp Leu Gln Glu Leu Gly Lys Tyr Glu Gln Tyr Ile Lys Trp
            20                  25                  30


Pro Trp Tyr Ile Trp Leu Gly Phe Ile Ala Gly Leu Ile Ala Ile Val
        35                  40                  45


Met Val Thr Ile
    50


<210>  395
<211>  80
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  395

Ala Ser Trp Phe Thr Ala Leu Thr Gln His Gly Lys Glu Asp Leu Lys
1               5                   10                  15


Phe Pro Arg Gly Gln Gly Val Pro Ile Asn Thr Asn Ser Ser Pro Asp
            20                  25                  30

```
Asp Gln Ile Gly Tyr Tyr Arg Arg Ala Thr Arg Arg Ile Arg Gly Gly
        35                  40                  45

Asp Gly Lys Met Lys Asp Leu Ser Pro Arg Trp Tyr Phe Tyr Tyr Leu
    50                  55                  60

Gly Thr Gly Pro Glu Ala Gly Leu Pro Tyr Gly Ala Asn Lys Asp Gly
65                  70                  75                  80
```

<210>  396
<211>  41
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  396

```
Asn Asn Leu Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg
1               5                   10                  15

Leu Phe Arg Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr
            20                  25                  30

Glu Ile Tyr Gln Ala Gly Ser Thr Pro
        35                  40
```

<210>  397
<211>  59
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  397

```
His His Leu Gly Arg Cys Asp Ile Lys Asp Leu Pro Lys Glu Ile Thr
1               5                   10                  15

Val Ala Thr Ser Arg Thr Leu Ser Tyr Tyr Lys Leu Gly Ala Ser Gln
            20                  25                  30

Arg Val Ala Gly Asp Ser Gly Phe Ala Ala Tyr Ser Arg Tyr Arg Ile
        35                  40                  45

Gly Asn Tyr Lys Leu Asn Thr Asp His Ser Ser
    50                  55
```

<210>  398
<211>  69
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  398

Ser Ser Ile Val Ile Thr Ser Gly Asp Gly Thr Thr Ser Pro Ile Ser
1               5                   10                  15


Glu His Asp Tyr Gln Ile Gly Gly Tyr Thr Glu Lys Trp Glu Ser Gly
            20                  25                  30


Val Lys Asp Cys Val Val Leu His Ser Tyr Phe Thr Ser Asp Tyr Tyr
        35                  40                  45


Gln Leu Tyr Ser Thr Gln Leu Ser Thr Asp Thr Gly Val Glu His Val
    50                  55                  60


Thr Phe Phe Ile Tyr
65


<210>  399
<211>  48
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  399

Leu Leu Phe Val Thr Val Tyr Ser His Leu Leu Leu Val Ala Ala Gly
1               5                   10                  15


Leu Glu Ala Pro Phe Leu Tyr Leu Tyr Ala Leu Val Tyr Phe Leu Gln
            20                  25                  30


Ser Ile Asn Phe Val Arg Ile Ile Met Arg Leu Trp Leu Cys Trp Lys
        35                  40                  45


<210>  400
<211>  59
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  400

Val Ile Lys Val Cys Glu Phe Gln Phe Cys Asn Asp Pro Phe Leu Gly
1               5                   10                  15


Val Tyr Tyr His Lys Asn Asn Lys Ser Trp Met Glu Ser Glu Phe Arg
            20                  25                  30

Val Tyr Ser Ser Ala Asn Asn Cys Thr Phe Glu Tyr Val Ser Gln Pro
        35                  40                  45

Phe Leu Met Asp Leu Glu Gly Lys Gln Gly Asn
    50                  55

<210>  401
<211>  61
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  401

Thr Ile Thr Ser Gly Trp Thr Phe Gly Ala Gly Ala Ala Leu Gln Ile
1               5                   10                  15

Pro Phe Ala Met Gln Met Ala Tyr Arg Phe Asn Gly Ile Gly Val Thr
            20                  25                  30

Gln Asn Val Leu Tyr Glu Asn Gln Lys Leu Ile Ala Asn Gln Phe Asn
        35                  40                  45

Ser Ala Ile Gly Lys Ile Gln Asp Ser Leu Ser Ser Thr
    50                  55                  60

<210>  402
<211>  49
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  402

Leu Phe Leu Ala Phe Val Val Phe Leu Leu Val Thr Leu Ala Ile Leu
1               5                   10                  15

Thr Ala Leu Arg Leu Cys Ala Tyr Cys Cys Asn Ile Val Asn Val Ser
            20                  25                  30

Leu Val Lys Pro Ser Phe Tyr Val Tyr Ser Arg Val Lys Asn Leu Asn
        35                  40                  45

Ser

<210>  403
<211>  33
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  403

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


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


Ala



<210>  404
<211>  31
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  404

Asn Leu Arg Glu Phe Val Phe Lys Asn Ile Asp Gly Tyr Phe Lys Ile
1               5                   10                  15


Tyr Ser Lys His Thr Pro Ile Asn Leu Val Arg Asp Leu Pro Gln
            20                  25                  30


<210>  405
<211>  30
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  405

Lys Ala His Phe Pro Arg Glu Gly Val Phe Val Ser Asn Gly Thr His
1               5                   10                  15


Trp Phe Val Thr Gln Arg Asn Phe Tyr Glu Pro Gln Ile Ile
            20                  25                  30


<210>  406
<211>  42
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  406

Gln Thr Val Thr Lys Lys Ser Ala Ala Glu Ala Ser Lys Lys Pro Arg

1 5 10 15

Gln Lys Arg Thr Ala Thr Lys Ala Tyr Asn Val Thr Gln Ala Phe Gly
20 25 30

Arg Arg Gly Pro Glu Gln Thr Gln Gly Asn
35 40

<210> 407
<211> 32
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 407

Val Pro Val Ala Ile His Ala Asp Gln Leu Thr Pro Thr Trp Arg Val
1 5 10 15

Tyr Ser Thr Gly Ser Asn Val Phe Gln Thr Arg Ala Gly Cys Leu Ile
20 25 30

<210> 408
<211> 41
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 408

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

Thr Asp Glu Met Ile Ala Gln Tyr Thr Ser Ala Leu Leu Ala Gly Thr
20 25 30

Ile Thr Ser Gly Trp Thr Phe Gly Ala
35 40

<210> 409
<211> 37
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 409

Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro Gly Gln
1 5 10 15

Thr Gly Lys Ile Ala Asp Tyr Asn Tyr Lys Leu Pro Asp Asp Phe Thr
            20                  25                  30

Gly Cys Val Ile Ala
        35

<210>  410
<211>  44
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  410

Pro Phe Gly Trp Leu Ile Val Gly Val Ala Leu Leu Ala Val Phe Gln
1               5                   10                  15

Ser Ala Ser Lys Ile Ile Thr Leu Lys Lys Arg Trp Gln Leu Ala Leu
            20                  25                  30

Ser Lys Gly Val His Phe Val Cys Asn Leu Leu Leu
        35                  40

<210>  411
<211>  34
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  411

Val Glu Gln Asp Lys Asn Thr Gln Glu Val Phe Ala Gln Val Lys Gln
1               5                   10                  15

Ile Tyr Lys Thr Pro Pro Ile Lys Asp Phe Gly Gly Phe Asn Phe Ser
            20                  25                  30

Gln Ile

<210>  412
<211>  35
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  412

Cys Leu Val Gly Leu Met Trp Leu Ser Tyr Phe Ile Ala Ser Phe Arg
1               5                   10                  15

Leu Phe Ala Arg Thr Arg Ser Met Trp Ser Phe Asn Pro Glu Thr Asn
            20                  25                  30

Ile Leu Leu
        35

<210>  413
<211>  36
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  413

Pro Ala Arg Met Ala Gly Asn Gly Gly Asp Ala Ala Leu Ala Leu Leu
1               5                   10                  15

Leu Leu Asp Arg Leu Asn Gln Leu Glu Ser Lys Met Ser Gly Lys Gly
            20                  25                  30

Gln Gln Gln Gln
        35

<210>  414
<211>  32
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  414

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

Leu Glu Gln Trp Asn Leu Val Ile Gly Phe Leu Phe Leu Thr Trp Ile
            20                  25                  30

<210>  415
<211>  33
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  415

Trp Ile Cys Leu Leu Gln Phe Ala Tyr Ala Asn Arg Asn Arg Phe Leu
1               5                   10                  15

Tyr Ile Ile Lys Leu Ile Phe Leu Trp Leu Leu Trp Pro Val Thr Leu
            20                  25                  30

Ala

<210>  416
<211>  16
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  416

Ala Gln Phe Ala Pro Ser Ala Ser Ala Phe Phe Gly Met Ser Arg Ile
1               5                   10                  15

<210>  417
<211>  25
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  417

Phe Gly Asp Asp Thr Val Ile Glu Val Gln Gly Tyr Lys Ser Val Asn
1               5                   10                  15

Ile Thr Phe Glu Leu Asp Glu Arg Ile
            20                  25

<210>  418
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  418

Tyr Thr Val Glu Leu Gly Thr Glu Val Asn Glu Phe Ala Cys Val
1               5                   10                  15

<210>  419
<211>  19
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  419

Val Gln Gln Glu Ser Pro Phe Val Met Met Ser Ala Pro Pro Ala Gln
1               5                   10                  15

Tyr Glu Leu

<210> 420
<211> 29
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 420

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

Ala Ser Phe Tyr Tyr Val Trp Lys Ser Tyr Val His Val
20 25

<210> 421
<211> 16
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 421

Lys Met Phe Asp Ala Tyr Val Asn Thr Phe Ser Ser Thr Phe Asn Val
1 5 10 15

<210> 422
<211> 20
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 422

Thr Ala Asn Pro Lys Thr Pro Lys Tyr Lys Phe Val Arg Ile Gln Pro
1 5 10 15

Gly Gln Thr Phe
20

<210> 423
<211> 17
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 423

Phe Leu Asn Arg Phe Thr Thr Thr Leu Asn Asp Phe Asn Leu Val Ala
1               5                   10                  15

Met

<210>  424
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  424

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

<210>  425
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  425

Arg Val Trp Thr Leu Met Asn Val Leu Thr Leu Val Tyr Lys Val
1               5                   10                  15

<210>  426
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  426

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

<210>  427
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  427

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

<210>  428

<211> 18
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 428

Ser Ser Val Glu Leu Lys His Phe Phe Phe Ala Gln Asp Gly Asn Ala
1 5 10 15

Ala Ile

<210> 429
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 429

Arg Ala Met Pro Asn Met Leu Arg Ile Met Ala Ser Leu Val Leu
1 5 10 15

<210> 430
<211> 28
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 430

Ser Ser Gly Asp Ala Thr Thr Ala Tyr Ala Asn Ser Val Phe Asn Ile
1 5 10 15

Cys Gln Ala Val Thr Ala Asn Val Asn Ala Leu Leu
20 25

<210> 431
<211> 16
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 431

Phe Val Asn Glu Phe Tyr Ala Tyr Leu Arg Lys His Phe Ser Met Met
1 5 10 15

<210> 432
<211> 18

<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  432

Ala Ser Ile Lys Asn Phe Lys Ser Val Leu Tyr Tyr Gln Asn Asn Val
1               5                   10                  15


Phe Met



<210>  433
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  433

Leu Met Ile Glu Arg Phe Val Ser Leu Ala Ile Asp Ala Tyr Pro
1               5                   10                  15


<210>  434
<211>  17
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  434

His Val Ile Ser Thr Ser His Lys Leu Val Leu Ser Val Asn Pro Tyr
1               5                   10                  15


Val



<210>  435
<211>  25
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  435

His Phe Ala Ile Gly Leu Ala Leu Tyr Tyr Pro Ser Ala Arg Ile Val
1               5                   10                  15


Tyr Thr Ala Cys Ser His Ala Ala Val
            20                  25

<210>  436
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  436

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


<210>  437
<211>  25
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  437

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


Gln Val Asn Gly Tyr Pro Asn Met Phe
            20                  25


<210>  438
<211>  24
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  438

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


Leu Trp Ala His Gly Phe Glu Leu
            20


<210>  439
<211>  26
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  439

Thr Val Tyr Thr Lys Val Asp Gly Val Asp Val Glu Leu Phe Glu Asn
1               5                   10                  15

Lys Thr Thr Leu Pro Val Asn Val Ala Phe
            20                  25


<210>  440
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  440

Tyr Leu Asn Thr Leu Thr Leu Ala Val Pro Tyr Asn Met Arg Val
1               5                   10                  15


<210>  441
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  441

Arg Val Tyr Ser Thr Gly Ser Asn Val Phe Gln Thr Arg Ala Gly
1               5                   10                  15


<210>  442
<211>  23
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  442

Ser Val Ala Tyr Ser Asn Asn Ser Ile Ala Ile Pro Thr Asn Phe Thr
1               5                   10                  15


Ile Ser Val Thr Thr Glu Ile
            20


<210>  443
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  443

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


<210>  444

<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  444

Leu Val Lys Pro Ser Phe Tyr Val Tyr Ser Arg Val Lys Asn Leu
1               5                   10                  15


<210>  445
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  445

Asn Ile Thr Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr
1               5                   10                  15


<210>  446
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  446

Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala
1               5                   10                  15


<210>  447
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  447

Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala Ser Val Tyr
1               5                   10                  15


<210>  448
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  448

Glu Val Phe Asn Ala Thr Arg Phe Ala Ser Val Tyr Ala Trp Asn
1               5                   10                  15

<210>  449
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  449

Asn Ala Thr Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg
1               5                   10                  15

<210>  450
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  450

Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn
1               5                   10                  15

<210>  451
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  451

Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala
1               5                   10                  15

<210>  452
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  452

Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser
1               5                   10                  15

<210>  453
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  453

Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser Val Leu Tyr
1               5                   10                  15


<210>  454
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  454

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


<210>  455
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  455

Cys Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser
1               5                   10                  15


<210>  456
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  456

Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys
1               5                   10                  15


<210>  457
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  457

Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr Gly
1               5                   10                  15

<210>  458
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  458

Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser Pro
1               5                   10                  15


<210>  459
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  459

Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser Pro Thr Lys Leu
1               5                   10                  15


<210>  460
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  460

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


<210>  461
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  461

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


<210>  462
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  462

Val Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr
1               5                   10                  15

<210>  463
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  463

Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp Ser
1               5                   10                  15

<210>  464
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  464

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

<210>  465
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  465

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

<210>  466
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  466

Asn Val Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg
1               5                   10                  15

<210>  467
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  467

Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala
1               5                   10                  15


<210>  468
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  468

Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro Gly Gln
1               5                   10                  15


<210>  469
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  469

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


<210>  470
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  470

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


<210>  471
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  471

Gln Ile Ala Pro Gly Gln Thr Gly Lys Ile Ala Asp Tyr Asn Tyr
1               5                   10                  15

<210>  472
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  472

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


<210>  473
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  473

Thr Gly Lys Ile Ala Asp Tyr Asn Tyr Lys Leu Pro Asp Asp Phe
1               5                   10                  15


<210>  474
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  474

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


<210>  475
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  475

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


<210>  476
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400> 476

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

<210> 477
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 477

Asp Asp Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu
1 5 10 15

<210> 478
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 478

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

<210> 479
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 479

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

<210> 480
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 480

Trp Asn Ser Asn Asn Leu Asp Ser Lys Val Gly Gly Asn Tyr Asn
1 5 10 15

<210> 481
<211> 15
<212> PRT

<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  481

Asn Asn Leu Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr
1               5                   10                  15


<210>  482
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  482

Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe
1               5                   10                  15


<210>  483
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  483

Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser
1               5                   10                  15


<210>  484
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  484

Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys
1               5                   10                  15


<210>  485
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  485

Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys Pro Phe Glu
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<220>
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<400>  486

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


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<220>
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<400>  487

Arg Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu
1               5                   10                  15


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<220>
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<400>  488

Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln
1               5                   10                  15


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<400>  489

Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser
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<220>
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<400> 490

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

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<400> 491

Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr Pro Cys Asn Gly Val
1 5 10 15

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<220>
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<400> 492

Ile Tyr Gln Ala Gly Ser Thr Pro Cys Asn Gly Val Glu Gly Phe
1 5 10 15

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<400> 493

Ala Gly Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr
1 5 10 15

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<400> 494

Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu
1 5 10 15

<210> 495
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<212>  PRT
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<220>
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<400>  495

Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser Tyr
1               5                   10                  15


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<220>
<223>  betacoronavirus epitope

<400>  496

Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser Tyr Gly Phe Gln
1               5                   10                  15


<210>  497
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<220>
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<400>  497

Asn Cys Tyr Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr Asn
1               5                   10                  15


<210>  498
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<220>
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<400>  498

Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly
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<210>  499
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<220>
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<400>  499

Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro

1 5 10 15

<210> 500
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<220>
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<400> 500

Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val
1 5 10 15

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<400> 501

Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val Val Val Leu
1 5 10 15

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<400> 502

Gly Val Gly Tyr Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu
1 5 10 15

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<400> 503

Tyr Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu His
1 5 10 15

<210> 504
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<223>  betacoronavirus epitope

<400>  504

Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala
1               5                   10                  15


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<400>  505

Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr
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<400>  506

Val Asn Leu Thr Thr Arg Thr Gln Leu Pro Pro Ala Tyr Thr Asn
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<400>  507

Thr Arg Thr Gln Leu Pro Pro Ala Tyr Thr Asn Ser Phe Thr Arg
1               5                   10                  15


<210>  508
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<220>
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<400>  508

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


<210>  509

<211>  15
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<220>
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<400>  509

Tyr Thr Asn Ser Phe Thr Arg Gly Val Tyr Tyr Pro Asp Lys Val
1               5                   10                  15


<210>  510
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<220>
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<400>  510

Phe Thr Arg Gly Val Tyr Tyr Pro Asp Lys Val Phe Arg Ser Ser
1               5                   10                  15


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<400>  511

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


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<220>
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<400>  512

Asp Lys Val Phe Arg Ser Ser Val Leu His Ser Thr Gln Asp Leu
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<400>  513

Arg Ser Ser Val Leu His Ser Thr Gln Asp Leu Phe Leu Pro Phe
1               5                   10                  15

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<220>
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<400>  514

Leu His Ser Thr Gln Asp Leu Phe Leu Pro Phe Phe Ser Asn Val
1               5                   10                  15

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<220>
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<400>  515

Gln Asp Leu Phe Leu Pro Phe Phe Ser Asn Val Thr Trp Phe His
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<220>
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<400>  516

Leu Pro Phe Phe Ser Asn Val Thr Trp Phe His Ala Ile His Val
1               5                   10                  15

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<220>
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<400>  517

Ser Asn Val Thr Trp Phe His Ala Ile His Val Ser Gly Thr Asn
1               5                   10                  15

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<212>  PRT
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<220>
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<400>  518

Trp Phe His Ala Ile His Val Ser Gly Thr Asn Gly Thr Lys Arg
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<400>  519

Ile His Val Ser Gly Thr Asn Gly Thr Lys Arg Phe Asp Asn Pro
1               5                   10                  15


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<400>  520

Gly Thr Asn Gly Thr Lys Arg Phe Asp Asn Pro Val Leu Pro Phe
1               5                   10                  15


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<400>  521

Thr Lys Arg Phe Asp Asn Pro Val Leu Pro Phe Asn Asp Gly Val
1               5                   10                  15


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<400>  522

Asp Asn Pro Val Leu Pro Phe Asn Asp Gly Val Tyr Phe Ala Ser
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<400>  523

Leu Pro Phe Asn Asp Gly Val Tyr Phe Ala Ser Thr Glu Lys Ser
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<400>  524

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


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<400>  525

Phe Ala Ser Thr Glu Lys Ser Asn Ile Ile Arg Gly Trp Ile Phe
1               5                   10                  15


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<400>  526

Glu Lys Ser Asn Ile Ile Arg Gly Trp Ile Phe Gly Thr Thr Leu
1               5                   10                  15


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<400>  527

Ile Ile Arg Gly Trp Ile Phe Gly Thr Thr Leu Asp Ser Lys Thr
1               5                   10                  15


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<220>
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<400>  528

Trp Ile Phe Gly Thr Thr Leu Asp Ser Lys Thr Gln Ser Leu Leu
1               5                   10                  15


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<400>  529

Thr Thr Leu Asp Ser Lys Thr Gln Ser Leu Leu Ile Val Asn Asn
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<400>  530

Ser Lys Thr Gln Ser Leu Leu Ile Val Asn Asn Ala Thr Asn Val
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<400>  531

Ser Leu Leu Ile Val Asn Asn Ala Thr Asn Val Val Ile Lys Val
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<220>
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<400>  532

Val Asn Asn Ala Thr Asn Val Val Ile Lys Val Cys Glu Phe Gln
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<400>  533

Thr Asn Val Val Ile Lys Val Cys Glu Phe Gln Phe Cys Asn Asp
1               5                   10                  15


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<220>
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<400>  534

Ile Lys Val Cys Glu Phe Gln Phe Cys Asn Asp Pro Phe Leu Gly
1               5                   10                  15


<210>  535
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<220>
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<400>  535

Glu Phe Gln Phe Cys Asn Asp Pro Phe Leu Gly Val Tyr Tyr His
1               5                   10                  15


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<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  536

Cys Asn Asp Pro Phe Leu Gly Val Tyr Tyr His Lys Asn Asn Lys
1               5                   10                  15

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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  537

Phe Leu Gly Val Tyr Tyr His Lys Asn Asn Lys Ser Trp Met Glu
1               5                   10                  15


<210>  538
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<213>  Artificial sequence

<220>
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<400>  538

Tyr Tyr His Lys Asn Asn Lys Ser Trp Met Glu Ser Glu Phe Arg
1               5                   10                  15


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<213>  Artificial sequence

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<400>  539

Asn Asn Lys Ser Trp Met Glu Ser Glu Phe Arg Val Tyr Ser Ser
1               5                   10                  15


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<212>  PRT
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<400>  540

Trp Met Glu Ser Glu Phe Arg Val Tyr Ser Ser Ala Asn Asn Cys
1               5                   10                  15


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<400> 541

Glu Phe Arg Val Tyr Ser Ser Ala Asn Asn Cys Thr Phe Glu Tyr
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<220>
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<400> 542

Tyr Ser Ser Ala Asn Asn Cys Thr Phe Glu Tyr Val Ser Gln Pro
1 5 10 15

<210> 543
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<220>
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<400> 543

Asn Asn Cys Thr Phe Glu Tyr Val Ser Gln Pro Phe Leu Met Asp
1 5 10 15

<210> 544
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<220>
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<400> 544

Phe Glu Tyr Val Ser Gln Pro Phe Leu Met Asp Leu Glu Gly Lys
1 5 10 15

<210> 545
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<220>
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<400> 545

Ser Gln Pro Phe Leu Met Asp Leu Glu Gly Lys Gln Gly Asn Phe
1 5 10 15

<210> 546
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<213>  Artificial sequence

<220>
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<400>  546

Leu Met Asp Leu Glu Gly Lys Gln Gly Asn Phe Lys Asn Leu Arg
1               5                   10                  15


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<212>  PRT
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<220>
<223>  betacoronavirus epitope

<400>  547

Glu Gly Lys Gln Gly Asn Phe Lys Asn Leu Arg Glu Phe Val Phe
1               5                   10                  15


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<212>  PRT
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<400>  548

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


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<400>  549

Asn Leu Arg Glu Phe Val Phe Lys Asn Ile Asp Gly Tyr Phe Lys
1               5                   10                  15


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<400>  550

Phe Val Phe Lys Asn Ile Asp Gly Tyr Phe Lys Ile Tyr Ser Lys
1               5                   10                  15

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<400>  551

Asn Ile Asp Gly Tyr Phe Lys Ile Tyr Ser Lys His Thr Pro Ile
1               5                   10                  15


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<400>  552

Tyr Phe Lys Ile Tyr Ser Lys His Thr Pro Ile Asn Leu Val Arg
1               5                   10                  15


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<220>
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<400>  553

Tyr Ser Lys His Thr Pro Ile Asn Leu Val Arg Asp Leu Pro Gln
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<220>
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<400>  554

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


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<220>
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<400> 555

Leu Val Arg Asp Leu Pro Gln Gly Phe Ser Ala Leu Glu Pro Leu
1 5 10 15

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<220>
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<400> 556

Leu Pro Gln Gly Phe Ser Ala Leu Glu Pro Leu Val Asp Leu Pro
1 5 10 15

<210> 557
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<220>
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<400> 557

Phe Ser Ala Leu Glu Pro Leu Val Asp Leu Pro Ile Gly Ile Asn
1 5 10 15

<210> 558
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<220>
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<400> 558

Glu Pro Leu Val Asp Leu Pro Ile Gly Ile Asn Ile Thr Arg Phe
1 5 10 15

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<220>
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<400> 559

Asp Leu Pro Ile Gly Ile Asn Ile Thr Arg Phe Gln Thr Leu Leu
1 5 10 15

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<212>  PRT
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<220>
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<400>  560

Gly Ile Asn Ile Thr Arg Phe Gln Thr Leu Leu Ala Leu His Arg
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<400>  561

Thr Arg Phe Gln Thr Leu Leu Ala Leu His Arg Ser Tyr Leu Thr
1               5                   10                  15


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<400>  562

Thr Leu Leu Ala Leu His Arg Ser Tyr Leu Thr Pro Gly Asp Ser
1               5                   10                  15


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<220>
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<400>  563

Leu His Arg Ser Tyr Leu Thr Pro Gly Asp Ser Ser Ser Gly Trp
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<210>  564
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<220>
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<400>  564

Tyr Leu Thr Pro Gly Asp Ser Ser Ser Gly Trp Thr Ala Gly Ala

1 5 10 15

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<220>
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<400> 565

Gly Asp Ser Ser Ser Gly Trp Thr Ala Gly Ala Ala Ala Tyr Tyr
1 5 10 15

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<220>
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<400> 566

Ser Gly Trp Thr Ala Gly Ala Ala Ala Tyr Tyr Val Gly Tyr Leu
1 5 10 15

<210> 567
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<220>
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<400> 567

Ala Gly Ala Ala Ala Tyr Tyr Val Gly Tyr Leu Gln Pro Arg Thr
1 5 10 15

<210> 568
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<220>
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<400> 568

Ala Tyr Tyr Val Gly Tyr Leu Gln Pro Arg Thr Phe Leu Leu Lys
1 5 10 15

<210> 569
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<220>

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<400>  569

Gly Tyr Leu Gln Pro Arg Thr Phe Leu Leu Lys Tyr Asn Glu Asn
1               5                   10                  15


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<400>  570

Pro Arg Thr Phe Leu Leu Lys Tyr Asn Glu Asn Gly Thr Ile Thr
1               5                   10                  15


<210>  571
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<400>  571

Leu Leu Lys Tyr Asn Glu Asn Gly Thr Ile Thr Asp Ala Val Asp
1               5                   10                  15


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<400>  572

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


<210>  573
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<220>
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<400>  573

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


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<220>
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<400>  574

Ala Val Asp Cys Ala Leu Asp Pro Leu Ser Glu Thr Lys Cys Thr
1               5                   10                  15


<210>  575
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<212>  PRT
<213>  Artificial sequence

<220>
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<400>  575

Ala Leu Asp Pro Leu Ser Glu Thr Lys Cys Thr Leu Lys Ser Phe
1               5                   10                  15


<210>  576
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<220>
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<400>  576

Leu Ser Glu Thr Lys Cys Thr Leu Lys Ser Phe Thr Val Glu Lys
1               5                   10                  15


<210>  577
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<400>  577

Lys Cys Thr Leu Lys Ser Phe Thr Val Glu Lys Gly Ile Tyr Gln
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Lys Ser Phe Thr Val Glu Lys Gly Ile Tyr Gln Thr Ser Asn Phe
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<400>  579

Val Glu Lys Gly Ile Tyr Gln Thr Ser Asn Phe Arg Val Gln Pro
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<220>
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<400>  580

Ile Tyr Gln Thr Ser Asn Phe Arg Val Gln Pro Thr Glu Ser Ile
1               5                   10                  15


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<400>  581

Ser Asn Phe Arg Val Gln Pro Thr Glu Ser Ile Val Arg Phe Pro
1               5                   10                  15


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<223>  betacoronavirus epitope

<400>  582

Val Gln Pro Thr Glu Ser Ile Val Arg Phe Pro Asn Ile Thr Asn
1               5                   10                  15


<210>  583
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<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  583

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


<210>  584
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  584

Arg Phe Pro Asn Ile Thr Asn Leu Cys Pro Phe Gly Glu Val Phe
1               5                   10                  15


<210>  585
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  585

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


<210>  586
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  586

Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala Ser Val
1               5                   10                  15


<210>  587
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  587

Glu Val Phe Asn Ala Thr Arg Phe Ala Ser Val Tyr Ala Trp Asn
1               5                   10                  15

<210>  588
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  588

Ala Thr Arg Phe Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile
1               5                   10                  15


<210>  589
<211>  15
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<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  589

Ala Ser Val Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val
1               5                   10                  15


<210>  590
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  590

Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser
1               5                   10                  15


<210>  591
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  591

Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser Val Leu Tyr Asn
1               5                   10                  15


<210>  592
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  592

Asn Cys Val Ala Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe
1               5                   10                  15

<210>  593
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<212>  PRT
<213>  Artificial sequence

<220>
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<400>  593

Asp Tyr Ser Val Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys
1               5                   10                  15

<210>  594
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  594

Leu Tyr Asn Ser Ala Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val
1               5                   10                  15

<210>  595
<211>  15
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<220>
<223>  betacoronavirus epitope

<400>  595

Ala Ser Phe Ser Thr Phe Lys Cys Tyr Gly Val Ser Pro Thr Lys
1               5                   10                  15

<210>  596
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  596

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

<210>  597
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  597

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


<210>  598
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  598

Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp
1               5                   10                  15


<210>  599
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  599

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


<210>  600
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  600

Phe Thr Asn Val Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu
1               5                   10                  15


<210>  601
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  601

Tyr Ala Asp Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile
1               5                   10                  15

<210>  602
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  602

Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro Gly Gln
1               5                   10                  15


<210>  603
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  603

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


<210>  604
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<220>
<223>  betacoronavirus epitope

<400>  604

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


<210>  605
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<220>
<223>  betacoronavirus epitope

<400>  605

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


<210>  606
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  606

Gly Lys Ile Ala Asp Tyr Asn Tyr Lys Leu Pro Asp Asp Phe Thr
1               5                   10                  15


<210>  607
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<212>  PRT
<213>  Artificial sequence

<220>
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<400>  607

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


<210>  608
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  608

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


<210>  609
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  609

Asp Phe Thr Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp
1               5                   10                  15


<210>  610
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  610

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


<210>  611
<211>  15
<212>  PRT

<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  611

Trp Asn Ser Asn Asn Leu Asp Ser Lys Val Gly Gly Asn Tyr Asn
1               5                   10                  15


<210>  612
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  612

Asn Leu Asp Ser Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg
1               5                   10                  15


<210>  613
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  613

Lys Val Gly Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys
1               5                   10                  15


<210>  614
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  614

Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys
1               5                   10                  15


<210>  615
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  615

Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys Pro Phe Glu Arg
1               5                   10                  15

<210>  616
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  616

Phe Arg Lys Ser Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr
1               5                   10                  15


<210>  617
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  617

Asn Leu Lys Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln
1               5                   10                  15


<210>  618
<211>  15
<212>  PRT
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<220>
<223>  betacoronavirus epitope

<400>  618

Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr
1               5                   10                  15


<210>  619
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<212>  PRT
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<220>
<223>  betacoronavirus epitope

<400>  619

Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr Pro Cys Asn Gly
1               5                   10                  15


<210>  620
<211>  15
<212>  PRT
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<220>
<223>  betacoronavirus epitope

<400> 620

Ile Tyr Gln Ala Gly Ser Thr Pro Cys Asn Gly Val Glu Gly Phe
1 5 10 15

<210> 621
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<220>
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<400> 621

Gly Ser Thr Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe
1 5 10 15

<210> 622
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<220>
<223> betacoronavirus epitope

<400> 622

Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser
1 5 10 15

<210> 623
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<220>
<223> betacoronavirus epitope

<400> 623

Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser Tyr Gly Phe Gln
1 5 10 15

<210> 624
<211> 15
<212> PRT
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<220>
<223> betacoronavirus epitope

<400> 624

Cys Tyr Phe Pro Leu Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly
1 5 10 15

<210> 625
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<212>  PRT
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<220>
<223>  betacoronavirus epitope

<400>  625

Leu Gln Ser Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln
1               5                   10                  15


<210>  626
<211>  15
<212>  PRT
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<220>
<223>  betacoronavirus epitope

<400>  626

Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val
1               5                   10                  15


<210>  627
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  627

Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val Val Val Leu Ser
1               5                   10                  15


<210>  628
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  628

Gly Tyr Gln Pro Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu
1               5                   10                  15


<210>  629
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<220>
<223>  betacoronavirus epitope

<400>  629

Tyr Arg Val Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala

1 5 10 15

<210> 630
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 630

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

<210> 631
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 631

Glu Leu Leu His Ala Pro Ala Thr Val Cys Gly Pro Lys Lys Ser
1 5 10 15

<210> 632
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<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 632

Ala Pro Ala Thr Val Cys Gly Pro Lys Lys Ser Thr Asn Leu Val
1 5 10 15

<210> 633
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<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 633

Val Cys Gly Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys
1 5 10 15

<210> 634
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<220>

<223>  betacoronavirus epitope

<400>  634

Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn Phe Asn
1               5                   10                  15


<210>  635
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  635

Asn Leu Val Lys Asn Lys Cys Val Asn Phe Asn Phe Asn Gly Leu
1               5                   10                  15


<210>  636
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  636

Asn Lys Cys Val Asn Phe Asn Phe Asn Gly Leu Thr Gly Thr Gly
1               5                   10                  15


<210>  637
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  637

Asn Phe Asn Phe Asn Gly Leu Thr Gly Thr Gly Val Leu Thr Glu
1               5                   10                  15


<210>  638
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  638

Asn Gly Leu Thr Gly Thr Gly Val Leu Thr Glu Ser Asn Lys Lys
1               5                   10                  15


<210>  639

<211>  15
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<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  639

Gly Thr Gly Val Leu Thr Glu Ser Asn Lys Lys Phe Leu Pro Phe
1               5                   10                  15


<210>  640
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  640

Leu Thr Glu Ser Asn Lys Lys Phe Leu Pro Phe Gln Gln Phe Gly
1               5                   10                  15


<210>  641
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  641

Asn Lys Lys Phe Leu Pro Phe Gln Gln Phe Gly Arg Asp Ile Ala
1               5                   10                  15


<210>  642
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  642

Leu Pro Phe Gln Gln Phe Gly Arg Asp Ile Ala Asp Thr Thr Asp
1               5                   10                  15


<210>  643
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<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  643

Gln Phe Gly Arg Asp Ile Ala Asp Thr Thr Asp Ala Val Arg Asp
1               5                   10                  15

<210>  644
<211>  15
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<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  644

Asp Ile Ala Asp Thr Thr Asp Ala Val Arg Asp Pro Gln Thr Leu
1               5                   10                  15

<210>  645
<211>  15
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<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  645

Thr Thr Asp Ala Val Arg Asp Pro Gln Thr Leu Glu Ile Leu Asp
1               5                   10                  15

<210>  646
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  646

Val Arg Asp Pro Gln Thr Leu Glu Ile Leu Asp Ile Thr Pro Cys
1               5                   10                  15

<210>  647
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<220>
<223>  betacoronavirus epitope

<400>  647

Gln Thr Leu Glu Ile Leu Asp Ile Thr Pro Cys Ser Phe Gly Gly
1               5                   10                  15

<210>  648
<211>  15
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<220>
<223>  betacoronavirus epitope

<400>  648

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


<210>  649
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<220>
<223>  betacoronavirus epitope

<400>  649

Thr Pro Cys Ser Phe Gly Gly Val Ser Val Ile Thr Pro Gly Thr
1               5                   10                  15


<210>  650
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<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  650

Phe Gly Gly Val Ser Val Ile Thr Pro Gly Thr Asn Thr Ser Asn
1               5                   10                  15


<210>  651
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<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  651

Ser Val Ile Thr Pro Gly Thr Asn Thr Ser Asn Gln Val Ala Val
1               5                   10                  15


<210>  652
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<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  652

Pro Gly Thr Asn Thr Ser Asn Gln Val Ala Val Leu Tyr Gln Asp
1               5                   10                  15

<210>  653
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<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  653

Thr Ser Asn Gln Val Ala Val Leu Tyr Gln Asp Val Asn Cys Thr
1               5                   10                  15


<210>  654
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<213>  Artificial sequence

<220>
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<400>  654

Val Ala Val Leu Tyr Gln Asp Val Asn Cys Thr Glu Val Pro Val
1               5                   10                  15


<210>  655
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  655

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


<210>  656
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  656

Asn Cys Thr Glu Val Pro Val Ala Ile His Ala Asp Gln Leu Thr
1               5                   10                  15


<210>  657
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  657

Val Pro Val Ala Ile His Ala Asp Gln Leu Thr Pro Thr Trp Arg
1               5                   10                  15

<210>  658
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  658

Ile His Ala Asp Gln Leu Thr Pro Thr Trp Arg Val Tyr Ser Thr
1               5                   10                  15

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<220>
<223>  betacoronavirus epitope

<400>  659

Gln Leu Thr Pro Thr Trp Arg Val Tyr Ser Thr Gly Ser Asn Val
1               5                   10                  15

<210>  660
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
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<400>  660

Thr Trp Arg Val Tyr Ser Thr Gly Ser Asn Val Phe Gln Thr Arg
1               5                   10                  15

<210>  661
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<212>  PRT
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<220>
<223>  betacoronavirus epitope

<400>  661

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

<210>  662
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  662

Ser Asn Val Phe Gln Thr Arg Ala Gly Cys Leu Ile Gly Ala Glu
1               5                   10                  15


<210>  663
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  663

Gln Thr Arg Ala Gly Cys Leu Ile Gly Ala Glu His Val Asn Asn
1               5                   10                  15


<210>  664
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<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  664

Gly Cys Leu Ile Gly Ala Glu His Val Asn Asn Ser Tyr Glu Cys
1               5                   10                  15


<210>  665
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  665

Gly Ala Glu His Val Asn Asn Ser Tyr Glu Cys Asp Ile Pro Ile
1               5                   10                  15


<210>  666
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  666

Val Asn Asn Ser Tyr Glu Cys Asp Ile Pro Ile Gly Ala Gly Ile
1               5                   10                  15

<210>  667
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  667

Tyr Glu Cys Asp Ile Pro Ile Gly Ala Gly Ile Cys Ala Ser Tyr
1               5                   10                  15


<210>  668
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  668

Ile Pro Ile Gly Ala Gly Ile Cys Ala Ser Tyr Gln Thr Gln Thr
1               5                   10                  15


<210>  669
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  669

Ala Gly Ile Cys Ala Ser Tyr Gln Thr Gln Thr Asn Ser Pro Arg
1               5                   10                  15


<210>  670
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<220>
<223>  betacoronavirus epitope

<400>  670

Ala Ser Tyr Gln Thr Gln Thr Asn Ser Pro Arg Arg Ala Arg Ser
1               5                   10                  15


<210>  671
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<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400> 671

Thr Gln Thr Asn Ser Pro Arg Arg Ala Arg Ser Val Ala Ser Gln
1 5 10 15

<210> 672
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<220>
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<400> 672

Ser Pro Arg Arg Ala Arg Ser Val Ala Ser Gln Ser Ile Ile Ala
1 5 10 15

<210> 673
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<220>
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<400> 673

Ala Arg Ser Val Ala Ser Gln Ser Ile Ile Ala Tyr Thr Met Ser
1 5 10 15

<210> 674
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<220>
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<400> 674

Ala Ser Gln Ser Ile Ile Ala Tyr Thr Met Ser Leu Gly Ala Glu
1 5 10 15

<210> 675
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<220>
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<400> 675

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

<210> 676
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<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  676

Thr Met Ser Leu Gly Ala Glu Asn Ser Val Ala Tyr Ser Asn Asn
1               5                   10                  15


<210>  677
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  677

Gly Ala Glu Asn Ser Val Ala Tyr Ser Asn Asn Ser Ile Ala Ile
1               5                   10                  15


<210>  678
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  678

Ser Val Ala Tyr Ser Asn Asn Ser Ile Ala Ile Pro Thr Asn Phe
1               5                   10                  15


<210>  679
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<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  679

Ser Asn Asn Ser Ile Ala Ile Pro Thr Asn Phe Thr Ile Ser Val
1               5                   10                  15


<210>  680
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
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<400>  680

Ile Ala Ile Pro Thr Asn Phe Thr Ile Ser Val Thr Thr Glu Ile
1               5                   10                  15

<210>  681
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<213>  Artificial sequence

<220>
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<400>  681

Thr Asn Phe Thr Ile Ser Val Thr Thr Glu Ile Leu Pro Val Ser
1               5                   10                  15


<210>  682
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<212>  PRT
<213>  Artificial sequence

<220>
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<400>  682

Ile Ser Val Thr Thr Glu Ile Leu Pro Val Ser Met Thr Lys Thr
1               5                   10                  15


<210>  683
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<220>
<223>  betacoronavirus epitope

<400>  683

Thr Glu Ile Leu Pro Val Ser Met Thr Lys Thr Ser Val Asp Cys
1               5                   10                  15


<210>  684
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<220>
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<400>  684

Pro Val Ser Met Thr Lys Thr Ser Val Asp Cys Thr Met Tyr Ile
1               5                   10                  15


<210>  685
<211>  15
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<220>
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<400> 685

Thr Lys Thr Ser Val Asp Cys Thr Met Tyr Ile Cys Gly Asp Ser
1 5 10 15

<210> 686
<211> 15
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<220>
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<400> 686

Val Asp Cys Thr Met Tyr Ile Cys Gly Asp Ser Thr Glu Cys Ser
1 5 10 15

<210> 687
<211> 15
<212> PRT
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<220>
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<400> 687

Met Tyr Ile Cys Gly Asp Ser Thr Glu Cys Ser Asn Leu Leu Leu
1 5 10 15

<210> 688
<211> 15
<212> PRT
<213> Artificial sequence

<220>
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<400> 688

Gly Asp Ser Thr Glu Cys Ser Asn Leu Leu Leu Gln Tyr Gly Ser
1 5 10 15

<210> 689
<211> 15
<212> PRT
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<220>
<223> betacoronavirus epitope

<400> 689

Glu Cys Ser Asn Leu Leu Leu Gln Tyr Gly Ser Phe Cys Thr Gln
1 5 10 15

<210> 690
<211> 15

<212>  PRT
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<220>
<223>  betacoronavirus epitope

<400>  690

Leu Leu Leu Gln Tyr Gly Ser Phe Cys Thr Gln Leu Asn Arg Ala
1               5                   10                  15


<210>  691
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  691

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


<210>  692
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  692

Cys Thr Gln Leu Asn Arg Ala Leu Thr Gly Ile Ala Val Glu Gln
1               5                   10                  15


<210>  693
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  693

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


<210>  694
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  694

Thr Gly Ile Ala Val Glu Gln Asp Lys Asn Thr Gln Glu Val Phe

1 5 10 15

<210> 695
<211> 15
<212> PRT
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<220>
<223> betacoronavirus epitope

<400> 695

Val Glu Gln Asp Lys Asn Thr Gln Glu Val Phe Ala Gln Val Lys
1 5 10 15

<210> 696
<211> 15
<212> PRT
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<220>
<223> betacoronavirus epitope

<400> 696

Lys Asn Thr Gln Glu Val Phe Ala Gln Val Lys Gln Ile Tyr Lys
1 5 10 15

<210> 697
<211> 15
<212> PRT
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<220>
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<400> 697

Glu Val Phe Ala Gln Val Lys Gln Ile Tyr Lys Thr Pro Pro Ile
1 5 10 15

<210> 698
<211> 15
<212> PRT
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<220>
<223> betacoronavirus epitope

<400> 698

Gln Val Lys Gln Ile Tyr Lys Thr Pro Pro Ile Lys Asp Phe Gly
1 5 10 15

<210> 699
<211> 15
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<220>

<223>  betacoronavirus epitope

<400>  699

Ile Tyr Lys Thr Pro Pro Ile Lys Asp Phe Gly Gly Phe Asn Phe
1               5                   10                  15


<210>  700
<211>  15
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<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  700

Pro Pro Ile Lys Asp Phe Gly Gly Phe Asn Phe Ser Gln Ile Leu
1               5                   10                  15


<210>  701
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  701

Asp Phe Gly Gly Phe Asn Phe Ser Gln Ile Leu Pro Asp Pro Ser
1               5                   10                  15


<210>  702
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  702

Phe Asn Phe Ser Gln Ile Leu Pro Asp Pro Ser Lys Pro Ser Lys
1               5                   10                  15


<210>  703
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  703

Gln Ile Leu Pro Asp Pro Ser Lys Pro Ser Lys Arg Ser Phe Ile
1               5                   10                  15


<210>  704

<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  704

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


<210>  705
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  705

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


<210>  706
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  706

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


<210>  707
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  707

Asp Leu Leu Phe Asn Lys Val Thr Leu Ala Asp Ala Gly Phe Ile
1               5                   10                  15


<210>  708
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  708

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

<210>  709
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  709

Leu Ala Asp Ala Gly Phe Ile Lys Gln Tyr Gly Asp Cys Leu Gly
1               5                   10                  15

<210>  710
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  710

Gly Phe Ile Lys Gln Tyr Gly Asp Cys Leu Gly Asp Ile Ala Ala
1               5                   10                  15

<210>  711
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  711

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

<210>  712
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  712

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

<210>  713
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  713

Ile Ala Ala Arg Asp Leu Ile Cys Ala Gln Lys Phe Asn Gly Leu
1               5                   10                  15


<210>  714
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  714

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


<210>  715
<211>  15
<212>  PRT
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<220>
<223>  betacoronavirus epitope

<400>  715

Ala Gln Lys Phe Asn Gly Leu Thr Val Leu Pro Pro Leu Leu Thr
1               5                   10                  15


<210>  716
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  716

Asn Gly Leu Thr Val Leu Pro Pro Leu Leu Thr Asp Glu Met Ile
1               5                   10                  15


<210>  717
<211>  15
<212>  PRT
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<220>
<223>  betacoronavirus epitope

<400>  717

Val Leu Pro Pro Leu Leu Thr Asp Glu Met Ile Ala Gln Tyr Thr
1               5                   10                  15

<210>  718
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  718

Leu Leu Thr Asp Glu Met Ile Ala Gln Tyr Thr Ser Ala Leu Leu
1               5                   10                  15


<210>  719
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  719

Glu Met Ile Ala Gln Tyr Thr Ser Ala Leu Leu Ala Gly Thr Ile
1               5                   10                  15


<210>  720
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  720

Gln Tyr Thr Ser Ala Leu Leu Ala Gly Thr Ile Thr Ser Gly Trp
1               5                   10                  15


<210>  721
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  721

Ala Leu Leu Ala Gly Thr Ile Thr Ser Gly Trp Thr Phe Gly Ala
1               5                   10                  15


<210>  722
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  722

Gly Thr Ile Thr Ser Gly Trp Thr Phe Gly Ala Gly Ala Ala Leu
1               5                   10                  15

<210>  723
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  723

Ser Gly Trp Thr Phe Gly Ala Gly Ala Ala Leu Gln Ile Pro Phe
1               5                   10                  15

<210>  724
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  724

Phe Gly Ala Gly Ala Ala Leu Gln Ile Pro Phe Ala Met Gln Met
1               5                   10                  15

<210>  725
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  725

Ala Ala Leu Gln Ile Pro Phe Ala Met Gln Met Ala Tyr Arg Phe
1               5                   10                  15

<210>  726
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  726

Ile Pro Phe Ala Met Gln Met Ala Tyr Arg Phe Asn Gly Ile Gly
1               5                   10                  15

<210>  727
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  727

Met Gln Met Ala Tyr Arg Phe Asn Gly Ile Gly Val Thr Gln Asn
1               5                   10                  15


<210>  728
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  728

Tyr Arg Phe Asn Gly Ile Gly Val Thr Gln Asn Val Leu Tyr Glu
1               5                   10                  15


<210>  729
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  729

Gly Ile Gly Val Thr Gln Asn Val Leu Tyr Glu Asn Gln Lys Leu
1               5                   10                  15


<210>  730
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  730

Thr Gln Asn Val Leu Tyr Glu Asn Gln Lys Leu Ile Ala Asn Gln
1               5                   10                  15


<210>  731
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  731

Leu Tyr Glu Asn Gln Lys Leu Ile Ala Asn Gln Phe Asn Ser Ala
1               5                   10                  15

<210>  732
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  732

Gln Lys Leu Ile Ala Asn Gln Phe Asn Ser Ala Ile Gly Lys Ile
1               5                   10                  15


<210>  733
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  733

Ala Asn Gln Phe Asn Ser Ala Ile Gly Lys Ile Gln Asp Ser Leu
1               5                   10                  15


<210>  734
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  734

Asn Ser Ala Ile Gly Lys Ile Gln Asp Ser Leu Ser Ser Thr Ala
1               5                   10                  15


<210>  735
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  735

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


<210>  736
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  736

Asp Ser Leu Ser Ser Thr Ala Ser Ala Leu Gly Lys Leu Gln Asp
1               5                   10                  15


<210>  737
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  737

Ser Thr Ala Ser Ala Leu Gly Lys Leu Gln Asp Val Val Asn Gln
1               5                   10                  15


<210>  738
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  738

Ala Leu Gly Lys Leu Gln Asp Val Val Asn Gln Asn Ala Gln Ala
1               5                   10                  15


<210>  739
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  739

Leu Gln Asp Val Val Asn Gln Asn Ala Gln Ala Leu Asn Thr Leu
1               5                   10                  15


<210>  740
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  740

Val Asn Gln Asn Ala Gln Ala Leu Asn Thr Leu Val Lys Gln Leu
1               5                   10                  15


<210>  741
<211>  15
<212>  PRT

<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  741

Ala Gln Ala Leu Asn Thr Leu Val Lys Gln Leu Ser Ser Asn Phe
1               5                   10                  15


<210>  742
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  742

Asn Thr Leu Val Lys Gln Leu Ser Ser Asn Phe Gly Ala Ile Ser
1               5                   10                  15


<210>  743
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  743

Lys Gln Leu Ser Ser Asn Phe Gly Ala Ile Ser Ser Val Leu Asn
1               5                   10                  15


<210>  744
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  744

Ser Asn Phe Gly Ala Ile Ser Ser Val Leu Asn Asp Ile Leu Ser
1               5                   10                  15


<210>  745
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<212>  PRT
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<220>
<223>  betacoronavirus epitope

<400>  745

Ala Ile Ser Ser Val Leu Asn Asp Ile Leu Ser Arg Leu Asp Lys
1               5                   10                  15

<210>  746
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  746

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


<210>  747
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  747

Ile Leu Ser Arg Leu Asp Lys Val Glu Ala Glu Val Gln Ile Asp
1               5                   10                  15


<210>  748
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  748

Leu Asp Lys Val Glu Ala Glu Val Gln Ile Asp Arg Leu Ile Thr
1               5                   10                  15


<210>  749
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  749

Glu Ala Glu Val Gln Ile Asp Arg Leu Ile Thr Gly Arg Leu Gln
1               5                   10                  15


<210>  750
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400> 750

Gln Ile Asp Arg Leu Ile Thr Gly Arg Leu Gln Ser Leu Gln Thr
1 5 10 15

<210> 751
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<212> PRT
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<220>
<223> betacoronavirus epitope

<400> 751

Leu Ile Thr Gly Arg Leu Gln Ser Leu Gln Thr Tyr Val Thr Gln
1 5 10 15

<210> 752
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<212> PRT
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<220>
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<400> 752

Arg Leu Gln Ser Leu Gln Thr Tyr Val Thr Gln Gln Leu Ile Arg
1 5 10 15

<210> 753
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 753

Leu Gln Thr Tyr Val Thr Gln Gln Leu Ile Arg Ala Ala Glu Ile
1 5 10 15

<210> 754
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 754

Val Thr Gln Gln Leu Ile Arg Ala Ala Glu Ile Arg Ala Ser Ala
1 5 10 15

<210> 755
<211> 15

<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  755

Leu Ile Arg Ala Ala Glu Ile Arg Ala Ser Ala Asn Leu Ala Ala
1               5                   10                  15


<210>  756
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  756

Ala Glu Ile Arg Ala Ser Ala Asn Leu Ala Ala Thr Lys Met Ser
1               5                   10                  15


<210>  757
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  757

Ala Ser Ala Asn Leu Ala Ala Thr Lys Met Ser Glu Cys Val Leu
1               5                   10                  15


<210>  758
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  758

Leu Ala Ala Thr Lys Met Ser Glu Cys Val Leu Gly Gln Ser Lys
1               5                   10                  15


<210>  759
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  759

Lys Met Ser Glu Cys Val Leu Gly Gln Ser Lys Arg Val Asp Phe

1 5 10 15

<210> 760
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<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 760

Cys Val Leu Gly Gln Ser Lys Arg Val Asp Phe Cys Gly Lys Gly
1 5 10 15

<210> 761
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<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 761

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

<210> 762
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<212> PRT
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<220>
<223> betacoronavirus epitope

<400> 762

Val Asp Phe Cys Gly Lys Gly Tyr His Leu Met Ser Phe Pro Gln
1 5 10 15

<210> 763
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<212> PRT
<213> Artificial sequence

<220>
<223> betacoronavirus epitope

<400> 763

Gly Lys Gly Tyr His Leu Met Ser Phe Pro Gln Ser Ala Pro His
1 5 10 15

<210> 764
<211> 15
<212> PRT
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<220>

<223>  betacoronavirus epitope

<400>  764

His Leu Met Ser Phe Pro Gln Ser Ala Pro His Gly Val Val Phe
1               5                   10                  15


<210>  765
<211>  15
<212>  PRT
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<220>
<223>  betacoronavirus epitope

<400>  765

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


<210>  766
<211>  15
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<220>
<223>  betacoronavirus epitope

<400>  766

Ala Pro His Gly Val Val Phe Leu His Val Thr Tyr Val Pro Ala
1               5                   10                  15


<210>  767
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  767

Val Val Phe Leu His Val Thr Tyr Val Pro Ala Gln Glu Lys Asn
1               5                   10                  15


<210>  768
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  768

His Val Thr Tyr Val Pro Ala Gln Glu Lys Asn Phe Thr Thr Ala
1               5                   10                  15


<210>  769

<211>  15
<212>  PRT
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<220>
<223>  betacoronavirus epitope

<400>  769

Val Pro Ala Gln Glu Lys Asn Phe Thr Thr Ala Pro Ala Ile Cys
1               5                   10                  15


<210>  770
<211>  15
<212>  PRT
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<220>
<223>  betacoronavirus epitope

<400>  770

Glu Lys Asn Phe Thr Thr Ala Pro Ala Ile Cys His Asp Gly Lys
1               5                   10                  15


<210>  771
<211>  15
<212>  PRT
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<220>
<223>  betacoronavirus epitope

<400>  771

Thr Thr Ala Pro Ala Ile Cys His Asp Gly Lys Ala His Phe Pro
1               5                   10                  15


<210>  772
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  772

Ala Ile Cys His Asp Gly Lys Ala His Phe Pro Arg Glu Gly Val
1               5                   10                  15


<210>  773
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  773

Asp Gly Lys Ala His Phe Pro Arg Glu Gly Val Phe Val Ser Asn
1               5                   10                  15

<210>  774
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  774

His Phe Pro Arg Glu Gly Val Phe Val Ser Asn Gly Thr His Trp
1               5                   10                  15

<210>  775
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  775

Glu Gly Val Phe Val Ser Asn Gly Thr His Trp Phe Val Thr Gln
1               5                   10                  15

<210>  776
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  776

Val Ser Asn Gly Thr His Trp Phe Val Thr Gln Arg Asn Phe Tyr
1               5                   10                  15

<210>  777
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  777

Thr His Trp Phe Val Thr Gln Arg Asn Phe Tyr Glu Pro Gln Ile
1               5                   10                  15

<210>  778
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<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  778

Val Thr Gln Arg Asn Phe Tyr Glu Pro Gln Ile Ile Thr Thr Asp
1               5                   10                  15


<210>  779
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  779

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


<210>  780
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  780

Pro Gln Ile Ile Thr Thr Asp Asn Thr Phe Val Ser Gly Asn Cys
1               5                   10                  15


<210>  781
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  781

Thr Thr Asp Asn Thr Phe Val Ser Gly Asn Cys Asp Val Val Ile
1               5                   10                  15


<210>  782
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  782

Thr Phe Val Ser Gly Asn Cys Asp Val Val Ile Gly Ile Val Asn
1               5                   10                  15

<210>  783
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  783

Gly Asn Cys Asp Val Val Ile Gly Ile Val Asn Asn Thr Val Tyr
1               5                   10                  15


<210>  784
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  784

Val Val Ile Gly Ile Val Asn Asn Thr Val Tyr Asp Pro Leu Gln
1               5                   10                  15


<210>  785
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  785

Ile Val Asn Asn Thr Val Tyr Asp Pro Leu Gln Pro Glu Leu Asp
1               5                   10                  15


<210>  786
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  786

Thr Val Tyr Asp Pro Leu Gln Pro Glu Leu Asp Ser Phe Lys Glu
1               5                   10                  15


<210>  787
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  787

Pro Leu Gln Pro Glu Leu Asp Ser Phe Lys Glu Glu Leu Asp Lys
1               5                   10                  15

<210>  788
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  788

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

<210>  789
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  789

Phe Lys Glu Glu Leu Asp Lys Tyr Phe Lys Asn His Thr Ser Pro
1               5                   10                  15

<210>  790
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  790

Leu Asp Lys Tyr Phe Lys Asn His Thr Ser Pro Asp Val Asp Leu
1               5                   10                  15

<210>  791
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  791

Phe Lys Asn His Thr Ser Pro Asp Val Asp Leu Gly Asp Ile Ser
1               5                   10                  15

<210>  792
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  792

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


<210>  793
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  793

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


<210>  794
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  794

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


<210>  795
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  795

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


<210>  796
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  796

Val Val Asn Ile Gln Lys Glu Ile Asp Arg Leu Asn Glu Val Ala
1               5                   10                  15

<210>  797
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  797

Gln Lys Glu Ile Asp Arg Leu Asn Glu Val Ala Lys Asn Leu Asn
1               5                   10                  15


<210>  798
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  798

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


<210>  799
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  799

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


<210>  800
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400>  800

Asn Leu Asn Glu Ser Leu Ile Asp Leu Gln Glu Leu Gly Lys Tyr
1               5                   10                  15


<210>  801
<211>  15
<212>  PRT
<213>  Artificial sequence

<220>
<223>  betacoronavirus epitope

<400> 801

Ser Leu Ile Asp Leu Gln Glu Leu Gly Lys Tyr Glu Gln Tyr Ile
1 5 10 15

<210> 802
<211> 223
<212> PRT
<213> Artificial sequence

<220>
<223> RBD sequence

<400> 802

Arg Val Gln Pro Thr Glu Ser Ile Val Arg Phe Pro Asn Ile Thr Asn
1 5 10 15

Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala Ser Val
20 25 30

Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser
35 40 45

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

Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp
65 70 75 80

Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro Gly Gln
85 90 95

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

Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys Val Gly
115 120 125

Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys
130 135 140

Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr
145 150 155 160

Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser
165 170 175

Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val
180 185 190

Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val Cys Gly

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        195                 200                 205

Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn Phe
    210                 215                 220


<210>  803
<211>  223
<212>  PRT
<213>  Artificial sequence

<220>
<223>  RBD mutated sequence

<400>  803

Arg Val Gln Pro Thr Glu Ser Ile Val Arg Phe Pro Asn Ile Thr Asn
1               5                   10                  15


Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala Ser Val
            20                  25                  30


Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser
        35                  40                  45


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


Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp
65                  70                  75                  80


Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro Gly Gln
                85                  90                  95


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


Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys Val Gly
        115                 120                 125


Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys
    130                 135                 140


Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr
145                 150                 155                 160


Pro Cys Asn Gly Val Lys Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser
                165                 170                 175


Tyr Gly Phe Gln Pro Thr Tyr Gly Val Gly Tyr Gln Pro Tyr Arg Val
            180                 185                 190
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Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val Cys Gly
        195                 200                 205


Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn Phe
    210                 215                 220


<210>  804
<211>  223
<212>  PRT
<213>  Artificial sequence

<220>
<223>  RBD mutated sequence

<400>  804

Arg Val Gln Pro Thr Glu Ser Ile Val Arg Phe Pro Asn Ile Thr Asn
1               5                   10                  15


Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala Ser Val
            20                  25                  30


Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser
        35                  40                  45


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


Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp
65                  70                  75                  80


Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro Gly Gln
                85                  90                  95


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


Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys Val Gly
        115                 120                 125


Gly Asn Tyr Asn Tyr Leu Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys
    130                 135                 140


Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr
145                 150                 155                 160


Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser
                165                 170                 175


Tyr Gly Phe Gln Pro Thr Tyr Gly Val Gly Tyr Gln Pro Tyr Arg Val
            180                 185                 190
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Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val Cys Gly
        195                 200                 205


Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn Phe
    210                 215                 220


<210>  805
<211>  223
<212>  PRT
<213>  Artificial sequence

<220>
<223>  RBD mutated sequence

<400>  805

Arg Val Gln Pro Thr Glu Ser Ile Val Arg Phe Pro Asn Ile Thr Asn
1               5                   10                  15


Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Arg Phe Ala Ser Val
            20                  25                  30


Tyr Ala Trp Asn Arg Lys Arg Ile Ser Asn Cys Val Ala Asp Tyr Ser
        35                  40                  45


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


Ser Pro Thr Lys Leu Asn Asp Leu Cys Phe Thr Asn Val Tyr Ala Asp
65                  70                  75                  80


Ser Phe Val Ile Arg Gly Asp Glu Val Arg Gln Ile Ala Pro Gly Gln
                85                  90                  95


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


Gly Cys Val Ile Ala Trp Asn Ser Asn Asn Leu Asp Ser Lys Val Gly
        115                 120                 125


Gly Asn Tyr Asn Tyr Arg Tyr Arg Leu Phe Arg Lys Ser Asn Leu Lys
    130                 135                 140


Pro Phe Glu Arg Asp Ile Ser Thr Glu Ile Tyr Gln Ala Gly Ser Thr
145                 150                 155                 160


Pro Cys Asn Gly Val Glu Gly Phe Asn Cys Tyr Phe Pro Leu Gln Ser
                165                 170                 175


Tyr Gly Phe Gln Pro Thr Asn Gly Val Gly Tyr Gln Pro Tyr Arg Val
            180                 185                 190
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```
Val Val Leu Ser Phe Glu Leu Leu His Ala Pro Ala Thr Val Cys Gly
        195                 200                 205


Pro Lys Lys Ser Thr Asn Leu Val Lys Asn Lys Cys Val Asn Phe
    210                 215                 220
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<210> 806
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> Linker

<400> 806

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Gly Gly Gly Gly Ser
1               5
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<210> 807
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> Linker

<400> 807

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Gly Gly Gly Ser Ser
1               5
```

<210> 808
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> Linker

<400> 808

```
Gly Gly Gly Ser Gly
1               5
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<210> 809
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> Linker

<400> 809

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Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
1               5                   10
```

<210>  810
<211>  5
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  810

Leu Gly Gly Gly Ser
1               5


<210>  811
<211>  5
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  811

Gly Leu Gly Gly Ser
1               5


<210>  812
<211>  5
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  812

Gly Gly Leu Gly Ser
1               5


<210>  813
<211>  5
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  813

Gly Gly Gly Leu Ser
1               5


<210>  814
<211>  5
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400> 814

Gly Gly Gly Gly Leu
1 5

<210> 815
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> Linker

<400> 815

Leu Gly Gly Ser Gly
1 5

<210> 816
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> Linker

<400> 816

Gly Leu Gly Ser Gly
1 5

<210> 817
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> Linker

<400> 817

Gly Gly Leu Ser Gly
1 5

<210> 818
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> Linker

<400> 818

Gly Gly Gly Leu Gly
1 5

<210> 819
<211> 5
<212> PRT

<213>  Artificial sequence

<220>
<223>  Linker

<400>  819

Leu Gly Gly Ser Ser
1               5


<210>  820
<211>  5
<212>  PRT
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<220>
<223>  Linker

<400>  820

Gly Leu Gly Ser Ser
1               5


<210>  821
<211>  5
<212>  PRT
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<220>
<223>  Linker

<400>  821

Gly Gly Leu Ser Ser
1               5


<210>  822
<211>  5
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  822

Gly Gly Gly Ser Leu
1               5


<210>  823
<211>  5
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  823

Leu Gly Leu Gly Ser
1               5

<210>  824
<211>  5
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  824

Gly Leu Gly Leu Ser
1               5


<210>  825
<211>  5
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  825

Gly Leu Leu Gly Ser
1               5


<210>  826
<211>  5
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  826

Leu Gly Gly Leu Ser
1               5


<210>  827
<211>  5
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  827

Gly Leu Gly Gly Leu
1               5


<210>  828
<211>  5
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400> 828

Leu Gly Leu Ser Gly
1 5

<210> 829
<211> 5
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<220>
<223> Linker

<400> 829

Gly Leu Leu Ser Gly
1 5

<210> 830
<211> 5
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<213> Artificial sequence

<220>
<223> Linker

<400> 830

Gly Gly Leu Ser Leu
1 5

<210> 831
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> Linker

<400> 831

Gly Gly Leu Leu Gly
1 5

<210> 832
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> Linker

<400> 832

Gly Leu Gly Ser Leu
1 5

<210> 833
<211> 5

<212>  PRT
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<220>
<223>  Linker

<400>  833

Leu Gly Leu Ser Ser
1               5


<210>  834
<211>  5
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  834

Gly Gly Leu Leu Ser
1               5


<210>  835
<211>  10
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  835

Leu Gly Gly Gly Ser Gly Gly Gly Gly Ser
1               5                   10


<210>  836
<211>  10
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  836

Gly Leu Gly Gly Ser Gly Gly Gly Gly Ser
1               5                   10


<210>  837
<211>  10
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  837

Gly Gly Leu Gly Ser Gly Gly Gly Gly Ser

1 5 10

<210> 838
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> Linker

<400> 838

Gly Gly Gly Leu Ser Gly Gly Gly Gly Ser
1 5 10

<210> 839
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> Linker

<400> 839

Gly Gly Gly Gly Leu Gly Gly Gly Gly Ser
1 5 10

<210> 840
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> Linker

<400> 840

Leu Gly Gly Ser Gly Gly Gly Gly Ser Gly
1 5 10

<210> 841
<211> 10
<212> PRT
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<220>
<223> Linker

<400> 841

Gly Leu Gly Ser Gly Gly Gly Gly Ser Gly
1 5 10

<210> 842
<211> 10
<212> PRT
<213> Artificial sequence

<220>

<223>  Linker

<400>  842

Gly Gly Leu Ser Gly Gly Gly Gly Ser Gly
1               5                   10


<210>  843
<211>  10
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  843

Gly Gly Gly Leu Gly Gly Gly Gly Ser Gly
1               5                   10


<210>  844
<211>  10
<212>  PRT
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<220>
<223>  Linker

<400>  844

Gly Gly Gly Ser Leu Gly Gly Gly Ser Gly
1               5                   10


<210>  845
<211>  10
<212>  PRT
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<220>
<223>  Linker

<400>  845

Leu Gly Gly Ser Ser Gly Gly Gly Ser Ser
1               5                   10


<210>  846
<211>  10
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  846

Gly Leu Gly Ser Ser Gly Gly Gly Ser Ser
1               5                   10


<210>  847

<211>  10
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  847

Gly Gly Leu Ser Ser Gly Gly Gly Ser Ser
1               5                   10


<210>  848
<211>  10
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  848

Gly Gly Gly Leu Ser Gly Gly Gly Ser Ser
1               5                   10


<210>  849
<211>  10
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  849

Gly Gly Gly Ser Leu Gly Gly Gly Ser Ser
1               5                   10


<210>  850
<211>  10
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  850

Leu Gly Gly Gly Ser Leu Gly Gly Gly Ser
1               5                   10


<210>  851
<211>  10
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  851

Gly Leu Gly Gly Ser Gly Leu Gly Gly Ser
1               5                   10

<210>  852
<211>  10
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  852

Gly Gly Leu Gly Ser Gly Gly Leu Gly Ser
1               5                   10

<210>  853
<211>  10
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  853

Gly Gly Gly Leu Ser Gly Gly Gly Leu Ser
1               5                   10

<210>  854
<211>  10
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  854

Gly Gly Gly Gly Leu Gly Gly Gly Gly Leu
1               5                   10

<210>  855
<211>  10
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  855

Leu Gly Gly Ser Gly Leu Gly Gly Ser Gly
1               5                   10

<210>  856
<211>  10
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  856

Gly Leu Gly Ser Gly Gly Leu Gly Ser Gly
1               5                   10


<210>  857
<211>  10
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  857

Gly Gly Leu Ser Gly Gly Gly Leu Ser Gly
1               5                   10


<210>  858
<211>  10
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  858

Gly Gly Gly Leu Gly Gly Gly Gly Leu Gly
1               5                   10


<210>  859
<211>  10
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  859

Gly Gly Gly Ser Leu Gly Gly Gly Ser Leu
1               5                   10


<210>  860
<211>  10
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  860

Leu Gly Gly Ser Ser Leu Gly Gly Ser Ser
1               5                   10

<210>  861
<211>  10
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  861

Gly Leu Gly Ser Ser Gly Leu Gly Ser Ser
1               5                   10


<210>  862
<211>  10
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  862

Gly Gly Leu Ser Ser Gly Gly Leu Ser Ser
1               5                   10


<210>  863
<211>  16
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  863

Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly Gly Leu
1               5                   10                  15


<210>  864
<211>  13
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  864

Ser Leu Ser Leu Ser Pro Gly Lys Gly Leu Gly Gly Leu
1               5                   10


<210>  865
<211>  4
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  865

Gly Ser Ala Thr
1

<210>  866
<211>  36
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  866

Gly Gly Ser Ala Gly Gly Ser Gly Ser Gly Ser Ser Gly Gly Ser Ser
1               5                   10                  15

Gly Ala Ser Gly Thr Gly Thr Ala Gly Gly Thr Gly Ser Gly Ser Gly
            20                  25                  30

Thr Gly Ser Gly
        35

<210>  867
<211>  36
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  867

Gly Gly Ser Gly Gly Gly Ser Glu Gly Gly Gly Ser Glu Gly Gly Gly
1               5                   10                  15

Ser Glu Gly Gly Gly Ser Glu Gly Gly Gly Ser Glu Gly Gly Gly Ser
            20                  25                  30

Gly Gly Gly Ser
        35

<210>  868
<211>  5
<212>  PRT
<213>  Artificial sequence

<220>
<223>  Linker

<400>  868

Gly Leu Ser Gly Leu
1               5