

PhoenixTemp5796.tmp.txt
SEQUENCE LISTING

<110> ANACONDA
INSTITUT PASTEUR
DEMERET, caroline
THIERRY, francoise
BLUMENFELD, marta
GAUTHIER, jean-michel

<120> NEW POLYPEPTIDES INDUCING APOPTOSIS AND USES THEREOF

<130> 353280

<150> EP07301239.5
<151> 2007-07-16

<160> 70

<170> PatentIn version 3.3

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Met Glu Thr Leu Cys Gln Arg Leu Asn Val Cys Gln Asp Lys Ile Leu
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Thr His Tyr Glu Asn Asp Ser Thr Asp Leu Arg Asp His Ile Asp Tyr
 20 25 30

Trp Lys His Met Arg Leu Glu Cys Ala Ile Tyr Tyr Lys Ala Arg Glu
 35 40 45

Met Gly Phe Lys His Ile Asn His Gln Val Val Pro Thr Leu Ala Val
 50 55 60

Ser Lys Asn Lys Ala Leu Gln Ala Ile Glu Leu Gln Leu Thr Leu Glu
 65 70 75 80

Thr Ile Tyr Asn Ser Gln Tyr Ser Asn Glu Lys Trp Thr Leu Gln Asp
 85 90 95

Val Ser Leu Glu Val Tyr Leu Thr Ala Pro Thr Gly Cys Ile Lys Lys
 100 105 110

His Gly Tyr Thr Val Glu Val Gln Phe Asp Gly Asp Ile Cys Asn Thr
 115 120 125

Met His Tyr Thr Asn Trp Thr His Ile Tyr Ile Cys Glu Glu Ala Ser
 130 135 140

Val Thr Val Val Glu Gly Gln Val Asp Tyr Tyr Gly Leu Tyr Tyr Val
 145 150 155 160

His Glu Gly Ile Arg Thr Tyr Phe Val Gln Phe Lys Asp Asp Ala Glu
 165 170 175

Lys Tyr Ser Lys Asn Lys Val Trp Glu Val His Ala Gly Gly Gln Val
 180 185 190

Ile Leu Cys Pro Thr Ser Val Phe Ser
 195 200

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Met Glu Thr Leu Ser Gln Arg Leu Asn Val Cys Gln Asp Lys Ile Leu
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Glu His Tyr Glu Asn Asp Ser Lys Arg Leu Cys Asp His Ile Asp Tyr
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Trp Lys His Ile Arg Leu Glu Cys Val Leu Met Tyr Lys Ala Arg Glu
 35 40 45

Met Gly Ile His Ser Ile Asn His Gln Val Val Pro Ala Leu Ser Val
 50 55 60

Ser Lys Ala Lys Ala Leu Gln Ala Ile Glu Leu Gln Met Met Leu Glu
 65 70 75 80

Thr Leu Asn Asn Thr Glu Tyr Lys Asn Glu Asp Trp Thr Met Gln Gln
 85 90 95

Thr Ser Leu Glu Leu Tyr Leu Thr Ala Pro Thr Gly Cys Leu Lys Lys
 100 105 110

His Gly Tyr Thr Val Glu Val Gln Phe Asp Gly Asp Val His Asn Thr
 115 120 125

Met His Tyr Thr Asn Trp Lys Phe Ile Tyr Leu Cys Ile Asp Gly Gln
 130 135 140

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

His Glu Gly His Ile Thr Tyr Phe Val Asn Phe Thr Glu Glu Ala Lys
 165 170 175

Lys Tyr Gly Thr Gly Lys Lys Trp Glu Val His Ala Gly Gly Gln Val
 180 185 190

Ile Val Phe Pro Glu Ser Val Phe Ser
 195 200

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Glu His Tyr Glu Thr Asp Ser Thr Cys Leu Ser Asp His Ile Gln Tyr
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 Trp Lys Leu Ile Arg Leu Glu Cys Ala Val Phe Tyr Lys Ala Arg Glu
 35 40 45
 Met Gly Ile Lys Thr Leu Asn His Gln Val Val Pro Thr Gln Ala Ile
 50 55 60
 Ser Lys Ala Lys Ala Met Gln Ala Ile Glu Leu Gln Leu Met Leu Glu
 65 70 75 80
 Thr Leu Asn Thr Thr Glu Tyr Ser Thr Glu Thr Trp Thr Leu Gln Glu
 85 90 95
 Thr Ser Ile Glu Leu Tyr Thr Thr Val Pro Gln Gly Cys Phe Lys Lys
 100 105 110
 His Gly Val Thr Val Glu Val Gln Phe Asp Gly Asp Lys Gln Asn Thr
 115 120 125
 Met His Tyr Thr Asn Trp Thr His Ile Tyr Ile Leu Glu Asp Ser Ile
 130 135 140
 Cys Thr Val Val Lys Gly Leu Val Asn Tyr Lys Gly Ile Tyr Tyr Val
 145 150 155 160
 His Gln Gly Val Glu Thr Tyr Tyr Val Thr Phe Arg Glu Glu Ala Lys
 165 170 175
 Lys Tyr Gly Lys Lys Asn Ile Trp Glu Val His Val Gly Gly Gln Val
 180 185 190
 Ile Val Cys Pro Glu Ser Val Phe Ser
 195 200

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 Asp Leu Tyr Glu Ala Asp Ser Asn Asp Leu Asn Ala Gln Ile Glu His
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 Trp Lys Leu Thr Arg Met Glu Cys Val Leu Phe Tyr Lys Ala Lys Glu
 35 40 45

Leu Gly Ile Thr His Ile Gly His Gln Val Val Pro Pro Met Ala Val
50 55 60

Ser Lys Ala Lys Ala Cys Gln Ala Ile Glu Leu Gln Leu Ala Leu Glu
65 70 75 80

Ala Leu Asn Lys Thr Gln Tyr Ser Thr Asp Gly Trp Thr Leu Gln Gln
85 90 95

Thr Ser Leu Glu Met Trp Arg Ala Glu Pro Gln Lys Tyr Phe Lys Lys
100 105 110

His Gly Tyr Thr Ile Thr Val Gln Tyr Asp Asn Asp Lys Asn Asn Thr
115 120 125

Met Asp Tyr Thr Asn Trp Lys Glu Ile Tyr Leu Leu Gly Glu Cys Glu
130 135 140

Cys Thr Ile Val Glu Gly Gln Val Asp Tyr Tyr Gly Leu Tyr Tyr Trp
145 150 155 160

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

Gln Tyr Cys Val Thr Gly Val Trp Glu Val His Val Gly Gly Gln Val
180 185 190

Ile Val Cys Pro Ala Ser Val Ser Ser
195 200

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

Trp Lys Leu Ile Arg Met Glu Cys Ala Ile Met Tyr Thr Ala Arg Gln
35 40 45

Met Gly Ile Ser His Leu Cys His Gln Val Val Pro Ser Leu Val Ala
50 55 60

Ser Lys Thr Lys Ala Phe Gln Val Ile Glu Leu Gln Met Ala Leu Glu
65 70 75 80

Thr Leu Asn Ala Ser Pro Tyr Lys Thr Asp Glu Trp Thr Leu Gln Gln
85 90 95

Thr Ser Leu Glu Val Trp Leu Ser Glu Pro Gln Lys Cys Phe Lys Lys
100 105 110

Lys Gly Ile Thr Val Thr Val Gln Tyr Asp Asn Asp Lys Ala Asn Thr
115 120 125

Met Asp Tyr Thr Asn Trp Ser Glu Ile Tyr Ile Ile Glu Glu Thr Thr
130 135 140

Cys Thr Leu Val Ala Gly Glu Val Asp Tyr Val Gly Leu Tyr Tyr Ile
145 150 155 160

His Gly Asn Glu Lys Thr Tyr Phe Lys Tyr Phe Lys Glu Asp Ala Lys
165 170 175

Lys Tyr Ser Lys Thr Gln Leu Trp Glu Val His Val Gly Ser Arg Val
180 185 190

Ile Val Cys Pro Thr Ser Ile Pro Ser
195 200

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

Asp Leu Tyr Glu Ala Asp Lys Thr Asp Leu Pro Ser Gln Ile Glu His
20 25 30

Trp Lys Leu Ile Arg Met Glu Cys Ala Leu Leu Tyr Thr Ala Lys Gln
35 40 45

Met Gly Phe Ser His Leu Cys His Gln Val Val Pro Ser Leu Leu Ala
50 55 60

Ser Lys Thr Lys Ala Phe Gln Val Ile Glu Leu Gln Met Ala Leu Glu
65 70 75 80

Thr Leu Ser Lys Ser Gln Tyr Ser Thr Ser Gln Trp Thr Leu Gln Gln
85 90 95

Thr Ser Leu Glu Val Trp Leu Cys Glu Pro Pro Lys Cys Phe Lys Lys
100 105 110

Gln Gly Glu Thr Val Thr Val Gln Tyr Asp Asn Asp Lys Lys Asn Thr
115 120 125

Met Asp Tyr Thr Asn Trp Gly Glu Ile Tyr Ile Ile Glu Glu Asp Thr
 130 135 140

Cys Thr Met Val Thr Gly Lys Val Asp Tyr Ile Gly Met Tyr Tyr Ile
 145 150 155 160

His Asn Cys Glu Lys Val Tyr Phe Lys Tyr Phe Lys Glu Asp Ala Ala
 165 170 175

Lys Tyr Ser Lys Thr Gln Met Trp Glu Val His Val Gly Gly Gln Val
 180 185 190

Ile Val Cys Pro Thr Ser Ile Ser Ser
 195 200

<210> 8
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Met Glu Glu Ile Ala Thr Arg Leu Asn Ala Val Gln Glu Lys Ile Leu
 1 5 10 15

Asp Val Tyr Glu Ala Asn Lys Lys Asp Leu Cys Thr Gln Ile Glu His
 20 25 30

Trp Arg Leu Arg Arg Ile Glu Cys Ala Leu Tyr Tyr Lys Ala Lys Glu
 35 40 45

Leu Gly Leu Ala Arg Ile Gly His Gln Val Val Pro Pro Met Ser Val
 50 55 60

Thr Lys Ala Lys Ala Cys Gln Ile Ile Glu Leu Gln Met Ala Leu Gln
 65 70 75 80

Thr Leu Asn Glu Thr Gln Tyr Ser Asn Asp Glu Trp Thr Leu Gln Ser
 85 90 95

Thr Ser Leu Glu Leu Trp Leu Cys Glu Pro Lys Lys Cys Leu Lys Lys
 100 105 110

Lys Gly Glu Thr Val Thr Val Gln Tyr Asp Asn Asp Lys Glu Asn Thr
 115 120 125

Met Glu Tyr Thr Ser Trp Asn Glu Ile Tyr Ile Val Lys Asp Ser Val
 130 135 140

Trp Thr Val Val Val Gly Lys Val Asp Tyr Met Gly Leu Tyr Tyr Ile
 145 150 155 160

Tyr Glu Thr Glu Lys Thr Tyr Tyr Val Lys Phe Glu Thr Asp Ala Lys
 165 170 175

Lys Tyr Ser Lys Gln Asn Ile Trp Glu Val His Val Gly Ala Gln Val
180 185 190

Ile Val Cys Pro Thr Ser Met Phe Ser
195 200

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Met Glu Thr Leu Ser Gln Arg Leu Asn Val Leu Gln Glu Lys Ile Leu
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Glu His Tyr Glu Gln Asp Ser Lys Cys Ile Gln Asp His Ile Asn Tyr
20 25 30

Trp Asn Cys Val Arg Leu Glu Asn Ala Ile Tyr Tyr Ala Ala Arg Glu
35 40 45

Arg Gly Met His Asn Ile Asp His Gln Val Val Pro Pro Val Asn Ile
50 55 60

Ser Lys Thr Lys Ala Tyr Gln Ala Ile Glu Leu Gln Met Ala Leu Glu
65 70 75 80

Ser Leu Ala Lys Thr Ala Tyr Ser Ala Glu Glu Trp Thr Leu Arg Asp
85 90 95

Thr Ser Asn Glu Leu Trp His Thr Lys Pro Lys Gln Cys Phe Lys Lys
100 105 110

His Gly Val Thr Val Glu Val Trp Tyr Asp Gly Asp Lys Ser Asn Ser
115 120 125

Met His Tyr Val Val Trp Gly Thr Ile Tyr Phe Lys Asn Ser Thr Asp
130 135 140

Thr Trp Cys Lys Thr Gln Gly Arg Val Asp Tyr Trp Gly Val Tyr Tyr
145 150 155 160

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

Gln Leu Tyr Gly Thr Ser Gly Lys Trp Asp Val His Tyr Asn Gly Asn
180 185 190

Ile Ile His Cys Pro Asp Ser Met Cys Ser
195 200

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Met Glu Thr Leu Ser Gln Arg Leu Asn Ala Leu Gln Glu Lys Ile Leu
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Glu His Tyr Glu Gln Asp Ser Lys Leu Ile Tyr Asp Gln Ile Asn Tyr
 20 25 30

Trp Lys Tyr Val Arg Leu Glu Asn Ala Ile Phe Tyr Ala Ala Arg Glu
 35 40 45

Arg Gly Met His Thr Ile Asp His Gln Val Val Pro Pro Gly Thr Thr
 50 55 60

Ser Lys Ala Lys Ala Tyr Gln Ala Ile Glu Leu Gln Met Ala Leu Glu
 65 70 75 80

Ser Leu Ala Gln Thr Asp Phe Asn Lys Glu Glu Trp Thr Leu Lys Asp
 85 90 95

Thr Ser Asn Glu Met Trp Gln Thr Lys Pro Lys Gln Cys Phe Lys Lys
 100 105 110

Lys Gly Val Thr Val Glu Val Trp Tyr Asp Gly Asn Lys Asp Asn Ser
 115 120 125

Met His Tyr Val Val Trp Gly Ala Ile Tyr Tyr Lys Thr His Thr Asp
 130 135 140

Thr Trp Cys Lys Thr Glu Gly Tyr Val Asp Tyr Trp Gly Ile Tyr Tyr
 145 150 155 160

Val His Glu Gln His Lys Thr Tyr Tyr Glu Val Phe Lys Gln Asp Ala
 165 170 175

Gln Met Tyr Gly Thr Ser Gly Lys Trp Glu Val His Cys Asn Gly Asn
 180 185 190

Ile Ile His Cys Pro Asp Ser Met Tyr Ser
 195 200

<210> 11
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Met Lys Thr Leu Ser Gln Arg Leu Asn Val Leu Gln Asp Lys Ile Leu
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Glu Tyr Tyr Glu Gln Asp Ser Lys Ser Ile Tyr Asp Gln Ile Asn Tyr
 20 25 30
 Trp Lys Cys Val Arg Met Glu Asn Ala Ile Phe Tyr Ala Ala Arg Glu
 35 40 45
 Arg Gly Met His Thr Ile Asp His Gln Val Val Pro Thr Ile Asn Ile
 50 55 60
 Ser Lys Cys Lys Ala Tyr Gln Ala Ile Glu Leu Gln Met Ala Leu Glu
 65 70 75 80
 Ser Val Ala Gln Thr Glu Tyr Asn Thr Glu Glu Trp Thr Leu Lys Asp
 85 90 95
 Thr Ser Asn Glu Leu Trp His Thr Gln Pro Lys Gln Cys Phe Lys Lys
 100 105 110
 Gln Gly Thr Thr Val Glu Val Trp Tyr Asp Gly Asp Lys Cys Asn Ala
 115 120 125
 Met Asn Tyr Val Leu Trp Gly Ala Ile Tyr Tyr Lys Asn Asn Ile Asp
 130 135 140
 Ile Trp Cys Lys Thr Glu Gly Cys Val Asp Tyr Trp Gly Ile Tyr Tyr
 145 150 155 160
 Met Asn Glu His Leu Lys Val Tyr Tyr Glu Val Phe Ile Gln Asp Ala
 165 170 175
 Glu Arg Tyr Gly Thr Ser Gly Lys Trp Glu Val His Tyr Asn Gly Asn
 180 185 190
 Ile Ile His Cys Pro Asp Ser Met Cys Ser
 195 200

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<400> 12

Met Asp Thr Leu Ser Gln Arg Leu Ser Val Leu Gln Asp Gln Ile Leu
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 Glu His Tyr Glu Asn Asp Ser Lys Asp Ile Asn Glu His Ile Asn Tyr
 20 25 30
 Trp Lys Leu Val Arg Met Glu Asn Val Ile Leu Phe Ala Ala Arg Glu
 35 40 45
 Asn Asn Ile His Thr Leu Asn His Gln Val Val Pro Thr Phe Leu Val
 Page 10

50

55

60

Ser Lys Asn Lys Ala Cys Glu Ala Ile Glu Leu Gln Ser Asn Arg Thr
65 70 75 80

Ser Thr Val Met Pro Cys Phe Leu Lys His Phe Leu Gly Ala Val Cys
85 90 95

His Ser Ser Trp His Val Ser Cys Ile Val His Cys Ser Phe Leu Asn
100 105 110

Ser Val Cys Ala Lys Leu Ser Asn Ala Ile Cys Ser Lys Glu Asn Thr
115 120 125

Met His Tyr Thr Ser Trp Thr Phe Ile Tyr Tyr Val Asn Asp Val Gly
130 135 140

Gln Trp Cys Lys Thr Thr Gly Asn Val Asp Phe Trp Gly Leu Tyr Tyr
145 150 155 160

Lys Val Glu Glu Glu Gln Val Tyr Tyr Val Lys Phe Ile His Asp Ala
165 170 175

Lys Lys Tyr Gly Thr Thr Asp Lys Trp Glu Val His Tyr Asn Gly Lys
180 185 190

Val Ile Asp Cys Tyr Asp Ser Met Cys Ser
195 200

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

His Tyr Glu Asn Asp Ser Lys Asp Ile Asp Ser Gln Ile Gln Tyr Trp
20 25 30

Gln Leu Ile Arg Trp Glu Asn Ala Ile Phe Phe Ala Ala Arg Glu His
35 40 45

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

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

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

Cys Glu Glu Leu Trp Asn Thr Glu Pro Thr His Cys Phe Lys Lys Gly
100 105 110

Gly Gln Thr Val Gln Val Tyr Phe Asp Gly Asn Lys Asp Asn Cys Met
115 120 125

Thr Tyr Val Ala Trp Asp Ser Val Tyr Tyr Met Thr Asp Ala Gly Thr
130 135 140

Trp Asp Lys Thr Ala Thr Cys Val Ser His Arg Gly Leu Tyr Tyr Val
145 150 155 160

Lys Glu Gly Tyr Asn Thr Phe Tyr Ile Glu Phe Lys Ser Glu Cys Glu
165 170 175

Lys Tyr Gly Asn Thr Gly Thr Trp Glu Val His Phe Gly Asn Asn Val
180 185 190

Ile Asp Cys Asn Asp Ser Met Cys Ser
195 200

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Glu Ser Leu Ser Glu Arg Leu Ser Ala Leu Gln Asp Lys Ile Leu Asp
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His Tyr Glu Asn Asp Ser Lys Asp Ile Asn Ser Gln Ile Ser Tyr Trp
20 25 30

Gln Leu Ile Arg Leu Glu Asn Ala Ile Leu Phe Thr Ala Arg Glu His
35 40 45

Gly Ile Thr Lys Leu Asn His Gln Val Val Pro Pro Ile Asn Ile Ser
50 55 60

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

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

Cys Glu Glu Leu Trp Asn Thr Glu Pro Ser Gln Cys Phe Lys Lys Gly
100 105 110

Gly Lys Thr Val His Val Tyr Phe Asp Gly Asn Lys Asp Asn Cys Met
115 120 125

Asn Tyr Val Val Trp Asp Ser Ile Tyr Tyr Ile Thr Glu Thr Gly Ile
Page 12

130

135

140

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

Lys Asp Gly Asp Thr Thr Tyr Tyr Val Gln Phe Lys Ser Glu Cys Glu
 165 170 175

Lys Tyr Gly Asn Ser Asn Thr Trp Glu Val Gln Tyr Gly Gly Asn Val
 180 185 190

Ile Asp Cys Asn Asp Ser Met Cys Ser
 195 200

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<212> PRT

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<400> 15

Met Glu Asn Leu Cys Gln Arg Leu Asn Ala Cys Gln Glu Lys Ile Leu
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Asp Tyr Tyr Glu Leu Asp Ser Asp Lys Leu Ser Asp Gln Ile Asp Tyr
 20 25 30

Trp Lys Leu Val Arg Tyr Glu Cys Ala Ile Phe Tyr Lys Ala Arg Glu
 35 40 45

Gly Asn Met Gln Cys Ile Asn His Gln Val Val Pro Ser Thr Thr Val
 50 55 60

Cys Lys Glu Lys Ala Trp Gln Ala Ile Glu Leu His Ile Ala Leu Gln
 65 70 75 80

Ser Leu Met Asn Ser Glu Tyr Gly Lys Glu Lys Trp Thr Met Arg Asp
 85 90 95

Thr Cys Tyr Glu Leu Tyr Val Thr Glu Pro Lys His Cys Phe Lys Lys
 100 105 110

Glu Gly Thr Thr Val Thr Val Val Phe Asp Cys Asn Lys Glu Asn Thr
 115 120 125

Met Asp Tyr Ile Arg Trp Thr Ser Val Tyr Tyr Lys Thr Asp Met Gly
 130 135 140

Trp Cys Lys Thr Asn Gly Glu Val Asp Tyr Lys Gly Ile Tyr Tyr Met
 145 150 155 160

His Gly Cys Cys Lys Gln Tyr Tyr Val Asp Phe Lys Gln Glu Ala Leu
 165 170 175

Lys Tyr Gly Thr Gly Leu Gln Trp Asp Val His Val Cys Gly Gln Val
 180 185 190

Ile Cys Cys Pro Glu Phe Val Ser Ser
 195 200

<210> 16
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 <400> 16

Met Glu Asn Leu Cys Gln Arg Leu Asn Ala Cys Gln Glu Lys Ile Leu
 1 5 10 15

Asp Tyr Tyr Glu Leu Asp Ser Asn Lys Leu Thr Asp Gln Ile Asp Tyr
 20 25 30

Trp Lys Leu Val Arg Tyr Glu Cys Ala Ile Phe Tyr Lys Ala Arg Glu
 35 40 45

Gly Asn Met Gln Cys Ile Asn His Gln Val Val Pro Ser Thr Val Val
 50 55 60

Cys Lys Gln Lys Ala Trp Gln Ala Ile Glu Ile His Ile Ala Leu Gln
 65 70 75 80

Ser Leu Ile Asn Thr Asp Tyr Asn Thr Glu Ala Trp Thr Met Arg Asp
 85 90 95

Thr Ser Tyr Glu Met Tyr Met Thr Glu Pro Lys His Cys Phe Lys Lys
 100 105 110

Glu Gly Thr Thr Val Thr Val Val Phe Asp Cys Asn Lys Glu Asn Thr
 115 120 125

Met Asp Tyr Ile Arg Trp Lys Tyr Val Tyr Tyr Lys Thr Asp Ile Gly
 130 135 140

Trp Cys Lys Gly Thr Gly Asp Val Asp Ala Lys Gly Ile Tyr Tyr Thr
 145 150 155 160

Gln Gly Ala Tyr Lys Gln Tyr Tyr Val Asp Phe Lys Gln Glu Ala Glu
 165 170 175

Lys Tyr Gly Thr Gly Val Gln Trp Ala Val His Val Cys Gly Gln Val
 180 185 190

Ile Cys Cys Pro Glu Phe Val Ser Ser
 195 200

<210> 17

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<400> 17

Met Glu Thr Leu Cys His Arg Leu Asn Val Cys Gln Glu Lys Ile Leu
 1 5 10 15

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

Trp Thr Leu Val Arg Tyr Glu Cys Ala Met Phe Tyr Thr Ala Arg Glu
 35 40 45

Arg Asn Met Gln Thr Leu Asn His Gln Val Val Pro Ala Ser Ala Val
 50 55 60

Ser Lys Gln Lys Ala Cys Gln Ala Ile Glu Met His Met Ala Leu Glu
 65 70 75 80

Ser Leu Asn Lys Ser Glu Tyr Asn Met Glu Pro Trp Thr Met Arg Asp
 85 90 95

Thr Cys Tyr Glu Leu Trp Gly Glu Ala Pro Lys His Cys Phe Lys Lys
 100 105 110

Gly Gly Lys Thr Val Thr Val Met Phe Asp Gly Asn Lys Asp Asn Thr
 115 120 125

Met Asp Tyr Thr Cys Trp Thr Tyr Val Tyr Ile Tyr Lys Glu Asp Arg
 130 135 140

Trp Val Lys Thr Gln Gly Asn Val Asp Tyr Thr Gly Ile Tyr Tyr Lys
 145 150 155 160

Pro Asp Val Asn Lys Glu Tyr Tyr Val Thr Phe Lys Asp Glu Ala Lys
 165 170 175

Lys Tyr Gly Ala Gln Gln Trp Glu Val Tyr Met Cys Gly Asn Val Ile
 180 185 190

Thr Cys Pro Glu Tyr Val Ser Ser
 195 200

<210> 18
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 <213> Human papillomavirus

<400> 18

Met Glu Thr Leu Cys His Arg Leu Asn Val Cys Gln Glu Lys Ile Leu
 1 5 10 15

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

Trp Thr Leu Leu Arg Tyr Glu Ala Ala Met Phe Tyr Ala Ala Arg Glu
35 40 45

Arg Asn Leu Arg Thr Ile Asn His Gln Val Val Pro Ala Thr Thr Val
50 55 60

Ser Lys Gln Lys Ala Cys Gln Ala Ile Glu Met His Met Ala Leu Gln
65 70 75 80

Ser Leu Asn Lys Ser Asp Tyr Asn Met Glu Pro Trp Thr Met Arg Glu
85 90 95

Thr Cys Tyr Glu Leu Trp Cys Val Ala Pro Lys Gln Cys Phe Lys Lys
100 105 110

Gly Gly Ile Thr Val Thr Val Ile Phe Asp Gly Asn Lys Asp Asn Ala
115 120 125

Met Asp Tyr Thr Ser Trp Lys Phe Ile Tyr Ile Tyr Asp Asn Asp Lys
130 135 140

Trp Val Lys Thr Asn Gly Asn Val Asp Tyr Thr Gly Ile Tyr Tyr Thr
145 150 155 160

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

Ile Tyr Gly Ala Gln Gln Trp Glu Val Tyr Met Tyr Gly Thr Val Ile
180 185 190

Thr Cys Pro Glu Tyr Val Ser Ser
195 200

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<400> 19

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

Asp Cys Tyr Glu Lys Asp Ser Lys Cys Ile Ile Asp His Ile Asp Tyr
20 25 30

Trp Lys Ala Val Arg His Glu Tyr Val Leu Tyr Tyr Lys Ala Arg Glu
35 40 45

Asn Asp Ile Asn Val Leu Asn His Gln Met Val Pro Ser Leu Gln Val
50 55 60

Cys Lys Ala Lys Ala Cys Ser Ala Ile Glu Leu Gln Ile Ala Leu Glu
 65 70 75 80
 Ala Ile Ser Asn Thr Ile Tyr Lys Asn Glu Glu Trp Thr Leu Arg Asp
 85 90 95
 Thr Cys Asp Glu Leu Trp Arg Thr Glu Pro Lys Asn Cys Phe Lys Lys
 100 105 110
 Glu Gly Gln His Ile Glu Val Trp Phe Asp Gly Asn Lys Asn Asn Cys
 115 120 125
 Met Glu Tyr Val Val Trp Lys Phe Ile Tyr Tyr Asn Gly Glu Cys Gly
 130 135 140
 Trp Cys Lys Val Ser Ser Gly Val Asp Tyr Arg Gly Ile Tyr Tyr Met
 145 150 155 160
 His Asp Gly His Lys Thr Tyr Tyr Thr Asp Phe Glu Gln Glu Ala Lys
 165 170 175
 Lys Tyr Gly Cys Thr Asn Ile Trp Glu Val His Met Glu Thr Glu Ser
 180 185 190
 Ile Tyr Cys Pro Asp Ser Val Ser Ser
 195 200

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<400> 20

Met Glu Thr Leu Cys Gln Arg Leu Asp Ala Cys Gln Glu Lys Ile Leu
 1 5 10 15
 Asp Cys Phe Glu Arg Asp Ser Lys Asn Ile Thr Asp His Ile Asp Tyr
 20 25 30
 Trp Lys Ala Val Arg Gln Glu Asn Val Ile Tyr Tyr Lys Ala Arg Glu
 35 40 45
 Asn Asn Met Thr Lys Leu Gly His Gln Val Val Pro Cys Leu Gln Val
 50 55 60
 Cys Lys Ala Lys Ala Cys Val Ala Ile Glu Leu Gln Ile Ala Leu Glu
 65 70 75 80
 Ser Leu Cys Lys Thr Glu Tyr Asn Met Glu Glu Trp Thr Leu Arg Asp
 85 90 95

Val Cys Glu Ser Met Trp Tyr Thr Glu Pro Lys Gln Cys Phe Lys Lys
100 105 110

Gln Gly Gln His Ile Glu Val Trp Phe Asp Gly Ser Lys Asp Asn Arg
115 120 125

Ala Glu Tyr Val Val Trp Lys Trp Val Tyr Tyr Cys Gly Glu Asp Gly
130 135 140

Trp Cys Lys Val Ser Ser Ala Val Ser Tyr Glu Gly Ile Tyr Tyr Ile
145 150 155 160

His Asp Gly His Lys Thr Tyr Tyr Thr Asn Phe Lys Asp Glu Ala Thr
165 170 175

Lys Tyr Gly Cys Lys Gly Thr Trp Glu Val His Met Gly Lys Gln Ser
180 185 190

Ile Tyr Cys Pro Asp Ser Val Ser Ser
195 200

<210> 21
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<400> 21

Met Glu Thr Leu Cys Gln Arg Leu Asp Ala Cys Gln Glu Lys Ile Leu
1 5 10 15

Asp Cys Phe Glu Asn Asp Ser Lys Lys Ile Glu Asp His Ile Val Tyr
20 25 30

Trp Lys Ala Val Arg His Glu Asn Val Val Leu Tyr Lys Ala Arg Gln
35 40 45

Asn Asn Ile Thr Lys Leu Arg His Gln Val Val Pro Cys Leu Gln Val
50 55 60

Cys Lys Ala Lys Ala Cys Val Ala Ile Glu Ile Gln Met Ala Leu Glu
65 70 75 80

Ser Leu Tyr Lys Thr Glu Tyr Lys Val Glu Glu Trp Thr Leu Lys Asp
85 90 95

Val Cys Glu Asn Met Trp His Thr Ala Pro Lys Gln Cys Phe Lys Lys
100 105 110

Ser Gly Lys Arg Ile Glu Val Trp Phe Asp Gly Lys Lys Asp Asn Arg
115 120 125

Thr Glu Tyr Val Val Trp Gln Trp Val Tyr Tyr Cys Gly Asp Asn Gly
130 135 140

Trp Thr Lys Val Pro Ser Val Val Asp Tyr Lys Gly Ile Tyr Tyr Val
145 150 155 160

His Asp Gly Asn Lys Val Tyr Tyr Thr Asp Phe Asn Asp Glu Ala Val
165 170 175

Lys Tyr Gly Tyr Lys Gly Thr Trp Glu Val His Met Gly Asn Glu Ser
180 185 190

Ile Tyr Cys Pro Asp Ser Val Ser Ser
195 200

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<400> 22

Met Glu Ser Leu Ala Asp Arg Leu Asp Ala Cys Gln Glu Lys Leu Leu
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Asp Leu Tyr Glu Lys Asp Ser Asn Lys Leu Glu Asp Gln Ile Leu His
20 25 30

Trp His Tyr Val Arg Leu Glu Asn Ala Met Leu Phe Lys Ala Arg Gln
35 40 45

Ala Gly Leu Thr Arg Val Gly His Gln Met Val Pro Thr Leu Ser Val
50 55 60

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

Gly Leu Gln Thr Ser Ala Tyr Ala His Glu Pro Trp Thr Leu Gln Thr
85 90 95

Thr Ser Leu Glu Met Trp Asn Thr Gln Pro Gln Arg Cys Trp Lys Lys
100 105 110

Lys Gly Arg Arg Leu Thr Val Lys Phe Asp Gly Glu Asp His Lys Ala
115 120 125

Val Glu Tyr Val Ser Trp Gly Tyr Ile Tyr Val Gln Ser Thr Glu Thr
130 135 140

Asp Leu Trp Tyr Lys Val Pro Gly Lys Val Ser Tyr Lys Gly Leu Tyr
145 150 155 160

Tyr Glu Met Glu Gly Gln Glu His Tyr Tyr Val Thr Phe Ala Gln Glu
165 170 175

Ala Gln Lys Tyr Gly Glu Thr Gly Lys Trp Glu Val His Met Gly Asn
 180 185 190

Thr Val Ile Tyr Glu Pro Cys Ala Ser Val Ser
 195 200

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<400> 23

Met Glu Thr Ile Ala Lys His Leu Asp Val Cys Gln Glu Gln Leu Leu
 1 5 10 15

Glu Leu Tyr Glu Glu Asn Ser Asn Asn Leu Thr Lys His Ile Gln His
 20 25 30

Trp Lys Cys Ile Arg Tyr Glu Cys Val Leu Leu His Lys Ala Lys Gln
 35 40 45

Met Gly Leu Asn His Ile Gly Met Gln Val Val Pro Ala Leu Thr Val
 50 55 60

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

Thr Leu Leu Asn Ser Asp Tyr Gly Met Glu Pro Trp Thr Leu Gln Asp
 85 90 95

Thr Ser Arg Glu Met Trp Leu Thr Ala Pro Lys Tyr Cys Phe Lys Lys
 100 105 110

Gln Gly Gln Thr Val Glu Val Lys Tyr Asp Cys Asn Ala Asp Asn Ile
 115 120 125

Met Glu Tyr Val Ser Trp Lys Tyr Ile Tyr Val His Asp Thr Asp Lys
 130 135 140

Trp Val Lys Val Thr Gly His Ile Asp Tyr Lys Gly Leu Tyr Tyr Val
 145 150 155 160

His Gly Gly His Lys Thr Tyr Tyr Thr Asn Phe Glu Lys Glu Ala Lys
 165 170 175

Lys Tyr Gly Asn Ser Leu Gln Trp Glu Val Cys Ile Gly Ser Ser Val
 180 185 190

Ile Cys Ser Pro Ala Ser Ile Ser Ser
 195 200

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<212> PRT
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<400> 24

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Met Glu Thr Ile Ala Lys His Leu Asp Val Cys Gln Glu Gln Leu Leu
1          5          10          15

Glu Leu Tyr Glu Glu Asn Ser Asn Lys Leu Thr Lys His Ile Gln His
20          25          30

Trp Lys Cys Ile Arg Tyr Glu Cys Val Leu Leu His Lys Ala Lys Gln
35          40          45

Met Gly Leu Asn His Ile Gly Met Gln Val Val Pro Ala Leu Ala Val
50          55          60

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

Thr Leu Leu Asn Ser Asp Tyr Gly Thr Glu Pro Trp Thr Leu Gln Glu
85          90          95

Thr Ser Arg Glu Met Trp Leu Thr Pro Pro Lys Tyr Cys Phe Lys Lys
100         105         110

Gln Gly Gln Thr Val Glu Val Lys Phe Asp Cys Asn Ala Asp Asn Ala
115         120         125

Met Glu Tyr Val Trp Trp Lys Val Ile Tyr Val Phe Asp Thr Asp Lys
130         135         140

Trp Val Lys Val Thr Gly His Ile Asp Tyr Lys Gly Leu Tyr Tyr Val
145         150         155         160

His Gly Gly His Lys Thr Tyr Tyr Thr Asn Phe Glu Lys Glu Ala Glu
165         170         175

Lys Tyr Gly Asn Ser Leu Gln Trp Glu Val Cys Ile Gly Ser Ser Ile
180         185         190

Ile Cys Ser Pro Ala Ser Ile Ser Ser
195         200

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Met Glu Thr Ile Ala Lys His Leu Asp Ala Cys Gln Glu Gln Gly Arg
1          5          10          15

Ile Arg Leu Asn Met Tyr Glu Glu Asn Ser Asn Glu Leu Lys Lys His

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20

25

30

Ile Gln His Trp Lys Cys Leu Arg Tyr Glu Ser Val Leu Leu His Lys
 35 40 45

Ala Arg Gln Met Gly Leu Ser His Ile Gly Leu Gln Val Val Pro Pro
 50 55 60

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

Thr Leu Glu Thr Leu Leu Glu Ser Glu Phe Gly Met Glu Pro Trp Thr
 85 90 95

Leu Gln Asp Thr Ser Arg Glu Met Trp Leu Thr Pro Pro Lys Arg Cys
 100 105 110

Phe Lys Lys Gln Gly Gln Thr Val Glu Val Lys Tyr Asp Cys Asn Thr
 115 120 125

Asp Asn Arg Met Asp Tyr Val Ser Trp Thr Tyr Ile Tyr Val Phe Asp
 130 135 140

Thr Asp Lys Trp Thr Lys Val Lys Gly Met Val Asp Tyr Lys Gly Leu
 145 150 155 160

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

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

Ser Thr Val Ile Cys Ser Pro Ala Ser Val Ser Ser
 195 200

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<212> PRT

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Met Glu Ala Ile Ala Lys Arg Leu Asp Ala Cys Gln Glu Gln Leu Leu
 1 5 10 15

Glu Leu Tyr Glu Glu Asn Ser Thr Asp Leu Asn Lys His Val Leu His
 20 25 30

Trp Lys Cys Met Arg His Glu Ser Val Leu Leu Tyr Lys Ala Lys Gln
 35 40 45

Met Gly Leu Ser His Ile Gly Met Gln Val Val Pro Pro Leu Lys Val
 50 55 60

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

Ser Leu Leu Lys Thr Glu Tyr Ser Met Glu Pro Trp Thr Leu Gln Glu
85 90 95

Thr Ser Tyr Glu Met Trp Gln Thr Pro Pro Lys Arg Cys Phe Lys Lys
100 105 110

Arg Gly Lys Thr Val Glu Val Lys Phe Asp Gly Cys Ala Asn Asn Thr
115 120 125

Met Asp Tyr Val Val Trp Thr Asp Val Tyr Val Gln Asp Thr Asp Ser
130 135 140

Trp Val Lys Val His Ser Met Val Asp Ala Lys Gly Ile Tyr Tyr Thr
145 150 155 160

Cys Gly Gln Phe Lys Thr Tyr Tyr Val Asn Phe Val Lys Glu Ala Glu
165 170 175

Lys Tyr Gly Ser Thr Lys Gln Trp Glu Val Cys Tyr Gly Ser Thr Val
180 185 190

Ile Cys Ser Pro Ala Ser Val Ser Ser
195 200

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<212> PRT
<213> Human papillomavirus
<400> 27

Met Glu Ala Ile Ala Lys Arg Leu Asp Ala Cys Gln Glu Gln Leu Leu
1 5 10 15

Glu Leu Tyr Glu Glu Asn Ser Thr Asp Leu His Lys His Val Leu His
20 25 30

Trp Lys Cys Met Arg His Glu Ser Val Leu Leu Tyr Lys Ala Lys Gln
35 40 45

Met Gly Leu Ser His Ile Gly Met Gln Val Val Pro Pro Leu Lys Val
50 55 60

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

Ser Leu Leu Arg Thr Glu Tyr Ser Met Glu Pro Trp Thr Leu Gln Glu
85 90 95

Thr Ser Tyr Glu Met Trp Gln Thr Pro Pro Lys Arg Cys Phe Lys Lys
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100

105

110

Arg Gly Lys Thr Val Glu Val Lys Phe Asp Gly Cys Ala Asn Asn Thr
 115 120 125

Met Asp Tyr Val Val Trp Thr Asp Val Tyr Val Gln Asp Asn Asp Thr
 130 135 140

Trp Val Lys Val His Ser Met Val Asp Ala Lys Gly Ile Tyr Tyr Thr
 145 150 155 160

Cys Gly Gln Phe Lys Thr Tyr Tyr Val Asn Phe Val Lys Glu Ala Glu
 165 170 175

Lys Tyr Gly Ser Thr Lys His Trp Glu Val Cys Tyr Gly Ser Thr Val
 180 185 190

Ile Cys Ser Pro Ala Ser Val Ser Ser
 195 200

<210> 28
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<400> 28

Met Glu Ala Ile Ala Lys Arg Leu Asp Ala Cys Gln Asp Gln Leu Leu
 1 5 10 15

Glu Leu Tyr Glu Glu Asn Ser Ile Asp Ile His Lys His Ile Met His
 20 25 30

Trp Lys Cys Ile Arg Leu Glu Ser Val Leu Leu His Lys Ala Lys Gln
 35 40 45

Met Gly Leu Ser His Ile Gly Leu Gln Val Val Pro Pro Leu Thr Val
 50 55 60

Ser Glu Thr Lys Gly His Asn Ala Ile Glu Met Gln Met His Leu Glu
 65 70 75 80

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

Thr Ser Tyr Glu Met Trp Leu Thr Pro Pro Lys Arg Cys Phe Lys Lys
 100 105 110

Gln Gly Asn Thr Val Glu Val Lys Phe Asp Gly Cys Glu Asp Asn Val
 115 120 125

Met Glu Tyr Val Val Trp Thr His Ile Tyr Leu Gln Asp Asn Asp Ser
 130 135 140

Trp Val Lys Val Thr Ser Ser Val Asp Ala Lys Gly Ile Tyr Tyr Thr
145 150 155 160

Cys Gly Gln Phe Lys Thr Tyr Tyr Val Asn Phe Asn Lys Glu Ala Gln
165 170 175

Lys Tyr Gly Ser Thr Asn His Trp Glu Val Cys Tyr Gly Ser Thr Val
180 185 190

Ile Cys Ser Pro Ala Ser Val Ser Ser
195 200

<210> 29
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<213> Human papillomavirus

<400> 29

Met Glu Thr Leu Ala Lys Arg Leu Asp Ala Cys Gln Glu Gln Leu Leu
1 5 10 15

Glu Leu Tyr Glu Glu Asp Ser Lys His Leu Glu Lys His Val Gln His
20 25 30

Trp Lys Cys Leu Arg Ile Glu Ala Ala Leu Leu Phe Lys Ala Arg Glu
35 40 45

Met Gly Tyr Ala Gln Val Gly His Gln Ile Val Pro Ala Leu Glu Ile
50 55 60

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

Thr Leu Leu Gln Ser Thr Phe Gly Thr Glu Pro Trp Thr Leu Gln Glu
85 90 95

Thr Ser Tyr Glu Met Trp His Ala Glu Pro Lys Lys Cys Leu Lys Lys
100 105 110

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

Met His Tyr Thr Ala Trp Thr Phe Ile Tyr Val Gln Thr Leu Asp Gly
130 135 140

Thr Trp Cys Lys Val Tyr Gly His Val Cys Tyr Ala Gly Leu Tyr Tyr
145 150 155 160

Ile Val Asp Asn Met Lys Gln Phe Tyr Cys Asn Phe Lys Asn Glu Ala
165 170 175

Lys Lys Tyr Gly Val Thr Gly Gln Trp Glu Val His Asp Gly Thr Gln
Page 25

180

185

190

Val Ile Val Ser Pro Ala Ser Ile Ser Ser
 195 200

<210> 30
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<400> 30

Met Glu Arg Leu Ala Lys Arg Leu Asp Ala Cys Gln Glu Gln Leu Leu
 1 5 10 15

Glu Leu Tyr Glu Glu Asn Ser Arg Asp Leu Gln Lys His Ile Glu His
 20 25 30

Trp Lys Cys Leu Arg Met Glu Ala Val Val Leu Tyr Lys Ala Arg Glu
 35 40 45

Met Gly Phe Ala Asn Ile Gly His Gln Ile Val Pro Thr Leu Glu Thr
 50 55 60

Cys Arg Ala Lys Ala His Met Ala Ile Glu Ile His Leu Ala Leu Glu
 65 70 75 80

Thr Leu Leu Gln Ser Ser Tyr Gly Lys Glu Pro Trp Thr Leu Gln Glu
 85 90 95

Thr Ser Asn Glu Leu Trp Leu Thr Asn Pro Lys Lys Cys Phe Lys Lys
 100 105 110

Gln Gly Arg Thr Val Glu Val Ile Phe Asp Gly Lys Gln Asp Asn Ala
 115 120 125

Met His Tyr Thr Ala Trp Thr Tyr Ile Tyr Ile Gln Thr Val Gln Gly
 130 135 140

Thr Trp Cys Lys Val Gln Gly His Val Cys His Ala Gly Leu Tyr Tyr
 145 150 155 160

Ile Val Glu Asn Met Lys Gln Phe Tyr Cys Asn Phe Lys Glu Glu Ala
 165 170 175

Lys Lys Tyr Gly Val Thr Asp Gln Trp Glu Val His Asp Gly Asn Gln
 180 185 190

Val Ile Val Ser Pro Ala Pro Ile Ser Ser
 195 200

<210> 31
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 <212> PRT

<213> Human papillomavirus

<400> 31

Met Glu Thr Leu Ala Thr Arg Leu Asp Val Cys Gln Glu Arg Leu Leu
1 5 10 15Asp Leu Tyr Glu Lys Asp Ser Asp Lys Leu Glu Asp Gln Ile Glu His
20 25 30Trp Lys Cys Ile Arg Leu Glu Cys Ala Leu Gln Tyr Lys Ala Arg Glu
35 40 45Leu Gly Tyr Lys Val Leu Gln His Gln Ala Leu Pro Ala Leu Ala Val
50 55 60Ser Lys Gly Lys Gly His Lys Ala Ile Glu Leu Gln Leu Ala Leu Gln
65 70 75 80Thr Leu Gln Gln Thr Val Tyr Ser Thr Glu Pro Trp Thr Leu Gln Asp
85 90 95Thr Cys Leu Glu Arg Trp Asp Ala Pro Pro Thr Gly Cys Phe Lys Lys
100 105 110Arg Gly Gln Thr Val Asp Val Ile Phe Asp Gly His Lys Glu Asn Thr
115 120 125Met Gln Tyr Val Met Trp Ala Cys Ile Tyr Phe Pro Asn Cys Asp Gly
130 135 140Glu Gly Trp Thr Lys Val Cys Ser Asn Ile Asp Ala Met Gly Ile Tyr
145 150 155 160Tyr Met Asp Ala Glu Tyr Lys Val Tyr Tyr Val Asp Phe Ala Lys Glu
165 170 175Ala Ser Lys Tyr Gly Glu His Gly Gln Trp Glu Val Arg Met Gly Ser
180 185 190Ser Ile Ile Phe Ser Pro Ala Ser Val Ser Ser
195 200

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<212> PRT

<213> Human papillomavirus

<400> 32

Met Glu Thr Leu Ala Thr Arg Leu Asp Val Cys Gln Glu Arg Leu Leu
1 5 10 15Asp Leu Tyr Glu Lys Asp Ser Asn Lys Leu Glu Asp Gln Ile Glu His
20 25 30

Trp Lys Cys Ile Arg Leu Glu Cys Ala Leu Gln Tyr Lys Ala Arg Glu
35 40 45

Met Gly Tyr Lys Val Leu Gln His Gln Ala Leu Pro Ala Leu Ala Val
50 55 60

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

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

Thr Cys Leu Glu Arg Trp Asn Ala Pro Pro Thr Gly Cys Leu Lys Arg
100 105 110

Arg Gly Gln Thr Val Asp Val Ile Phe Asp Gly His Gln Asp Asn Thr
115 120 125

Met Gln Tyr Val Met Trp Gly Asp Ile Tyr Tyr Gln Asn Cys Asp Gly
130 135 140

Glu Gly Trp Thr Lys Val Cys Ser Asn Ile Asp Ala Met Gly Ile Tyr
145 150 155 160

Tyr Met Asp Ala Glu His Lys Val Tyr Tyr Val Asp Phe Lys Lys Glu
165 170 175

Ala Ser Lys Tyr Gly Glu Tyr Gly Gln Trp Glu Val Arg Met Gly Ser
180 185 190

Ser Ile Ile Phe Ser Pro Ala Ser Val Ser Ser
195 200

<210> 33
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<212> PRT
<213> Human papillomavirus

<400> 33

Met Glu Thr Leu Cys Lys Arg Leu Ser Ala Cys Gln Asp Ala Ile Leu
1 5 10 15

Glu Leu Tyr Glu Arg Asp Ser Val His Leu Ser Asp His Ile Asp His
20 25 30

Trp Lys His Val Arg His Glu Asn Val Leu Leu His Lys Ala Arg Glu
35 40 45

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

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

Ser Leu Asn Glu Ser Leu Tyr Asn Thr Glu Glu Trp Thr Leu Gln His
85 90 95

Thr Ser Trp Glu Leu Trp Val Thr Glu Pro Lys Gln Cys Phe Lys Lys
100 105 110

Asp Gly Lys Thr Val Glu Val Arg Tyr Asp Cys Glu Lys Asp Asn Ser
115 120 125

Met Gln Tyr Val Phe Trp Thr His Ile Tyr Cys Trp Tyr Glu Gly Gly
130 135 140

Trp Ala Lys Val Gly Ser Lys Ile Asp Tyr Asn Gly Ile Tyr Tyr Glu
145 150 155 160

Thr Asp Asp Glu Glu Lys Val Tyr Tyr Thr Arg Phe Asp Thr Asp Ala
165 170 175

Lys Arg Tyr Gly Val Lys Gly Ile Trp Glu Val His Met Gly Gly Gln
180 185 190

Val Ile Cys Cys Ala Pro Val Ser Ser
195 200

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<213> Human papillomavirus

<400> 34

Met Glu Thr Leu Cys Lys Arg Leu Ser Ala Cys Gln Asp Ala Ile Leu
1 5 10 15

Glu Leu Tyr Glu Arg Asp Ser Ile His Leu Ser Asp His Ile Asp His
20 25 30

Trp Lys His Val Arg Leu Glu Asn Val Leu Leu His Lys Ala Arg Glu
35 40 45

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

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

Ser Leu Asn Glu Ser Ser Tyr Asn Thr Glu Glu Trp Thr Leu Gln Gln
85 90 95

Thr Ser Trp Glu Gln Trp Val Thr Asp Pro Lys Gln Cys Phe Lys Lys
100 105 110

Gly Gly Lys Thr Val Glu Val Arg Tyr Asp Cys Asp Lys Asp Asn Thr
115 120 125

Met Gln Tyr Val Val Trp Thr Phe Val Tyr Tyr Trp Leu Glu Gly Lys
130 135 140

Trp Tyr Lys Val Ser Ser His Val Asp Tyr Asn Gly Ile Tyr Tyr Glu
145 150 155 160

Thr Gln Asp Asn Glu Lys Val Tyr Tyr Thr Gln Phe Asp Arg Asp Ala
165 170 175

Lys Arg Tyr Gly Val Lys Gly Ile Trp Asp Val Cys Met Gly Gly Lys
180 185 190

Val Ile Cys Phe Ala Pro Val Phe Ser
195 200

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<213> Human papillomavirus

<400> 35

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

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

Trp Gln Leu Leu Arg Gln Glu Gln Ile Ile Tyr His Tyr Ala Arg Arg
35 40 45

His Gly Val Thr Arg Leu Gly Tyr Gln Pro Val Pro Ser Leu Ala Ser
50 55 60

Ser Glu Ala Lys Ala Lys Asp Ala Ile Ser Met Val Leu Leu Leu Glu
65 70 75 80

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

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

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

Met Ser Tyr Thr Val Trp Thr Tyr Ile Tyr Tyr Leu Thr Asp Glu Asp
130 135 140

Ile Trp Glu Lys Val Glu Gly His Val Asp Tyr Thr Gly Ala Tyr Tyr
 145 150 155 160

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

Lys Arg Tyr Gly Val Thr Gly Leu Trp Glu Val His Val Asn Lys Asp
 180 185 190

Thr Val Phe Thr Pro Val Thr Ser Ser Thr
 195 200

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 <213> Human papillomavirus
 <400> 36

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

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

Trp Lys Leu Leu Arg Gln Glu Gln Ile Leu Leu Tyr Tyr Ala Arg Lys
 35 40 45

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

Ser Glu Ile Lys Ala Lys Asp Ala Ile Ala Ile Gly Ile Leu Leu Glu
 65 70 75 80

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

Thr Ser Leu Glu Thr Ile Arg Ser Pro Pro Val Asp Cys Phe Lys Lys
 100 105 110

Gly Pro Lys Thr Val Glu Val Tyr Phe Asp Gly Asp Pro Glu Asn Val
 115 120 125

Met Pro Tyr Thr Val Trp Ser Tyr Ile Tyr Tyr Gln Thr Asp Glu Asp
 130 135 140

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

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

Lys Arg Phe Gly Thr Thr Gly Met Trp Glu Val His Val Asn Lys Asp
 180 185 190

Thr Val Phe Thr Pro Val Thr Ser Ser Thr
195 200

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<212> PRT
<213> Human papillomavirus

<400> 37

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

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

Trp Lys Leu Leu Arg Gln Glu Gln Val Leu Phe Tyr Tyr Ala Arg Arg
35 40 45

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

Ser Glu Ser Lys Ala Lys Asp Ala Ile Ala Met Gly Leu Leu Leu Glu
65 70 75 80

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

Thr Ser Leu Glu Thr Val Lys Ser Pro Pro Ala Asp Cys Phe Lys Lys
100 105 110

Gly Pro Lys Ser Val Glu Val Tyr Phe Asp Gly Asp Pro Glu Asn Val
115 120 125

Met Ser Tyr Thr Val Trp Ser Tyr Ile Tyr Tyr Gln Thr Asp Asp Glu
130 135 140

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

Ile Glu Gly Thr Phe Lys Thr Tyr Tyr Ile Lys Phe Glu Thr Asp Ala
165 170 175

Lys Arg Tyr Gly Thr Thr Gly His Trp Glu Val His Val Asn Lys Asp
180 185 190

Thr Val Phe Thr Pro Val Thr Ser Ser Thr
195 200

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<212> PRT
<213> Human papillomavirus

<400> 38

Met Asp Thr Leu Ser Asp Arg Phe Asn Ala Leu Gln Glu Asn Leu Met
 1 5 10 15
 Asp Ile Tyr Glu Ser Gly Arg Asp Asp Leu Glu Thr Gln Ile Met His
 20 25 30
 Trp Gln Leu Leu Arg Gln Glu Gln Ile Leu Phe His Tyr Ala Arg Lys
 35 40 45
 Asn Gly Val Met Arg Leu Gly Tyr Gln Pro Val Pro Pro Leu Ala Thr
 50 55 60
 Ser Glu Ala Lys Ala Lys Asp Ala Ile Gly Met Val Ile Leu Leu Glu
 65 70 75 80
 Ser Leu Gln Gln Ser Ala Tyr Gly Lys Glu Ser Trp Thr Leu Thr Gln
 85 90 95
 Thr Ser Leu Glu Thr Val Arg Ser Pro Pro Ala Asn Cys Phe Lys Lys
 100 105 110
 Gly Pro Gln Asn Ile Glu Val Met Phe Asp Asn Asp Pro Glu Asn Leu
 115 120 125
 Met Val Tyr Thr Ala Trp Ser Phe Ile Tyr Tyr Gln Thr Val Asp Asp
 130 135 140
 Thr Trp Asn Lys Val Glu Gly His Val Asp Tyr Tyr Gly Ala Tyr Tyr
 145 150 155 160
 Phe Glu Gly Asp Leu Lys Val Tyr Tyr Ile Gln Phe Glu Gly Asp Ala
 165 170 175
 Ala Arg Phe Ser Lys Thr Gly Arg Trp Glu Val His Val Asn Lys Asp
 180 185 190
 Thr Ile Phe Ala Pro Val Thr Ser Ser Ser
 195 200

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<212> PRT

<213> Human papillomavirus

<400> 39

Met Asp Asn Leu Ser Glu Arg Phe Asn Val Leu Gln Glu Asn Leu Met
 1 5 10 15
 Asp Ile Tyr Glu Ser Gly Gln Glu Asp Ile Glu Thr Gln Ile Lys His
 20 25 30

Trp	Gln	Leu	Leu	Arg	Gln	Glu	Gln	Val	Leu	Phe	Tyr	Tyr	Ala	Arg	Lys
		35				40					45				
Asn	Gly	Val	Met	Arg	Val	Gly	Tyr	Gln	Pro	Val	Pro	Pro	Leu	Ala	Thr
	50					55					60				
Ser	Glu	Ala	Lys	Ala	Lys	Asp	Ala	Ile	Gly	Met	Val	Leu	Leu	Leu	Gln
65					70					75					80
Ser	Leu	Gln	Lys	Ser	Pro	Tyr	Gly	Lys	Glu	Pro	Trp	Thr	Leu	Thr	Gln
				85					90					95	
Thr	Ser	Leu	Glu	Thr	Val	Arg	Ser	Pro	Pro	Ala	Asn	Cys	Phe	Lys	Lys
			100					105					110		
Gly	Pro	Gln	Asn	Ile	Glu	Val	Met	Phe	Asp	Asn	Asp	Pro	Glu	Asn	Leu
		115					120					125			
Met	Ser	Tyr	Thr	Val	Trp	Ser	Phe	Ile	Tyr	Tyr	Gln	Asn	Leu	Asp	Asp
	130					135					140				
Thr	Trp	Asn	Lys	Val	Glu	Gly	Arg	Val	Asp	Tyr	His	Gly	Ala	Tyr	Tyr
145					150					155					160
Met	Glu	Gly	Ser	Leu	Lys	Val	Tyr	Tyr	Ile	Gln	Phe	Glu	Val	Asp	Ala
				165					170					175	
Ala	Arg	Phe	Gly	Lys	Thr	Gly	Arg	Trp	Glu	Val	His	Val	Asn	Glu	Asp
			180					185					190		
Thr	Ile	Phe	Ala	Pro	Val	Thr	Ser	Ser	Ser						
		195					200								

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<400> 40

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

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

Trp Gln Thr Leu Arg Gln Glu Gln Ile Leu Leu His Tyr Ala Arg Lys
35 40 45

Asn Gly Val Met Arg Leu Gly Tyr Gln Pro Val Pro Pro Leu Ala Thr
50 55 60

Ser Glu Glu Lys Ala Lys Asp Ala Ile Gly Met Val Leu Leu Leu Glu

Gly Pro Tyr Asn Ile Glu Val Ile Phe Asp Gly Asp Pro Glu Asn Leu
 115 120 125

Met Val Tyr Thr Ala Trp Lys Glu Ile Tyr Phe Val Asp Ser Asp Asp
 130 135 140

Met Trp Gln Lys Val Gln Gly Glu Val Asp Tyr Ala Gly Ala Tyr Tyr
 145 150 155 160

Lys Asp Gly Thr Ile Lys Gln Tyr Tyr Val Thr Phe Ala Asp Asp Ala
 165 170 175

Val Arg Tyr Gly Thr Ser Gly Gln Tyr Glu Val Arg Ile Asn Asn Glu
 180 185 190

Thr Val Phe Ala Pro Val Thr Ser Ser Thr
 195 200

<210> 42
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 <400> 42

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

Asn Ile Tyr Glu Ala Ala Glu Gln Thr Leu Gln Ala Gln Ile Lys His
 20 25 30

Trp Gln Thr Leu Arg Lys Glu Ala Val Leu Leu Tyr Tyr Ala Arg Glu
 35 40 45

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

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

Ser Leu Gln Thr Ser Asp Phe Ala His Glu Pro Trp Thr Leu Val Asp
 85 90 95

Thr Ser Thr Glu Thr Phe Arg Ser Ala Pro Glu Gly His Phe Lys Lys
 100 105 110

Gly Pro Val Pro Val Glu Val Ile Tyr Asp Asn Asp Pro Asp Asn Ala
 115 120 125

Asn Leu Tyr Thr Met Trp Thr Tyr Val Tyr Tyr Met Asp Ala Asp Asp
 130 135 140

Lys Trp His Lys Ala Arg Ser Gly Val Asn His Ile Gly Ile Tyr Tyr
 Page 36

145 150 155 160

Leu Gln Gly Thr Phe Lys Asn Tyr Tyr Val Leu Phe Ala Asp Asp Ala
165 170 175

Lys Arg Tyr Gly Thr Thr Gly Glu Trp Glu Val Lys Val Asn Lys Asp
180 185 190

Thr Val Phe Ala Pro Val Thr Ser Ser Thr
195 200

<210>	43
<211>	202
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<400>	43

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

Asn Ile Tyr Glu Ala Ala Glu Gln Thr Leu Gln Ala Gln Ile Lys His
20 25 30

Trp Gln Thr Leu Arg Lys Glu Pro Val Leu Leu Tyr Tyr Ala Arg Glu
35 40 45

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

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

Ser Leu Gln Thr Ser Asp Phe Ala His Glu Pro Trp Thr Leu Val Asp
85 90 95

Thr Ser Ile Glu Thr Phe Arg Ser Ala Pro Glu Gly His Phe Lys Lys
100 105 110

Gly Pro Leu Pro Val Glu Val Ile Tyr Asp Asn Asp Pro Asp Asn Ala
115 120 125

Asn Leu Tyr Thr Met Trp Thr Tyr Val Tyr Tyr Met Asp Ala Asp Asp
130 135 140

Lys Trp His Lys Ala Arg Ser Gly Val Asn His Ile Gly Ile Tyr Tyr
145 150 155 160

Leu Gln Gly Thr Phe Lys Asn Tyr Tyr Val Leu Phe Ala Asp Asp Ala
165 170 175

Lys Arg Tyr Gly Thr Thr Gly Glu Trp Glu Val Lys Val Asn Lys Glu
180 185 190

Thr Val Phe Ala Pro Val Thr Ser Ser Thr
195 200

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<400> 44

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

Asn Ile Tyr Glu Ala Ala Glu Gln Thr Leu Glu Ala Gln Ile Lys His
20 25 30

Trp Gln Thr Leu Arg Gln Glu Ala Val Leu Leu Tyr Phe Ala Arg Gln
35 40 45

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

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

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

Thr Ser Ile Glu Thr Phe Arg Ser Ala Pro Asp Gly His Phe Lys Lys
100 105 110

Gly Pro Val Pro Val Glu Val Ile Tyr Asp Asn Asp Ala Asp Asn Ala
115 120 125

Asn Leu Tyr Thr Met Trp Thr Tyr Val Tyr Tyr Met Glu Asp Asp Val
130 135 140

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

Gln Gly Thr Phe Lys Tyr Tyr Tyr Val Leu Phe Ala Asp Asp Ala Arg
165 170 175

Lys Tyr Ser Gln Thr Gly Gln Trp Glu Val Lys Val Asn Lys Glu Thr
180 185 190

Val Phe Ala Pro Val Thr Ser Ser Thr
195 200

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<400> 45

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

Asn Ile Tyr Glu Ala Ala Glu Gln Thr Leu Lys Ala Gln Ile Leu His
 20 25 30

Trp Gln Thr Leu Arg Lys Glu Ala Val Thr Leu Tyr Phe Ala Arg Gln
 35 40 45

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

Ser Glu Ala Arg Ala Lys Glu Ala Ile Tyr Met Val Leu Gln Leu Glu
 65 70 75 80

Ser Leu Gln Lys Ser Ala Phe Ala Leu Glu Pro Trp Thr Leu Val Asp
 85 90 95

Thr Ser Thr Glu Thr Phe Lys Ser Ala Pro Glu Asn His Phe Lys Lys
 100 105 110

Gly Pro Val Pro Val Glu Val Ile Tyr Asp Lys Asp Glu Ala Asn Ala
 115 120 125

Asn Leu Tyr Thr Met Trp Thr Phe Val Tyr Tyr Met Asp Ser Asp Asp
 130 135 140

Val Trp His Lys Thr Thr Ser Gly Val Asn Gln Thr Gly Ile Tyr Tyr
 145 150 155 160

Leu Val Glu Asn Met Lys Gln Phe Tyr Cys Asn Phe Lys Glu Glu Ala
 165 170 175

Lys Lys Tyr Gly Val Thr Asp Gln Trp Glu Val His Asp Gly Asn Gln
 180 185 190

Val Ile Val Ser Pro Ala Pro Ile Ser Ser
 195 200

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<212> PRT

<213> Human papillomavirus

<400> 46

Met Glu Asn Leu Ser Glu Arg Phe Asn Val Leu Gln Asp Gln Leu Met
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Asn Ile Tyr Glu Ala Ala Glu His Thr Leu Glu Thr Gln Ile Ala His
 20 25 30

Trp Thr Leu₃₅ Leu Arg Arg Glu₄₀ Ala Val Leu Leu Tyr₄₅ Tyr Ala Arg Gln

Lys Gly Ile Thr Arg Leu Gly₅₅ Tyr Gln Pro Val₆₀ Pro Thr Leu Ala Val

Ser Glu Ala Lys Ala Lys₇₀ Glu Ala Ile Gly₇₅ Ile Met Leu Gln Leu₈₀ Gln

Ser Leu Gln Lys₈₅ Ser Glu Tyr Ala Ser Glu₉₀ Asn Trp Thr Leu Val₉₅ Asp

Thr Ser Ala Glu₁₀₀ Thr Tyr Asn Asn Val₁₀₅ Pro Glu His His Phe₁₁₀ Lys Lys

Gly Pro Val₁₁₅ Pro Val Glu Val Ile Tyr Asp Lys Glu₁₂₅ Pro Glu Asn Ala

Asn Val₁₃₀ Tyr Thr Met Trp Lys₁₃₅ Tyr Val Tyr Tyr Met₁₄₀ Asp Pro Glu Asp

Val₁₄₅ Trp His Lys Thr Thr₁₅₀ Ser Gly Val Asn Gln₁₅₅ Thr Gly Ile Tyr Tyr₁₆₀

Leu His Gly Asp Phe₁₆₅ Lys His Tyr Tyr Val₁₇₀ Leu Phe Ala Asp Gly₁₇₅ Ala

Arg Met Tyr Ser₁₈₀ Lys Thr Gly Gln Trp₁₈₅ Glu Val Lys Val Asn₁₉₀ Lys Glu

Thr Val Phe₁₉₅ Ala Pro Val Thr Ser₂₀₀ Ser Thr

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<211> 202

<212> PRT

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<400> 47

Met Glu Asn Leu Ser₅ Glu Arg Phe Asn Val₁₀ Leu Gln Asp Gln Leu Met₁₅

Asn Ile Tyr Glu₂₀ Ala Ala Glu Gln Thr₂₅ Leu Glu Ala Gln Ile₃₀ Ala His

Trp Leu Leu₃₅ Leu Arg Lys Glu Ala Val Leu Leu Tyr Phe₄₅ Ala Arg Gln

Lys Gly Ile Thr Arg Ile Gly₅₅ Tyr Gln Pro Val₆₀ Pro Pro Leu Ala Val

Ser Glu Ala Lys Ala Lys₇₀ Gln Ala Ile Gly₇₅ Ile Met Leu Gln Leu₈₀ Gln

Ser Leu Gln Lys Ser Glu Phe Ala Asp Glu Pro Trp Thr Leu Val Asp
85 90 95

Thr Ser Ile Glu Thr Tyr Lys Asn Ala Pro Glu Asn His Phe Lys Lys
100 105 110

Gly Ala Thr Pro Val Glu Val Ile Tyr Asp Lys Gln Pro Asp Asn Ala
115 120 125

Asn Val Tyr Thr Met Trp Lys His Ile Tyr Tyr Thr Asp Ala Asp Asp
130 135 140

Lys Trp His Lys Thr Thr Ser Gly Val Asn Gln Thr Gly Ile Tyr Tyr
145 150 155 160

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

Arg Arg Tyr Ser Ala Thr Gly Glu Trp Glu Val Lys Ile Asn Lys Asp
180 185 190

Thr Val Phe Ala Pro Val Thr Ser Ser Thr
195 200

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<212> PRT
<213> Human papillomavirus

<400> 48

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

Asn Ile Tyr Glu Ser Ala Ala Asn Thr Ile Glu Ser Gln Ile Glu His
20 25 30

Trp Gln Thr Leu Arg Lys Glu Ala Val Leu Leu Tyr Phe Ala Arg Gln
35 40 45

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

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

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

Thr Ser Ala Glu Thr Phe Arg Ser Pro Pro Glu Asn His Phe Lys Lys
100 105 110

Gly Pro Val Ser Val Glu Val Ile Tyr Asp Asn Asp Lys Asp Asn Ala
115 120 125

Asn Ala Tyr Thr Met Trp Arg Tyr Val Tyr Tyr Val Asp Asp Asp Asp
130 135 140

Gln Trp His Lys Ser Pro Ser Gly Val Asn His Thr Gly Ile Tyr Phe
145 150 155 160

Met Gln Gly Thr Phe Arg His Tyr Tyr Val Leu Phe Ala Asp Asp Ala
165 170 175

Ser Arg Tyr Ser Arg Thr Gly His Trp Glu Val Asn Val Asn Lys Glu
180 185 190

Thr Val Phe Ala Pro Val Thr Ser Ser Thr
195 200

<210> 49
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<212> PRT
<213> Human papillomavirus

<400> 49

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

Asn Ile Tyr Glu Thr Ala Ala Asn Thr Leu Glu Ser Gln Ile Glu His
20 25 30

Trp Gln Thr Leu Arg Lys Glu Ala Val Leu Leu Tyr Phe Ala Arg Gln
35 40 45

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

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

Ser Leu Gln Lys Ser Gln Phe Gly Ser Glu Pro Trp Ser Leu Val Asp
85 90 95

Thr Ser Gly Glu Thr Phe Arg Ser Ala Pro Glu Asn His Phe Lys Lys
100 105 110

Gly Pro Val Ser Val Glu Val Ile Tyr Asp Asn Asp Lys Asp Asn Ala
115 120 125

Asn Ala Tyr Thr Met Trp Lys His Ile Tyr Tyr Gln Asp Asp Asp Glu
130 135 140

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

Met Gln Gly Thr Phe Arg Asn Tyr Tyr Val Leu Phe Ala Asp Asp Ala
165 170 175

Thr Arg Tyr Ser Lys Thr Gly His Trp Glu Val Lys Val Asn Lys Glu
180 185 190

Thr Val Phe Thr Pro Val Thr Ser Ser Thr
195 200

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<400> 50

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

Asn Ile Tyr Glu Ser Ala Pro Asp Thr Leu Glu Ser Gln Ile Glu His
20 25 30

Trp Gln Thr Leu Arg Lys Glu Ala Val Leu Leu Tyr Phe Ala Arg Gln
35 40 45

His Gly Ile Ser Arg Val Gly Tyr Gln Pro Val Pro Val Leu Ala Val
50 55 60

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

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

Ala Ser Ala Glu Thr Phe Arg Ser Pro Pro Glu Asn His Phe Lys Lys
100 105 110

Gly Pro Ile Ser Val Glu Val Ile Tyr Asp Lys Asp Lys Asp Asn Ala
115 120 125

Asn Ala Tyr Thr Met Trp Arg Phe Val Tyr Tyr Gln Asp Asp Asp Asp
130 135 140

Lys Trp His Lys Ser Ala Ser Gly Val Asn Gln Thr Gly Ile Tyr Phe
145 150 155 160

Met Gln Gly Thr Phe Arg His Tyr Tyr Val Leu Phe Ala Asp Asp Ala
165 170 175

Ser Arg Tyr Ser Thr Thr Gly Gln Trp Glu Val Lys Val Asn Lys Glu
180 185 190

Thr Val Phe Ala Pro Val Thr Ser Ser Thr
 195 200

<210> 51
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 <212> PRT
 <213> Human papillomavirus
 <400> 51

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

Asn Ile Tyr Glu Thr Ala Ala Gln Thr Leu Glu Ala Gln Ile Glu His
 20 25 30

Trp Gln Ile Leu Arg Arg Glu Ala Val Leu Leu Tyr Phe Ala Arg Gln
 35 40 45

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

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

Ser Leu Gln Lys Ser Glu Phe Gly Lys Glu Pro Trp Ser Leu Val Asp
 85 90 95

Thr Ser Thr Glu Thr Tyr Lys Ser Pro Pro Glu Asn His Phe Lys Lys
 100 105 110

Gly Pro Met Pro Ile Glu Val Ile Tyr Asp Lys Asp Ala Asp Asn Ala
 115 120 125

Asn Ala Tyr Thr Met Trp Arg Tyr Ile Tyr Tyr Val Asp Asp Asp Asp
 130 135 140

Lys Trp His Lys Ser Ala Ser Gly Val Asn His Thr Gly Ile Tyr Phe
 145 150 155 160

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

Arg Arg Tyr Ser Asn Thr Gly His Trp Glu Val Lys Val Asn Lys Asp
 180 185 190

Thr Val Phe Thr Pro Val Thr Ser Ser Thr
 195 200

<210> 52
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 <400> 52

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

Asn Ile Tyr Glu Ser Ala Ala Glu Thr Leu Glu Ser Gln Ile Glu His
20 25 30

Trp Gln Ile Leu Arg Lys Glu Ala Val Leu Leu Tyr Phe Ala Arg Arg
35 40 45

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

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

Ser Leu Gln Lys Ser Glu Tyr Gly Thr Glu Pro Trp Ser Leu Val Asp
85 90 95

Thr Ser Ala Glu Thr Tyr Arg Ser Ala Pro Glu Asn Tyr Phe Lys Lys
100 105 110

Gly Pro Met Pro Ile Glu Val Ile Tyr Asp Lys Asp Ala Asp Asn Ala
115 120 125

Asn Leu Tyr Thr Met Trp Lys Phe Val Tyr Tyr Val Asp Glu Asp Asp
130 135 140

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

Met Gln Gly Asn Phe Arg His Tyr Tyr Val Leu Phe Ala Asp Asp Ala
165 170 175

Arg Lys Tyr Ser Ala Thr Gly His Trp Glu Val Lys Val Asn Lys Glu
180 185 190

Thr Val Phe Thr Pro Val Thr Ser Ser Thr
195 200

<210> 53
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<212> PRT
<213> Human papillomavirus

<400> 53

Met Glu Thr Leu Arg Glu Arg Phe Asp Val Leu Gln Asp Gln Leu Met
1 5 10 15

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

Trp Arg Leu Leu Arg Lys Glu Ala Val Leu Leu Tyr Phe Ala Arg Gln
Page 45

35

Asn Gly Val Leu Arg Leu Gly Tyr Gln Pro Val Pro Pro Leu Ala Thr
50 55 60
Ser Glu Ala Lys Ala Lys Glu Ala Ile Gly Met Met Leu Gln Leu Gln
65 70 75 80
Ser Leu Gln Lys Ser Ala Tyr Ala Ser Glu Lys Trp Thr Leu Val Asp
85 90 95
Thr Ser Ile Glu Thr Phe Lys Asn Thr Pro Glu Asn His Phe Lys Lys
100 105 110
Gly Pro Val Asn Val Glu Val Ile Tyr Asp Gly Asp Pro Asp Asn Ala
115 120 125
Asn Leu Tyr Thr Met Trp Lys Tyr Val Tyr Tyr Leu Asp Ser Glu Asp
130 135 140
Arg Trp Gln Lys Thr Glu Ser Gly Ala Asn His Thr Gly Ile Tyr Tyr
145 150 155 160
Thr Ile Lys Asp Phe Lys His Tyr Tyr Thr Leu Phe Ala Asp Asp Ala
165 170 175
Lys Lys Tyr Gly Lys Ser Gly Gln Trp Glu Val Arg Ile Asn Lys Glu
180 185 190
Thr Val Phe Ala Pro Val Thr Ser Ser Thr
195 200

<210> 54
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<212> PRT
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<400> 54

Met Glu Asn Leu Lys Lys Arg Phe Asp Val Leu Gln Asp Leu Leu Met
1 5 10 15
Asn Ile Tyr Glu Gln Gly Ser Asp Thr Leu Glu Ser Gln Ile Glu His
20 25 30
Trp Gln Ala Leu Arg Arg Glu Ala Val Leu Leu Tyr Tyr Ala Arg Gln
35 40 45
Asn Gly Val Leu Arg Leu Gly Tyr Leu Pro Val Pro Pro Leu Ala Thr
50 55 60
Ser Glu Ala Lys Ala Lys Gln Ala Ile Ser Met Val Leu Gln Leu Gln
65 70 75 80

Ser Leu Gln Gln Ser Pro Tyr Gly Thr Glu Lys Trp Thr Leu Val Asp
85 90 95

Thr Ser Ile Glu Thr Phe Lys Asn Thr Pro Glu Asn His Phe Lys Lys
100 105 110

Gly Pro Ile Asn Val Glu Val Ile Tyr Asp Gly Asp Pro Asp Asn Ala
115 120 125

Asn Leu Tyr Thr Met Trp Lys Tyr Val Tyr Tyr Met Asp Asp Asn Asp
130 135 140

Gln Trp Gln Lys Thr Glu Ser Gly Ala Asn His Thr Gly Ile Tyr Tyr
145 150 155 160

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

Asn Arg Tyr Ser Lys Ser Gly Gln Trp Glu Val Arg Ile Asn Lys Glu
180 185 190

Thr Val Phe Ala Pro Val Thr Ser Ser Thr
195 200

<210> 55
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<212> PRT
<213> Human papillomavirus
<400> 55

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

Thr Leu Tyr Glu Lys Asp Ser Lys Asp Ile Glu Asp Gln Ile Met Gln
20 25 30

Trp Asn Leu Leu Arg Gln Glu Gln Val Leu Phe His Tyr Ala Arg Lys
35 40 45

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

Ser Gln Asp Lys Ala Lys Thr Ala Ile Glu Met Thr Leu Tyr Leu Ser
65 70 75 80

Gly Leu Arg Asp Ser Gln Tyr Gly Ser Glu Gln Trp Ser Leu Gln Asp
85 90 95

Thr Ser Arg Glu Ile Phe Leu Ala Pro Pro Asp His Thr Phe Lys Lys
100 105 110

Gly Gly Gln Thr Ile Glu Val Ile Tyr Asp Glu Asp Pro Asn Asn Ser
Page 47

115

Thr Arg His Thr Val Trp Arg His Ile Tyr Tyr Gln Asn Gly Asp Asn
130 135 140

Arg Trp Arg Lys Ala Ala Ser Asp Val Asp Val His Gly Val Phe Tyr
145 150 155 160

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

Ala Asn Arg Tyr Ser Lys Thr Gly Arg Tyr Thr Val Gln Tyr Glu Gly
180 185 190

Lys Arg Phe Thr Asn Val Met Ser Pro Val Asn
195 200

<210> 56
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<212> PRT
<213> Human papillomavirus

<400> 56

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

Asn Leu Tyr Glu Gln Asp Ser Lys Leu Ile Glu Asp Gln Ile Lys Gln
20 25 30

Trp Asn Leu Ile Arg Gln Glu Gln Val Leu Phe His Phe Ala Arg Lys
35 40 45

Asn Gly Val Met Arg Ile Gly Leu Gln Ala Val Pro Ser Leu Ala Ser
50 55 60

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

Ser Leu Lys Asp Ser Pro Tyr Gly Thr Glu Asp Trp Ser Leu Gln Asp
85 90 95

Thr Ser Arg Glu Leu Phe Leu Ala Pro Pro Ala Gly Thr Phe Lys Lys
100 105 110

Ser Gly Ser Thr Leu Glu Val Thr Tyr Asp Asn Asn Pro Asp Asn Gln
115 120 125

Thr Arg His Thr Ile Trp Asn His Val Tyr Tyr Gln Asn Gly Asp Asp
130 135 140

Val Trp Arg Lys Val Ser Ser Gly Val Asp Ala Val Gly Val Tyr Tyr
145 150 155 160

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

Ala Ser Lys Tyr Ser Thr Thr Gly Gln Tyr Ala Val Asn Tyr Arg Gly
180 185 190

Lys Arg Phe Thr Asn Val Met Ser Ser Thr Ser
195 200

<210> 57
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<212> PRT
<213> Human papillomavirus
<400> 57

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

Glu Gln Asp Ser Lys Asp Ile Gln Ala Gln Ile Gln Tyr Trp Asp Leu
20 25 30

Asn Arg Lys Leu Tyr Val Thr Tyr Tyr Tyr Ala Arg Lys Glu Gly Tyr
35 40 45

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

Lys Ala Lys Gln Ala Ile Glu Met Gly Leu Leu Leu Thr Ser Leu Ser
65 70 75 80

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

Glu Leu Leu Leu Thr Pro Pro Arg Asn Thr Phe Lys Lys Lys Gly Tyr
100 105 110

Thr Val Asn Val Trp Phe Asp Asn Asn Glu Asn Asn Thr Phe Pro Tyr
115 120 125

Thr Asn Trp Glu Tyr Ile Tyr Tyr Gln Asp Asp Ile Glu Gln Trp His
130 135 140

Arg Thr Arg Gly Glu Val Asp Tyr Asn Gly Leu Tyr Phe Thr Glu Asn
145 150 155 160

Asn Gly Asn Arg Ala Tyr Phe Leu Leu Phe Asp Ser Asp Ala Gln Thr
165 170 175

Tyr Ser Gln Thr Gly Thr Trp Thr Val His Tyr Lys Asn Gln Ile Ile
180 185 190

Ser Ala Pro Val Thr Ser Ser Ser

195

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<212> PRT
<213> Human papillomavirus

<400> 58

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

Thr His Ile Glu Ser Gly Asn Thr Thr Leu Glu Ser Gln Ile Lys Tyr
20 25 30

Trp Glu Asn Val Arg Lys Glu Asn Ala Ile Met His Tyr Ala Arg Lys
35 40 45

Gln Gly Leu Thr Lys Leu Gly Leu Gln Pro Leu Pro Ser Leu Leu Ala
50 55 60

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

Ser Leu Leu Lys Ser Pro Tyr Ala Ser Glu Pro Trp Thr Leu Pro Glu
85 90 95

Val Ser Ala Glu Leu Ile Asn Thr Pro Pro Gln Asn Val Leu Lys Lys
100 105 110

Gly Gly Tyr Asp Val Thr Val Trp Phe Asp Asp Asp Arg Asn Asn Thr
115 120 125

Met Val Tyr Thr Asn Trp Thr Ala Leu Tyr Tyr Gln Asp Ala Asn Glu
130 135 140

Ile Trp His Lys Val Lys Gly Glu Val Asp Tyr Asn Gly Leu Phe Phe
145 150 155 160

Thr Asp His Thr Gly Glu Arg Ala Tyr Phe Thr Leu Phe Ser Thr Asp
165 170 175

Ala Glu Arg Tyr Ser Gln Thr Gly Leu Trp Thr Val His Phe Lys Thr
180 185 190

Gln Val Ile Ser Ser Ser Val Val Ser Ser Thr
195 200

<210> 59
<211> 203
<212> PRT
<213> Human papillomavirus

<400> 59

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

Thr His Ile Glu Ser Gln Asp Asp Thr Leu Glu Ser Gln Ile Arg Tyr
20 25 30

Trp Glu Asn Ile Arg Lys Glu Asn Ala Ile Met His Phe Ala Arg Lys
35 40 45

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

Thr Glu Tyr Asn Ala Lys Gln Ala Ile Gln Ile His Leu Thr Leu Gln
65 70 75 80

Ser Leu Leu Lys Ser Pro Tyr Gly Ser Glu Arg Trp Thr Leu Pro Glu
85 90 95

Val Ser Ala Glu Leu Ile Asn Thr Ala Pro Gln Asn Cys Leu Lys Lys
100 105 110

Gly Gly Tyr Asp Val Ser Val Trp Phe Asp Asn Asp Arg Tyr Asn Ala
115 120 125

Met Val Tyr Thr Asn Trp Asp Tyr Leu Tyr Tyr Gln Asp Val Asn Glu
130 135 140

Ile Trp His Lys Val Lys Gly Glu Val Asp Tyr Asp Gly Leu Tyr Phe
145 150 155 160

Thr Asp His Thr Gly Glu Arg Ala Tyr Phe Thr Leu Phe Ser Thr Asp
165 170 175

Ala His Arg Phe Ser Arg Thr Gly Leu Trp Thr Val His Phe Lys Thr
180 185 190

Gln Val Ile Ser Ser Ser Val Val Ser Ser Thr
195 200

<210> 60

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<212> PRT

<213> Human papillomavirus

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

Thr His Ile Glu Ser Gln Glu Ser Thr Leu Glu Ser Gln Ile Gln Tyr
20 25 30

Trp Glu Asn Ile Arg Lys Glu Asn Ala Ile Met His Tyr Ala Arg Lys
35 40 45

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

Thr Glu Tyr Asn Ala Lys Gln Ala Ile Gln Ile His Leu Thr Leu Gln
65 70 75 80

Ser Leu Leu Lys Ser Pro Phe Ala Ser Glu Arg Trp Thr Leu Thr Asp
85 90 95

Val Ser Ala Glu Leu Ile Asn Thr Ser Pro Gln Asn Cys Leu Lys Lys
100 105 110

Gly Gly Tyr Asp Val Ala Val Trp Phe Asp Asn Asp Arg Gln Asn Ala
115 120 125

Met Leu Tyr Thr Asn Trp Asp Phe Leu Tyr Tyr Gln Asp Met Asn Glu
130 135 140

Gln Trp His Lys Val Lys Gly Glu Val Asp Tyr Asp Gly Leu Tyr Phe
145 150 155 160

Thr Asp His Thr Gly Glu Arg Ala Tyr Phe Thr Leu Phe Ser Ser Asp
165 170 175

Ala Gln Arg Phe Ser Arg Thr Gly Leu Trp Thr Val His Phe Lys Thr
180 185 190

Gln Val Ile Ser Ser Pro Ile Val Ser Ser Thr
195 200

<210> 61
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<212> PRT
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<400> 61

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

Leu Ile Glu Lys Asp Ser Lys Asn Leu Lys Asp His Ile Asp Tyr Trp
20 25 30

Glu Ser Met Arg Lys Glu Gln Val Leu Ala Phe Tyr Ala Lys Lys Glu
35 40 45

Asn Met Ser Arg Leu Gly Leu Gln Pro Leu Pro Pro Ala Lys Val Ser
50 55 60

Glu Gln Lys Ala Lys Asp Ala Ile Arg Ile Gln Leu Leu Leu Gln Ser
65 70 75 80

Leu Tyr Lys Ser Asp Phe Gly Ser Glu Pro Trp Thr Leu Ser Glu Cys
85 90 95

Ser Leu Glu Met Leu Asn Ala Pro Pro Arg Asn Cys Phe Lys Lys Gln
100 105 110

Pro Phe Thr Val Thr Val Gln Phe Asp Asn Asp Pro Lys Asn Val Tyr
115 120 125

Pro Tyr Ile Cys Tyr Glu Tyr Ile Tyr Tyr Gln Asp Asp Arg Asp Lys
130 135 140

Trp His Lys Val Lys Gly Leu Val Asp His Asn Gly Leu Tyr Phe Lys
145 150 155 160

Glu Val Thr Gly Asp Ser Val Tyr Phe Lys Leu Phe Gln Pro Asp Ala
165 170 175

Thr Val Tyr Gly Lys Ser Gly Gln Trp Thr Val Ile Phe Lys Asn Lys
180 185 190

Thr Ile His Ser Ser Val Thr Ser Ser Ser
195 200

<210> 62
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<212> PRT
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<400> 62

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

Leu Ile Glu Lys Glu Ser Tyr Asp Leu Lys Asp His Leu Ala Tyr Trp
20 25 30

Lys Ala Val Arg Leu Glu Asn Val Ile Ala Tyr Tyr Ala Arg Lys Glu
35 40 45

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

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

Leu Leu Lys Ser Glu Phe Ala Leu Glu Arg Trp Thr Leu Ala Glu Thr
85 90 95

Ser Ala Glu Thr Ile Asn Ser Ser Pro Arg Asn Cys Phe Lys Lys Val
100 105 110

Pro Phe Ile Val Asn Val Trp Phe Asp Asn Asp Glu Arg Asn Ser Phe
115 120 125

Pro Tyr Thr Cys Trp Asp Phe Ile Tyr Tyr Gln Asp Asp Gln Asn Lys
 130 135 140

Trp His Lys Thr Glu Gly Leu Val Asp His Asn Gly Cys Tyr Tyr Val
 145 150 155 160

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

Val Lys Tyr Gly Lys Thr Gly Leu Trp Thr Val Arg Phe Lys Asn Lys
 180 185 190

Thr Ile Ser Ala Ser Val Thr Ser Ser Ser
 195 200

<210> 63
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 <400> 63

Met Glu Arg Leu Leu Glu Arg Leu Asp Tyr Ile Gln Glu Gln Ile Leu
 1 5 10 15

Thr Leu Tyr Glu Lys Asp Ser Val Asp Leu Glu Asp His Ile Arg Leu
 20 25 30

Trp Asn Leu Leu Arg Arg Glu Asn Ala Ile Trp Tyr Val Leu Arg Gln
 35 40 45

Glu Gly His Ala Arg Val Gly Gly Arg Ala Val Pro Ala Met Thr Val
 50 55 60

Ser Glu Ala Asn Ala Lys Phe Ala Ile Glu Met Gln Ile Lys Leu Glu
 65 70 75 80

Ser Leu Lys Ala Ser Pro Tyr Ala Ala Glu Gly Trp Ser Leu Gln Glu
 85 90 95

Thr Thr Lys Glu Arg Tyr Leu Ala Glu Pro Ser Arg Thr Phe Lys Lys
 100 105 110

Leu Gly Gln Pro Val Thr Leu Met Phe Asp Asn Asp Pro Glu Asn Leu
 115 120 125

Thr Glu Val Val Leu Trp Lys Trp Val Tyr Tyr Ile Thr Pro Thr Asp
 130 135 140

Glu Trp Tyr Lys Ala Arg Gly Gly Ile Asp Asp Thr Gly Ile Tyr Tyr
 145 150 155 160

Ile Asp His Glu Ser Val Lys Met Tyr Tyr Val Arg Phe Asp Met Glu
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Xaa Xaa