

SEQUENCE LISTING

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<120> T CELL RECEPTORS

<130> BLUE-130.PC

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<160> 63

<170> PatentIn version 3.5

<210> 1

<211> 140

<212> PRT

<213> Homo sapiens

<400> 1

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

Ser Asp Lys Ser Val Cys Leu Phe Thr Asp Phe Asp Ser Gln Thr Asn
20 25 30

Val Ser Gln Ser Lys Asp Ser Asp Val Tyr Ile Thr Asp Lys Thr Val
35 40 45

Leu Asp Met Arg Ser Met Asp Phe Lys Ser Asn Ser Ala Val Ala Trp
50 55 60

Ser Asn Lys Ser Asp Phe Ala Cys Ala Asn Ala Phe Asn Asn Ser Ile
65 70 75 80

Ile Pro Glu Asp Thr Phe Phe Pro Ser Pro Glu Ser Ser Cys Asp Val
85 90 95

Lys Leu Val Glu Lys Ser Phe Glu Thr Asp Thr Asn Leu Asn Phe Gln
100 105 110

Asn Leu Ser Val Ile Gly Phe Arg Ile Leu Leu Leu Lys Val Ala Gly
115 120 125

Phe Asn Leu Leu Met Thr Leu Arg Leu Trp Ser Ser
130 135 140

<210> 2
<211> 176
<212> PRT
<213> Homo sapiens

<400> 2

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

Glu Ala Glu Ile Ser His Thr Gln Lys Ala Thr Leu Val Cys Leu Ala
20 25 30

Thr Gly Phe Phe Pro Asp His Val Glu Leu Ser Trp Trp Val Asn Gly
35 40 45

Lys Glu Val His Ser Gly Val Ser Thr Asp Pro Gln Pro Leu Lys Glu
50 55 60

Gln Pro Ala Leu Asn Asp Ser Arg Tyr Cys Leu Ser Ser Arg Leu Arg
65 70 75 80

Val Ser Ala Thr Phe Trp Gln Asn Pro Arg Asn His Phe Arg Cys Gln
85 90 95

Val Gln Phe Tyr Gly Leu Ser Glu Asn Asp Glu Trp Thr Gln Asp Arg
100 105 110

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

Asp Cys Gly Phe Thr Ser Val Ser Tyr Gln Gln Gly Val Leu Ser Ala
130 135 140

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

Leu Val Ser Ala Leu Val Leu Met Ala Met Val Lys Arg Lys Asp Phe
165 170 175

<210> 3
<211> 178
<212> PRT
<213> Homo sapiens

<400> 3

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

Glu Ala Glu Ile Ser His Thr Gln Lys Ala Thr Leu Val Cys Leu Ala
20 25 30

Thr Gly Phe Tyr Pro Asp His Val Glu Leu Ser Trp Trp Val Asn Gly
35 40 45

Lys Glu Val His Ser Gly Val Ser Thr Asp Pro Gln Pro Leu Lys Glu
50 55 60

Gln Pro Ala Leu Asn Asp Ser Arg Tyr Cys Leu Ser Ser Arg Leu Arg
65 70 75 80

Val Ser Ala Thr Phe Trp Gln Asn Pro Arg Asn His Phe Arg Cys Gln
85 90 95

Val Gln Phe Tyr Gly Leu Ser Glu Asn Asp Glu Trp Thr Gln Asp Arg
100 105 110

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

Asp Cys Gly Phe Thr Ser Glu Ser Tyr Gln Gln Gly Val Leu Ser Ala

130

135

140

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

Leu Val Ser Ala Leu Val Leu Met Ala Met Val Lys Arg Lys Asp Ser
 165 170 175

Arg Gly

<210> 4

<211> 140

<212> PRT

<213> Artificial Sequence

<220>

<223> Engineered TCR alpha constant region

<400> 4

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

Ser Asp Lys Ser Val Cys Leu Phe Thr Asp Phe Asp Ser Gln Thr Asn
 20 25 30

Val Ser Gln Ser Lys Asp Ser Asp Val Tyr Ile Thr Asp Lys Thr Val
 35 40 45

Leu Asp Met Arg Ser Met Asp Phe Lys Ser Asn Ser Ala Val Ala Trp
 50 55 60

Ser Asn Lys Ser Asp Phe Ala Cys Ala Asn Ala Phe Asn Asn Ser Ile
 65 70 75 80

Ile Pro Glu Asp Thr Phe Phe Pro Ser Ser Asp Val Pro Cys Asp Val
 85 90 95

Lys Leu Val Glu Lys Ser Phe Glu Thr Asp Thr Asn Leu Asn Phe Gln

100

105

110

Asn Leu Leu Val Ile Val Leu Arg Ile Leu Leu Leu Lys Val Ala Gly
 115 120 125

Phe Asn Leu Leu Met Thr Leu Arg Leu Trp Ser Ser
 130 135 140

<210> 5

<211> 176

<212> PRT

<213> Artificial Sequence

<220>

<223> Engineered TCR beta constant region 1

<400> 5

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

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

Thr Gly Phe Phe Pro Asp His Val Glu Leu Ser Trp Trp Val Asn Gly
 35 40 45

Lys Glu Val His Ser Gly Val Ser Thr Asp Pro Gln Pro Leu Lys Glu
 50 55 60

Gln Pro Ala Leu Asn Asp Ser Arg Tyr Cys Leu Ser Ser Arg Leu Arg
 65 70 75 80

Val Ser Ala Thr Phe Trp Gln Asn Pro Arg Asn His Phe Arg Cys Gln
 85 90 95

Val Gln Phe Tyr Gly Leu Ser Glu Asn Asp Glu Trp Thr Gln Asp Arg
 100 105 110

Ala Lys Pro Val Thr Gln Ile Val Ser Ala Glu Ala Trp Gly Arg Ala

115

120

125

Asp Cys Gly Ile Thr Ser Ala Ser Tyr His Gln Gly Val Leu Ser Ala
 130 135 140

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

Leu Val Ser Ala Leu Val Leu Met Ala Met Val Lys Arg Lys Asp Phe
 165 170 175

<210> 6

<211> 178

<212> PRT

<213> Artificial Sequence

<220>

<223> Engineered TCR beta constant region 2

<400> 6

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

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

Thr Gly Phe Tyr Pro Asp His Val Glu Leu Ser Trp Trp Val Asn Gly
 35 40 45

Lys Glu Val His Ser Gly Val Ser Thr Asp Pro Gln Pro Leu Lys Glu
 50 55 60

Gln Pro Ala Leu Asn Asp Ser Arg Tyr Cys Leu Ser Ser Arg Leu Arg
 65 70 75 80

Val Ser Ala Thr Phe Trp Gln Asn Pro Arg Asn His Phe Arg Cys Gln
 85 90 95

Val Gln Phe Tyr Gly Leu Ser Glu Asn Asp Glu Trp Thr Gln Asp Arg

100

105

110

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

Asp Cys Gly Ile Thr Ser Ala Ser Tyr His Gln Gly Val Leu Ser Ala
 130 135 140

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

Leu Val Ser Ala Leu Val Leu Met Ala Met Val Lys Arg Lys Asp Ser
 165 170 175

Arg Gly

<210> 7
 <211> 251
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Engineered MART-1 TCR alpha chain

<400> 7

Met Lys Glu Val Glu Gln Asn Ser Gly Pro Leu Ser Val Pro Glu Gly
 1 5 10 15

Ala Ile Ala Ser Leu Asn Cys Thr Tyr Ser Tyr Arg Gly Ser Gln Ser
 20 25 30

Phe Phe Trp Tyr Arg Gln Tyr Ser Gly Lys Ser Pro Glu Leu Ile Met
 35 40 45

Phe Ile Tyr Ser Asn Gly Asp Lys Glu Asp Gly Arg Phe Thr Ala Gln
 50 55 60

Leu Asn Lys Ala Ser Gln Tyr Val Ser Leu Leu Ile Arg Asp Ser Gln

65		70		75		80									
Pro	Ser	Asp	Ser	Ala	Thr	Tyr	Leu	Cys	Ala	Val	Asn	Phe	Gly	Gly	Gly
			85					90						95	
Lys	Leu	Ile	Phe	Gly	Gln	Gly	Thr	Glu	Leu	Ser	Val	Lys	Pro	Asn	Ile
		100						105					110		
Gln	Asn	Pro	Asp	Pro	Ala	Val	Tyr	Gln	Leu	Arg	Asp	Ser	Lys	Ser	Ser
		115					120					125			
Asp	Lys	Ser	Val	Cys	Leu	Phe	Thr	Asp	Phe	Asp	Ser	Gln	Thr	Asn	Val
	130					135					140				
Ser	Gln	Ser	Lys	Asp	Ser	Asp	Val	Tyr	Ile	Thr	Asp	Lys	Thr	Val	Leu
145					150					155					160
Asp	Met	Arg	Ser	Met	Asp	Phe	Lys	Ser	Asn	Ser	Ala	Val	Ala	Trp	Ser
				165					170					175	
Asn	Lys	Ser	Asp	Phe	Ala	Cys	Ala	Asn	Ala	Phe	Asn	Asn	Ser	Ile	Ile
			180					185					190		
Pro	Glu	Asp	Thr	Phe	Phe	Pro	Ser	Ser	Asp	Val	Pro	Cys	Asp	Val	Lys
		195					200					205			
Leu	Val	Glu	Lys	Ser	Phe	Glu	Thr	Asp	Thr	Asn	Leu	Asn	Phe	Gln	Asn
	210					215					220				
Leu	Leu	Val	Ile	Val	Leu	Arg	Ile	Leu	Leu	Leu	Lys	Val	Ala	Gly	Phe
225					230					235					240
Asn	Leu	Leu	Met	Thr	Leu	Arg	Leu	Trp	Ser	Ser					
			245						250						

<210> 8
 <211> 290
 <212> PRT

<213> Artificial Sequence

<220>

<223> Engineered MART-1 TCR beta chain

<400> 8

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

Gly Arg Arg Met Thr Leu Arg Cys Thr Gln Asp Met Arg His Asn Ala
20 25 30

Met Tyr Trp Tyr Arg Gln Asp Leu Gly Leu Gly Leu Arg Leu Ile His
35 40 45

Tyr Ser Asn Thr Ala Gly Thr Thr Gly Lys Gly Glu Val Pro Asp Gly
50 55 60

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

Ser Ala Val Pro Ser Gln Thr Ser Val Tyr Phe Cys Ala Ser Ser Trp
85 90 95

Ser Phe Gly Thr Glu Ala Phe Phe Gly Gln Gly Thr Arg Leu Thr Val
100 105 110

Val Glu Asp Leu Asn Lys Val Phe Pro Pro Glu Val Ala Val Phe Glu
115 120 125

Pro Ser Lys Ala Glu Ile Ala His Thr Gln Lys Ala Thr Leu Val Cys
130 135 140

Leu Ala Thr Gly Phe Phe Pro Asp His Val Glu Leu Ser Trp Trp Val
145 150 155 160

Asn Gly Lys Glu Val His Ser Gly Val Ser Thr Asp Pro Gln Pro Leu
165 170 175

Lys Glu Gln Pro Ala Leu Asn Asp Ser Arg Tyr Cys Leu Ser Ser Arg
180 185 190

Leu Arg Val Ser Ala Thr Phe Trp Gln Asn Pro Arg Asn His Phe Arg
195 200 205

Cys Gln Val Gln Phe Tyr Gly Leu Ser Glu Asn Asp Glu Trp Thr Gln
210 215 220

Asp Arg Ala Lys Pro Val Thr Gln Ile Val Ser Ala Glu Ala Trp Gly
225 230 235 240

Arg Ala Asp Cys Gly Ile Thr Ser Ala Ser Tyr His Gln Gly Val Leu
245 250 255

Ser Ala Thr Ile Leu Tyr Glu Ile Leu Leu Gly Lys Ala Thr Leu Tyr
260 265 270

Ala Val Leu Val Ser Ala Leu Val Leu Met Ala Met Val Lys Arg Lys
275 280 285

Asp Phe
290

<210> 9
<211> 268
<212> PRT
<213> Artificial Sequence

<220>
<223> Engineered MART-1 TCR alpha chain

<400> 9

Met Leu Leu Glu His Leu Leu Ile Ile Leu Trp Met Gln Leu Thr Trp
1 5 10 15

Val Ser Gly Gln Gln Leu Asn Gln Ser Pro Gln Ser Met Phe Ile Gln
20 25 30

Glu Gly Glu Asp Val Ser Met Asn Cys Thr Ser Ser Ser Ile Phe Asn
35 40 45

Thr Trp Leu Trp Tyr Lys Gln Asp Pro Gly Glu Gly Pro Val Leu Leu
50 55 60

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

Ala Gln Phe Gly Ile Thr Arg Lys Asp Ser Phe Leu Asn Ile Ser Ala
85 90 95

Ser Ile Pro Ser Asp Val Gly Ile Tyr Phe Cys Ala Gly Gly Thr Gly
100 105 110

Asn Gln Phe Tyr Phe Gly Thr Gly Thr Ser Leu Thr Val Ile Pro Asn
115 120 125

Ile Gln Asn Pro Asp Pro Ala Val Tyr Gln Leu Arg Asp Ser Lys Ser
130 135 140

Ser Asp Lys Ser Val Cys Leu Phe Thr Asp Phe Asp Ser Gln Thr Asn
145 150 155 160

Val Ser Gln Ser Lys Asp Ser Asp Val Tyr Ile Thr Asp Lys Thr Val
165 170 175

Leu Asp Met Arg Ser Met Asp Phe Lys Ser Asn Ser Ala Val Ala Trp
180 185 190

Ser Asn Lys Ser Asp Phe Ala Cys Ala Asn Ala Phe Asn Asn Ser Ile
195 200 205

Ile Pro Glu Asp Thr Phe Phe Pro Ser Ser Asp Val Pro Cys Asp Val
210 215 220

Lys Leu Val Glu Lys Ser Phe Glu Thr Asp Thr Asn Leu Asn Phe Gln

225 230 235 240

Asn Leu Leu Val Ile Val Leu Arg Ile Leu Leu Leu Lys Val Ala Gly
245 250 255

Phe Asn Leu Leu Met Thr Leu Arg Leu Trp Ser Ser
260 265

<210> 10
<211> 309
<212> PRT
<213> Artificial Sequene

<220>
<223> Engineered MART-1 TCR beta chain

<400> 10

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

Gly His Met Asp Ala Gly Ile Thr Gln Ser Pro Arg His Lys Val Thr
20 25 30

Glu Thr Gly Thr Pro Val Thr Leu Arg Cys His Gln Thr Glu Asn His
35 40 45

Arg Tyr Met Tyr Trp Tyr Arg Gln Asp Pro Gly His Gly Leu Arg Leu
50 55 60

Ile His Tyr Ser Tyr Gly Val Lys Asp Thr Asp Lys Gly Glu Val Ser
65 70 75 80

Asp Gly Tyr Ser Val Ser Arg Ser Lys Thr Glu Asp Phe Leu Leu Thr
85 90 95

Leu Glu Ser Ala Thr Ser Ser Gln Thr Ser Val Tyr Phe Cys Ala Ile
100 105 110

Ser Glu Val Gly Val Gly Gln Pro Gln His Phe Gly Asp Gly Thr Arg

115

120

125

Leu Ser Ile Leu Glu Asp Leu Asn Lys Val Phe Pro Pro Glu Val Ala
 130 135 140

Val Phe Glu Pro Ser Lys Ala Glu Ile Ala His Thr Gln Lys Ala Thr
 145 150 155 160

Leu Val Cys Leu Ala Thr Gly Phe Phe Pro Asp His Val Glu Leu Ser
 165 170 175

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

Gln Pro Leu Lys Glu Gln Pro Ala Leu Asn Asp Ser Arg Tyr Cys Leu
 195 200 205

Ser Ser Arg Leu Arg Val Ser Ala Thr Phe Trp Gln Asn Pro Arg Asn
 210 215 220

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

Trp Thr Gln Asp Arg Ala Lys Pro Val Thr Gln Ile Val Ser Ala Glu
 245 250 255

Ala Trp Gly Arg Ala Asp Cys Gly Ile Thr Ser Ala Ser Tyr His Gln
 260 265 270

Gly Val Leu Ser Ala Thr Ile Leu Tyr Glu Ile Leu Leu Gly Lys Ala
 275 280 285

Thr Leu Tyr Ala Val Leu Val Ser Ala Leu Val Leu Met Ala Met Val
 290 295 300

Lys Arg Lys Asp Phe
 305

<210> 11
<211> 270
<212> PRT
<213> Artificial Sequence

<220>
<223> Engineered WT-1 TCR alpha chain

<400> 11

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

Leu Val Asn Gly Glu Asn Val Glu Gln His Pro Ser Thr Leu Ser Val
20 25 30

Gln Glu Gly Asp Ser Ala Val Ile Lys Cys Thr Tyr Ser Asp Ser Ala
35 40 45

Ser Asn Tyr Phe Pro Trp Tyr Lys Gln Glu Leu Gly Lys Arg Pro Gln
50 55 60

Leu Ile Ile Asp Ile Arg Ser Asn Val Gly Glu Lys Lys Asp Gln Arg
65 70 75 80

Ile Ala Val Thr Leu Asn Lys Thr Ala Lys His Phe Ser Leu His Ile
85 90 95

Thr Glu Thr Gln Pro Glu Asp Ser Ala Val Tyr Phe Cys Ala Ala Thr
100 105 110

Glu Asp Tyr Gln Leu Ile Trp Gly Ala Gly Thr Lys Leu Ile Ile Lys
115 120 125

Pro Asp Ile Gln Asn Pro Asp Pro Ala Val Tyr Gln Leu Arg Asp Ser
130 135 140

Lys Ser Ser Asp Lys Ser Val Cys Leu Phe Thr Asp Phe Asp Ser Gln
145 150 155 160

Thr Asn Val Ser Gln Ser Lys Asp Ser Asp Val Tyr Ile Thr Asp Lys
165 170 175

Thr Val Leu Asp Met Arg Ser Met Asp Phe Lys Ser Asn Ser Ala Val
180 185 190

Ala Trp Ser Asn Lys Ser Asp Phe Ala Cys Ala Asn Ala Phe Asn Asn
195 200 205

Ser Ile Ile Pro Glu Asp Thr Phe Phe Pro Ser Ser Asp Val Pro Cys
210 215 220

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

Phe Gln Asn Leu Leu Val Ile Val Leu Arg Ile Leu Leu Leu Lys Val
245 250 255

Ala Gly Phe Asn Leu Leu Met Thr Leu Arg Leu Trp Ser Ser
260 265 270

<210> 12
<211> 310
<212> PRT
<213> Artificial Sequence

<220>
<223> Engineered WT-1 TCR beta chain

<400> 12

Met Ser Asn Gln Val Leu Cys Cys Val Val Leu Cys Phe Leu Gly Ala
1 5 10 15

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

Lys Glu Gly Gln Asn Val Thr Leu Ser Cys Glu Gln Asn Leu Asn His
35 40 45

Asp Ala Met Tyr Trp Tyr Arg Gln Asp Pro Gly Gln Gly Leu Arg Leu
50 55 60

Ile Tyr Tyr Ser Gln Ile Val Asn Asp Phe Gln Lys Gly Asp Ile Ala
65 70 75 80

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

Val Thr Ser Ala Gln Lys Asn Pro Thr Ala Phe Tyr Leu Cys Ala Ser
100 105 110

Ser Pro Gly Ala Leu Tyr Glu Gln Tyr Phe Gly Pro Gly Thr Arg Leu
115 120 125

Thr Val Thr Glu Asp Leu Lys Asn Val Phe Pro Pro Lys Val Ala Val
130 135 140

Phe Glu Pro Ser Lys Ala Glu Ile Ala His Thr Gln Lys Ala Thr Leu
145 150 155 160

Val Cys Leu Ala Thr Gly Phe Tyr Pro Asp His Val Glu Leu Ser Trp
165 170 175

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

Pro Leu Lys Glu Gln Pro Ala Leu Asn Asp Ser Arg Tyr Cys Leu Ser
195 200 205

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

Phe Arg Cys Gln Val Gln Phe Tyr Gly Leu Ser Glu Asn Asp Glu Trp
225 230 235 240

Thr Gln Asp Arg Ala Lys Pro Val Thr Gln Ile Val Ser Ala Glu Ala

245

250

255

Trp Gly Arg Ala Asp Cys Gly Ile Thr Ser Ala Ser Tyr His Gln Gly
 260 265 270

Val Leu Ser Ala Thr Ile Leu Tyr Glu Ile Leu Leu Gly Lys Ala Thr
 275 280 285

Leu Tyr Ala Val Leu Val Ser Ala Leu Val Leu Met Ala Met Val Lys
 290 295 300

Arg Lys Asp Ser Arg Gly
 305 310

<210> 13
 <211> 272
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Engineered HPV16 E6 TCR alpha chain

<400> 13

Met Leu Leu Glu His Leu Leu Ile Ile Leu Trp Met Gln Leu Thr Trp
 1 5 10 15

Val Ser Gly Gln Gln Leu Asn Gln Ser Pro Gln Ser Met Phe Ile Gln
 20 25 30

Glu Gly Glu Asp Val Ser Met Asn Cys Thr Ser Ser Ile Phe Asn
 35 40 45

Thr Trp Leu Trp Tyr Lys Gln Asp Pro Gly Glu Gly Pro Val Leu Leu
 50 55 60

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

Ala Gln Phe Gly Ile Thr Arg Lys Asp Ser Phe Leu Asn Ile Ser Ala

85

90

95

Ser Ile Pro Ser Asp Val Gly Ile Tyr Phe Cys Ala Gly His Pro Ser
100 105 110

Ser Asn Ser Gly Tyr Ala Leu Asn Phe Gly Lys Gly Thr Ser Leu Leu
115 120 125

Val Thr Pro His Ile Gln Asn Pro Asp Pro Ala Val Tyr Gln Leu Arg
130 135 140

Asp Ser Lys Ser Ser Asp Lys Ser Val Cys Leu Phe Thr Asp Phe Asp
145 150 155 160

Ser Gln Thr Asn Val Ser Gln Ser Lys Asp Ser Asp Val Tyr Ile Thr
165 170 175

Asp Lys Thr Val Leu Asp Met Arg Ser Met Asp Phe Lys Ser Asn Ser
180 185 190

Ala Val Ala Trp Ser Asn Lys Ser Asp Phe Ala Cys Ala Asn Ala Phe
195 200 205

Asn Asn Ser Ile Ile Pro Glu Asp Thr Phe Phe Pro Ser Ser Asp Val
210 215 220

Pro Cys Asp Val Lys Leu Val Glu Lys Ser Phe Glu Thr Asp Thr Asn
225 230 235 240

Leu Asn Phe Gln Asn Leu Leu Val Ile Val Leu Arg Ile Leu Leu Leu
245 250 255

Lys Val Ala Gly Phe Asn Leu Leu Met Thr Leu Arg Leu Trp Ser Ser
260 265 270

<210> 14

<211> 314

<212> PRT

<213> Artificial Sequence

<220>

<223> Engineered HPV16 E6 TCR beta chain

<400> 14

Met Gly Thr Ser Leu Leu Cys Trp Val Val Leu Gly Phe Leu Gly Thr
1 5 10 15

Asp His Thr Gly Ala Gly Val Ser Gln Ser Pro Arg Tyr Lys Val Thr
20 25 30

Lys Arg Gly Gln Asp Val Ala Leu Arg Cys Asp Pro Ile Ser Gly His
35 40 45

Val Ser Leu Tyr Trp Tyr Arg Gln Ala Leu Gly Gln Gly Pro Glu Phe
50 55 60

Leu Thr Tyr Phe Asn Tyr Glu Ala Gln Gln Asp Lys Ser Gly Leu Pro
65 70 75 80

Asn Asp Arg Phe Ser Ala Glu Arg Pro Glu Gly Ser Ile Ser Thr Leu
85 90 95

Thr Ile Gln Arg Thr Glu Gln Arg Asp Ser Ala Met Tyr Arg Cys Ala
100 105 110

Ser Ser Ser Gln Thr Gly Ala Arg Thr Asp Thr Gln Tyr Phe Gly Pro
115 120 125

Gly Thr Arg Leu Thr Val Leu Glu Asp Leu Lys Asn Val Phe Pro Pro
130 135 140

Lys Val Ala Val Phe Glu Pro Ser Lys Ala Glu Ile Ala His Thr Gln
145 150 155 160

Lys Ala Thr Leu Val Cys Leu Ala Thr Gly Phe Tyr Pro Asp His Val
165 170 175

Glu Leu Ser Trp Trp Val Asn Gly Lys Glu Val His Ser Gly Val Ser
180 185 190

Thr Asp Pro Gln Pro Leu Lys Glu Gln Pro Ala Leu Asn Asp Ser Arg
195 200 205

Tyr Cys Leu Ser Ser Arg Leu Arg Val Ser Ala Thr Phe Trp Gln Asn
210 215 220

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

Asn Asp Glu Trp Thr Gln Asp Arg Ala Lys Pro Val Thr Gln Ile Val
245 250 255

Ser Ala Glu Ala Trp Gly Arg Ala Asp Cys Gly Ile Thr Ser Ala Ser
260 265 270

Tyr His Gln Gly Val Leu Ser Ala Thr Ile Leu Tyr Glu Ile Leu Leu
275 280 285

Gly Lys Ala Thr Leu Tyr Ala Val Leu Val Ser Ala Leu Val Leu Met
290 295 300

Ala Met Val Lys Arg Lys Asp Ser Arg Gly
305 310

<210> 15
<211> 274
<212> PRT
<213> Artificial Sequence

<220>
<223> Engineered NY-ESO-1 TCR alpha chain

<400> 15

Met Glu Thr Leu Leu Gly Leu Leu Ile Leu Trp Leu Gln Leu Gln Trp
1 5 10 15

Val Ser Ser Lys Gln Glu Val Thr Gln Ile Pro Ala Ala Leu Ser Val
20 25 30

Pro Glu Gly Glu Asn Leu Val Leu Asn Cys Ser Phe Thr Asp Ser Ala
35 40 45

Ile Tyr Asn Leu Gln Trp Phe Arg Gln Asp Pro Gly Lys Gly Leu Thr
50 55 60

Ser Leu Leu Leu Ile Gln Ser Ser Gln Arg Glu Gln Thr Ser Gly Arg
65 70 75 80

Leu Asn Ala Ser Leu Asp Lys Ser Ser Gly Arg Ser Thr Leu Tyr Ile
85 90 95

Ala Ala Ser Gln Pro Gly Asp Ser Ala Thr Tyr Leu Cys Ala Val Arg
100 105 110

Pro Thr Ser Gly Gly Ser Tyr Ile Pro Thr Phe Gly Arg Gly Thr Ser
115 120 125

Leu Ile Val His Pro Tyr Ile Gln Asn Pro Asp Pro Ala Val Tyr Gln
130 135 140

Leu Arg Asp Ser Lys Ser Ser Asp Lys Ser Val Cys Leu Phe Thr Asp
145 150 155 160

Phe Asp Ser Gln Thr Asn Val Ser Gln Ser Lys Asp Ser Asp Val Tyr
165 170 175

Ile Thr Asp Lys Thr Val Leu Asp Met Arg Ser Met Asp Phe Lys Ser
180 185 190

Asn Ser Ala Val Ala Trp Ser Asn Lys Ser Asp Phe Ala Cys Ala Asn
195 200 205

Ala Phe Asn Asn Ser Ile Ile Pro Glu Asp Thr Phe Phe Pro Ser Ser

210

215

220

Asp Val Pro Cys Asp Val Lys Leu Val Glu Lys Ser Phe Glu Thr Asp
 225 230 235 240

Thr Asn Leu Asn Phe Gln Asn Leu Leu Val Ile Val Leu Arg Ile Leu
 245 250 255

Leu Leu Lys Val Ala Gly Phe Asn Leu Leu Met Thr Leu Arg Leu Trp
 260 265 270

Ser Ser

<210> 16
 <211> 311
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Engineered NY-ESO-1 TCR beta chain

<400> 16

Met Ser Ile Gly Leu Leu Cys Cys Ala Ala Leu Ser Leu Leu Trp Ala
 1 5 10 15

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

Lys Thr Gly Gln Ser Met Thr Leu Gln Cys Ala Gln Asp Met Asn His
 35 40 45

Glu Tyr Met Ser Trp Tyr Arg Gln Asp Pro Gly Met Gly Leu Arg Leu
 50 55 60

Ile His Tyr Ser Val Gly Ala Gly Ile Thr Asp Gln Gly Glu Val Pro
 65 70 75 80

Asn Gly Tyr Asn Val Ser Arg Ser Thr Thr Glu Asp Phe Pro Leu Arg

85

90

95

Leu Leu Ser Ala Ala Pro Ser Gln Thr Ser Val Tyr Phe Cys Ala Ser
 100 105 110

Ser Tyr Val Gly Asn Thr Gly Glu Leu Phe Phe Gly Glu Gly Ser Arg
 115 120 125

Leu Thr Val Leu Glu Asp Leu Lys Asn Val Phe Pro Pro Glu Val Ala
 130 135 140

Val Phe Glu Pro Ser Lys Ala Glu Ile Ala His Thr Gln Lys Ala Thr
 145 150 155 160

Leu Val Cys Leu Ala Thr Gly Phe Tyr Pro Asp His Val Glu Leu Ser
 165 170 175

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

Gln Pro Leu Lys Glu Gln Pro Ala Leu Asn Asp Ser Arg Tyr Cys Leu
 195 200 205

Ser Ser Arg Leu Arg Val Ser Ala Thr Phe Trp Gln Asn Pro Arg Asn
 210 215 220

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

Trp Thr Gln Asp Arg Ala Lys Pro Val Thr Gln Ile Val Ser Ala Glu
 245 250 255

Ala Trp Gly Arg Ala Asp Cys Gly Ile Thr Ser Ala Ser Tyr His Gln
 260 265 270

Gly Val Leu Ser Ala Thr Ile Leu Tyr Glu Ile Leu Leu Gly Lys Ala
 275 280 285

Thr Leu Tyr Ala Val Leu Val Ser Ala Leu Val Leu Met Ala Met Val
290 295 300

Lys Arg Lys Asp Ser Arg Gly
305 310

<210> 17
<211> 274
<212> PRT
<213> Artificial Sequence

<220>
<223> Engineered NY-ESO-1 TCR alpha chain

<400> 17

Met Glu Thr Leu Leu Gly Leu Leu Ile Leu Trp Leu Gln Leu Gln Trp
1 5 10 15

Val Ser Ser Lys Gln Glu Val Thr Gln Ile Pro Ala Ala Leu Ser Val
20 25 30

Pro Glu Gly Glu Asn Leu Val Leu Asn Cys Ser Phe Thr Asp Ser Ala
35 40 45

Ile Tyr Asn Leu Gln Trp Phe Arg Gln Asp Pro Gly Lys Gly Leu Thr
50 55 60

Ser Leu Leu Leu Ile Gln Ser Ser Gln Arg Glu Gln Thr Ser Gly Arg
65 70 75 80

Leu Asn Ala Ser Leu Asp Lys Ser Ser Gly Arg Ser Thr Leu Tyr Ile
85 90 95

Ala Ala Ser Gln Pro Gly Asp Ser Ala Thr Tyr Leu Cys Ala Val Arg
100 105 110

Pro Leu Tyr Gly Gly Ser Tyr Ile Pro Thr Phe Gly Arg Gly Thr Ser
115 120 125

Leu Ile Val His Pro Tyr Ile Gln Asn Pro Asp Pro Ala Val Tyr Gln
130 135 140

Leu Arg Asp Ser Lys Ser Ser Asp Lys Ser Val Cys Leu Phe Thr Asp
145 150 155 160

Phe Asp Ser Gln Thr Asn Val Ser Gln Ser Lys Asp Ser Asp Val Tyr
165 170 175

Ile Thr Asp Lys Thr Val Leu Asp Met Arg Ser Met Asp Phe Lys Ser
180 185 190

Asn Ser Ala Val Ala Trp Ser Asn Lys Ser Asp Phe Ala Cys Ala Asn
195 200 205

Ala Phe Asn Asn Ser Ile Ile Pro Glu Asp Thr Phe Phe Pro Ser Ser
210 215 220

Asp Val Pro Cys Asp Val Lys Leu Val Glu Lys Ser Phe Glu Thr Asp
225 230 235 240

Thr Asn Leu Asn Phe Gln Asn Leu Leu Val Ile Val Leu Arg Ile Leu
245 250 255

Leu Leu Lys Val Ala Gly Phe Asn Leu Leu Met Thr Leu Arg Leu Trp
260 265 270

Ser Ser

<210> 18
<211> 311
<212> PRT
<213> Artificial Sequence

<220>
<223> Engineered NY-ESO-1 TCR beta chain

<400> 18

Met Ser Ile Gly Leu Leu Cys Cys Ala Ala Leu Ser Leu Leu Trp Ala
1 5 10 15

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

Lys Thr Gly Gln Ser Met Thr Leu Gln Cys Ala Gln Asp Met Asn His
35 40 45

Glu Tyr Met Ser Trp Tyr Arg Gln Asp Pro Gly Met Gly Leu Arg Leu
50 55 60

Ile His Tyr Ser Val Gly Ala Gly Ile Thr Asp Gln Gly Glu Val Pro
65 70 75 80

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

Leu Leu Ser Ala Ala Pro Ser Gln Thr Ser Val Tyr Phe Cys Ala Ser
100 105 110

Ser Tyr Val Gly Asn Thr Gly Glu Leu Phe Phe Gly Glu Gly Ser Arg
115 120 125

Leu Thr Val Leu Glu Asp Leu Lys Asn Val Phe Pro Pro Lys Val Ala
130 135 140

Val Phe Glu Pro Ser Lys Ala Glu Ile Ala His Thr Gln Lys Ala Thr
145 150 155 160

Leu Val Cys Leu Ala Thr Gly Phe Tyr Pro Asp His Val Glu Leu Ser
165 170 175

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

Gln Pro Leu Lys Glu Gln Pro Ala Leu Asn Asp Ser Arg Tyr Cys Leu

195

200

205

Ser Ser Arg Leu Arg Val Ser Ala Thr Phe Trp Gln Asn Pro Arg Asn
 210 215 220

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

Trp Thr Gln Asp Arg Ala Lys Pro Val Thr Gln Ile Val Ser Ala Glu
 245 250 255

Ala Trp Gly Arg Ala Asp Cys Gly Ile Thr Ser Ala Ser Tyr His Gln
 260 265 270

Gly Val Leu Ser Ala Thr Ile Leu Tyr Glu Ile Leu Leu Gly Lys Ala
 275 280 285

Thr Leu Tyr Ala Val Leu Val Ser Ala Leu Val Leu Met Ala Met Val
 290 295 300

Lys Arg Lys Asp Ser Arg Gly
 305 310

<210> 19

<211> 276

<212> PRT

<213> Artificial Sequence

<220>

<223> Engineered NY-ESO-1 TCR alpha chain

<400> 19

Met Lys Lys His Leu Thr Thr Phe Leu Val Ile Leu Trp Leu Tyr Phe
 1 5 10 15

Tyr Arg Gly Asn Gly Lys Asn Gln Val Glu Gln Ser Pro Gln Ser Leu
 20 25 30

Ile Ile Leu Glu Gly Lys Asn Cys Thr Leu Gln Cys Asn Tyr Thr Val

35

40

45

Ser Pro Phe Ser Asn Leu Arg Trp Tyr Lys Gln Asp Thr Gly Arg Gly
 50 55 60

Pro Val Ser Leu Thr Ile Leu Thr Phe Ser Glu Asn Thr Lys Ser Asn
 65 70 75 80

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

His Ile Thr Ala Ser Gln Leu Ser Asp Ser Ala Ser Tyr Ile Cys Val
 100 105 110

Val Ser Gly Gly Thr Asp Ser Trp Gly Lys Leu Gln Phe Gly Ala Gly
 115 120 125

Thr Gln Val Val Val Thr Pro Asp Ile Gln Asn Pro Asp Pro Ala Val
 130 135 140

Tyr Gln Leu Arg Asp Ser Lys Ser Ser Asp Lys Ser Val Cys Leu Phe
 145 150 155 160

Thr Asp Phe Asp Ser Gln Thr Asn Val Ser Gln Ser Lys Asp Ser Asp
 165 170 175

Val Tyr Ile Thr Asp Lys Thr Val Leu Asp Met Arg Ser Met Asp Phe
 180 185 190

Lys Ser Asn Ser Ala Val Ala Trp Ser Asn Lys Ser Asp Phe Ala Cys
 195 200 205

Ala Asn Ala Phe Asn Asn Ser Ile Ile Pro Glu Asp Thr Phe Phe Pro
 210 215 220

Ser Ser Asp Val Pro Cys Asp Val Lys Leu Val Glu Lys Ser Phe Glu
 225 230 235 240

Thr Asp Thr Asn Leu Asn Phe Gln Asn Leu Leu Val Ile Val Leu Arg
245 250 255

Ile Leu Leu Leu Lys Val Ala Gly Phe Asn Leu Leu Met Thr Leu Arg
260 265 270

Leu Trp Ser Ser
275

<210> 20
<211> 311
<212> PRT
<213> Artificial Sequence

<220>
<223> Engineered NY-ESO-1 TCR beta chain

<400> 20

Met Ala Ser Leu Leu Phe Phe Cys Gly Ala Phe Tyr Leu Leu Gly Thr
1 5 10 15

Gly Ser Met Asp Ala Asp Val Thr Gln Thr Pro Arg Asn Arg Ile Thr
20 25 30

Lys Thr Gly Lys Arg Ile Met Leu Glu Cys Ser Gln Thr Lys Gly His
35 40 45

Asp Arg Met Tyr Trp Tyr Arg Gln Asp Pro Gly Leu Gly Leu Arg Leu
50 55 60

Ile Tyr Tyr Ser Phe Asp Val Lys Asp Ile Asn Lys Gly Glu Ile Ser
65 70 75 80

Asp Gly Tyr Ser Val Ser Arg Gln Ala Gln Ala Lys Phe Ser Leu Ser
85 90 95

Leu Glu Ser Ala Ile Pro Asn Gln Thr Ala Leu Tyr Phe Cys Ala Thr
100 105 110

Ser Gly Gln Gly Ala Tyr Glu Glu Gln Phe Phe Gly Pro Gly Thr Arg
115 120 125

Leu Thr Val Leu Glu Asp Leu Lys Asn Val Phe Pro Pro Lys Val Ala
130 135 140

Val Phe Glu Pro Ser Lys Ala Glu Ile Ala His Thr Gln Lys Ala Thr
145 150 155 160

Leu Val Cys Leu Ala Thr Gly Phe Tyr Pro Asp His Val Glu Leu Ser
165 170 175

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

Gln Pro Leu Lys Glu Gln Pro Ala Leu Asn Asp Ser Arg Tyr Cys Leu
195 200 205

Ser Ser Arg Leu Arg Val Ser Ala Thr Phe Trp Gln Asn Pro Arg Asn
210 215 220

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

Trp Thr Gln Asp Arg Ala Lys Pro Val Thr Gln Ile Val Ser Ala Glu
245 250 255

Ala Trp Gly Arg Ala Asp Cys Gly Ile Thr Ser Ala Ser Tyr His Gln
260 265 270

Gly Val Leu Ser Ala Thr Ile Leu Tyr Glu Ile Leu Leu Gly Lys Ala
275 280 285

Thr Leu Tyr Ala Val Leu Val Ser Ala Leu Val Leu Met Ala Met Val
290 295 300

Lys Arg Lys Asp Ser Arg Gly

305

310

<210> 21

<211> 273

<212> PRT

<213> Artificial Sequence

<220>

<223> Engineered NY-ESO-1 TCR alpha chain

<400> 21

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

Arg Thr Arg Gly Asn Ser Val Thr Gln Met Glu Gly Pro Val Thr Leu
 20 25 30

Ser Glu Glu Ala Phe Leu Thr Ile Asn Cys Thr Tyr Thr Ala Thr Gly
 35 40 45

Tyr Pro Ser Leu Phe Trp Tyr Val Gln Tyr Pro Gly Glu Gly Leu Gln
 50 55 60

Leu Leu Leu Lys Ala Thr Lys Ala Asp Asp Lys Gly Ser Asn Lys Gly
 65 70 75 80

Phe Glu Ala Thr Tyr Arg Lys Glu Thr Thr Ser Phe His Leu Glu Lys
 85 90 95

Gly Ser Val Gln Val Ser Asp Ser Ala Val Tyr Phe Cys Ala Leu Ser
 100 105 110

Ala Asn Gln Ala Gly Thr Ala Leu Ile Phe Gly Lys Gly Thr Thr Leu
 115 120 125

Ser Val Ser Ser Asn Ile Gln Asn Pro Asp Pro Ala Val Tyr Gln Leu
 130 135 140

Arg Asp Ser Lys Ser Ser Asp Lys Ser Val Cys Leu Phe Thr Asp Phe

20

25

30

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

Trp Tyr Arg Gln Phe Pro Lys Gln Ser Leu Met Leu Met Ala Thr Ser
 50 55 60

Asn Glu Gly Ser Lys Ala Thr Tyr Glu Gln Gly Val Glu Lys Asp Lys
 65 70 75 80

Phe Leu Ile Asn His Ala Ser Leu Thr Leu Ser Thr Leu Thr Val Thr
 85 90 95

Ser Ala His Pro Glu Asp Ser Ser Phe Tyr Ile Cys Ser Ala Ser Val
 100 105 110

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

Glu Asp Leu Lys Asn Val Phe Pro Pro Lys Val Ala Val Phe Glu Pro
 130 135 140

Ser Lys Ala Glu Ile Ala His Thr Gln Lys Ala Thr Leu Val Cys Leu
 145 150 155 160

Ala Thr Gly Phe Tyr Pro Asp His Val Glu Leu Ser Trp Trp Val Asn
 165 170 175

Gly Lys Glu Val His Ser Gly Val Ser Thr Asp Pro Gln Pro Leu Lys
 180 185 190

Glu Gln Pro Ala Leu Asn Asp Ser Arg Tyr Cys Leu Ser Ser Arg Leu
 195 200 205

Arg Val Ser Ala Thr Phe Trp Gln Asn Pro Arg Asn His Phe Arg Cys
 210 215 220

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

Arg Ala Lys Pro Val Thr Gln Ile Val Ser Ala Glu Ala Trp Gly Arg
245 250 255

Ala Asp Cys Gly Ile Thr Ser Ala Ser Tyr His Gln Gly Val Leu Ser
260 265 270

Ala Thr Ile Leu Tyr Glu Ile Leu Leu Gly Lys Ala Thr Leu Tyr Ala
275 280 285

Val Leu Val Ser Ala Leu Val Leu Met Ala Met Val Lys Arg Lys Asp
290 295 300

Ser Arg Gly
305

<210> 23
<211> 271
<212> PRT
<213> Artificial Sequence

<220>
<223> Engineered HPV16 E7 TCR alpha chain

<400> 23

Met Lys Ser Leu Arg Val Leu Leu Val Ile Leu Trp Leu Gln Leu Ser
1 5 10 15

Trp Val Trp Ser Gln Gly Gln Asn Ile Asp Gln Pro Thr Glu Met Thr
20 25 30

Ala Thr Glu Gly Ala Ile Val Gln Ile Asn Cys Thr Tyr Gln Thr Ser
35 40 45

Gly Phe Asn Gly Leu Phe Trp Tyr Gln Gln His Ala Gly Glu Ala Pro
50 55 60

Thr Phe Leu Ser Tyr Asn Val Leu Asp Gly Leu Glu Glu Lys Gly Arg
65 70 75 80

Phe Ser Ser Phe Leu Ser Arg Ser Lys Gly Tyr Ser Tyr Leu Leu Leu
85 90 95

Lys Glu Leu Gln Met Lys Asp Ser Ala Ser Tyr Leu Cys Ala Ser Val
100 105 110

Asp Gly Asn Asn Arg Leu Ala Phe Gly Lys Gly Asn Gln Val Val Val
115 120 125

Ile Pro Asp Ile Gln Asn Pro Asp Pro Ala Val Tyr Gln Leu Arg Asp
130 135 140

Ser Lys Ser Ser Asp Lys Ser Val Cys Leu Phe Thr Asp Phe Asp Ser
145 150 155 160

Gln Thr Asn Val Ser Gln Ser Lys Asp Ser Asp Val Tyr Ile Thr Asp
165 170 175

Lys Thr Val Leu Asp Met Arg Ser Met Asp Phe Lys Ser Asn Ser Ala
180 185 190

Val Ala Trp Ser Asn Lys Ser Asp Phe Ala Cys Ala Asn Ala Phe Asn
195 200 205

Asn Ser Ile Ile Pro Glu Asp Thr Phe Phe Pro Ser Ser Asp Val Pro
210 215 220

Cys Asp Val Lys Leu Val Glu Lys Ser Phe Glu Thr Asp Thr Asn Leu
225 230 235 240

Asn Phe Gln Asn Leu Leu Val Ile Val Leu Arg Ile Leu Leu Leu Lys
245 250 255

Val Ala Gly Phe Asn Leu Leu Met Thr Leu Arg Leu Trp Ser Ser

260

265

270

<210> 24
 <211> 314
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Engineered HPV16 E7 TCR beta chain

<400> 24

Met Gly Pro Gly Leu Leu Cys Trp Ala Leu Leu Cys Leu Leu Gly Ala
 1 5 10 15

Gly Leu Val Asp Ala Gly Val Thr Gln Ser Pro Thr His Leu Ile Lys
 20 25 30

Thr Arg Gly Gln Gln Val Thr Leu Arg Cys Ser Pro Lys Ser Gly His
 35 40 45

Asp Thr Val Ser Trp Tyr Gln Gln Ala Leu Gly Gln Gly Pro Gln Phe
 50 55 60

Ile Phe Gln Tyr Tyr Glu Glu Glu Glu Arg Gln Arg Gly Asn Phe Pro
 65 70 75 80

Asp Arg Phe Ser Gly His Gln Phe Pro Asn Tyr Ser Ser Glu Leu Asn
 85 90 95

Val Asn Ala Leu Leu Leu Gly Asp Ser Ala Leu Tyr Leu Cys Ala Ser
 100 105 110

Ser Leu Gly Trp Arg Gly Gly Arg Tyr Asn Glu Gln Phe Phe Gly Pro
 115 120 125

Gly Thr Arg Leu Thr Val Leu Glu Asp Leu Lys Asn Val Phe Pro Pro
 130 135 140

Lys Val Ala Val Phe Glu Pro Ser Lys Ala Glu Ile Ala His Thr Gln

<400> 25

Met Val Lys Ile Arg Gln Phe Leu Leu Ala Ile Leu Trp Leu Gln Leu
1 5 10 15

Ser Cys Val Ser Ala Ala Lys Asn Glu Val Glu Gln Ser Pro Gln Asn
20 25 30

Leu Thr Ala Gln Glu Gly Glu Phe Ile Thr Ile Asn Cys Ser Tyr Ser
35 40 45

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

Ile Val Ser Leu Phe Met Leu Ser Ser Gly Lys Lys Lys His Gly Arg
65 70 75 80

Leu Ile Ala Thr Ile Asn Ile Gln Glu Lys His Ser Ser Leu His Ile
85 90 95

Thr Ala Ser His Pro Arg Asp Ser Ala Val Tyr Ile Cys Ala Ala Ser
100 105 110

Leu Ile Gln Gly Ala Gln Lys Leu Val Phe Gly Gln Gly Thr Arg Leu
115 120 125

Thr Ile Asn Pro Asn Ile Gln Asn Pro Asp Pro Ala Val Tyr Gln Leu
130 135 140

Arg Asp Ser Lys Ser Ser Asp Lys Ser Val Cys Leu Phe Thr Asp Phe
145 150 155 160

Asp Ser Gln Thr Asn Val Ser Gln Ser Lys Asp Ser Asp Val Tyr Ile
165 170 175

Thr Asp Lys Thr Val Leu Asp Met Arg Ser Met Asp Phe Lys Ser Asn
180 185 190

Ser Ala Val Ala Trp Ser Asn Lys Ser Asp Phe Ala Cys Ala Asn Ala
195 200 205

Phe Asn Asn Ser Ile Ile Pro Glu Asp Thr Phe Phe Pro Ser Ser Asp
210 215 220

Val Pro Cys Asp Val Lys Leu Val Glu Lys Ser Phe Glu Thr Asp Thr
225 230 235 240

Asn Leu Asn Phe Gln Asn Leu Leu Val Ile Val Leu Arg Ile Leu Leu
245 250 255

Leu Lys Val Ala Gly Phe Asn Leu Leu Met Thr Leu Arg Leu Trp Ser
260 265 270

Ser

<210> 26
<211> 310
<212> PRT
<213> Artificial Sequence

<220>
<223> Engineered GP100 TCR beta chain

<400> 26

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

Lys His Thr Asp Ala Gly Val Ile Gln Ser Pro Arg His Glu Val Thr
20 25 30

Glu Met Gly Gln Glu Val Thr Leu Arg Cys Lys Pro Ile Ser Gly His
35 40 45

Asn Ser Leu Phe Trp Tyr Arg Gln Thr Met Met Arg Gly Leu Glu Leu
50 55 60

Leu Ile Tyr Phe Asn Asn Asn Val Pro Ile Asp Asp Ser Gly Met Pro
65 70 75 80

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

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

Ser Ser Pro Gly Gly Asn Glu Gln Phe Phe Gly Pro Gly Thr Arg Leu
115 120 125

Thr Val Leu Glu Asp Leu Lys Asn Val Phe Pro Pro Lys Val Ala Val
130 135 140

Phe Glu Pro Ser Lys Ala Glu Ile Ala His Thr Gln Lys Ala Thr Leu
145 150 155 160

Val Cys Leu Ala Thr Gly Phe Tyr Pro Asp His Val Glu Leu Ser Trp
165 170 175

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

Pro Leu Lys Glu Gln Pro Ala Leu Asn Asp Ser Arg Tyr Cys Leu Ser
195 200 205

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

Phe Arg Cys Gln Val Gln Phe Tyr Gly Leu Ser Glu Asn Asp Glu Trp
225 230 235 240

Thr Gln Asp Arg Ala Lys Pro Val Thr Gln Ile Val Ser Ala Glu Ala
245 250 255

Trp Gly Arg Ala Asp Cys Gly Ile Thr Ser Ala Ser Tyr His Gln Gly

260

265

270

Val Leu Ser Ala Thr Ile Leu Tyr Glu Ile Leu Leu Gly Lys Ala Thr
275 280 285

Leu Tyr Ala Val Leu Val Ser Ala Leu Val Leu Met Ala Met Val Lys
290 295 300

Arg Lys Asp Ser Arg Gly
305 310

<210> 27
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> amino acid linker sequence

<400> 27

Asp Gly Gly Gly Ser
1 5

<210> 28
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> amino acid linker sequence

<400> 28

Thr Gly Glu Lys Pro
1 5

<210> 29
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> amino acid linker sequence

<400> 29

Gly Gly Arg Arg
1

<210> 30

<211> 5

<212> PRT

<213> Artificial Sequence

<220>

<223> amino acid linker sequence

<400> 30

Gly Gly Gly Gly Ser
1 5

<210> 31

<211> 14

<212> PRT

<213> Artificial Sequence

<220>

<223> amino acid linker sequence

<400> 31

Glu Gly Lys Ser Ser Gly Ser Gly Ser Glu Ser Lys Val Asp
1 5 10

<210> 32

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> amino acid linker sequence

<400> 32

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

Leu Asp

<210> 33
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> amino acid linker sequence

<400> 33

Gly Gly Arg Arg Gly Gly Gly Ser
1 5

<210> 34
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> amino acid linker sequence

<400> 34

Leu Arg Gln Arg Asp Gly Glu Arg Pro
1 5

<210> 35
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> amino acid linker sequence

<400> 35

Leu Arg Gln Lys Asp Gly Gly Gly Ser Glu Arg Pro
1 5 10

<210> 36
<211> 16
<212> PRT
<213> Artificial Sequence

<220>

<223> amino acid linker sequence

<400> 36

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

<210> 37

<211> 18

<212> PRT

<213> Artificial Sequence

<220>

<223> amino acid linker sequence

<400> 37

Gly Ser Thr Ser Gly Ser Gly Lys Pro Gly Ser Gly Glu Gly Ser Thr
1 5 10 15

Lys Gly

<210> 38

<211> 7

<212> PRT

<213> Artificial Sequence

<220>

<223> Cleavage sequence by TEV protease

<220>

<221> misc_feature

<222> (2)..(3)

<223> Xaa is any amino acid

<220>

<221> misc_feature

<222> (5)..(5)

<223> Xaa is any amino acid

<220>

<221> MISC_FEATURE

<222> (7)..(7)

<223> Xaa = Gly or Ser

<400> 38

Glu Xaa Xaa Tyr Xaa Gln Xaa
1 5

<210> 39

<211> 7

<212> PRT

<213> Artificial Sequence

<220>

<223> Cleavage sequence by TEV protease

<400> 39

Glu Asn Leu Tyr Phe Gln Gly
1 5

<210> 40

<211> 7

<212> PRT

<213> Artificial Sequence

<220>

<223> Cleavage sequence by TEV protease

<400> 40

Glu Asn Leu Tyr Phe Gln Ser
1 5

<210> 41

<211> 22

<212> PRT

<213> Artificial Sequence

<220>

<223> Self-cleaving polypeptide comprising 2A site

<400> 41

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

Glu Glu Asn Pro Gly Pro

<210> 42
 <211> 19
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Self-cleaving polypeptide comprising 2A site

<400> 42

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

Pro Gly Pro

<210> 43
 <211> 14
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Self-cleaving polypeptide comprising 2A site

<400> 43

Leu	Leu	Lys	Gln	Ala	Gly	Asp	Val	Glu	Glu	Asn	Pro	Gly	Pro
1				5				10					

<210> 44
 <211> 21
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Self-cleaving polypeptide comprising 2A site

<400> 44

Gly	Ser	Gly	Glu	Gly	Arg	Gly	Ser	Leu	Leu	Thr	Cys	Gly	Asp	Val	Glu
1				5				10					15		

Glu Asn Pro Gly Pro

<210> 45
 <211> 18
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Self-cleaving polypeptide comprising 2A site

<400> 45

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

Gly Pro

<210> 46
 <211> 13
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Self-cleaving polypeptide comprising 2A site

<400> 46

Leu Leu Thr Cys Gly Asp Val Glu Glu Asn Pro Gly Pro
 1 5 10

<210> 47
 <211> 23
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Self-cleaving polypeptide comprising 2A site

<400> 47

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

Val Glu Ser Asn Pro Gly Pro

20

<210> 48
<211> 20
<212> PRT
<213> Artificial Sequence

<220>
<223> Self-cleaving polypeptide comprising 2A site

<400> 48

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

Asn Pro Gly Pro
20

<210> 49
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Self-cleaving polypeptide comprising 2A site

<400> 49

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

<210> 50
<211> 25
<212> PRT
<213> Artificial Sequence

<220>
<223> Self-cleaving polypeptide comprising 2A site

<400> 50

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

Gly Asp Val Glu Ser Asn Pro Gly Pro

20

25

<210> 51
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> Self-cleaving polypeptide comprising 2A site

<400> 51

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

Glu Ser Asn Pro Gly Pro
20

<210> 52
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Self-cleaving polypeptide comprising 2A site

<400> 52

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

<210> 53
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Self-cleaving polypeptide comprising 2A site

<400> 53

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

Pro Gly Pro

<210> 54
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Self-cleaving polypeptide comprising 2A site

<400> 54

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

Pro Gly Pro

<210> 55
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Self-cleaving polypeptide comprising 2A site

<400> 55

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

<210> 56
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Self-cleaving polypeptide comprising 2A site

<400> 56

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

Pro

<210> 57
<211> 20
<212> PRT
<213> Artificial Sequence

<220>
<223> Self-cleaving polypeptide comprising 2A site

<400> 57

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

Asn Pro Gly Pro
20

<210> 58
<211> 24
<212> PRT
<213> Artificial Sequence

<220>
<223> Self-cleaving polypeptide comprising 2A site

<400> 58

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

Asp Val Glu Ser Asn Pro Gly Pro
20

<210> 59
<211> 40
<212> PRT
<213> Artificial Sequence

<220>
<223> Self-cleaving polypeptide comprising 2A site

<400> 59

Val Thr Glu Leu Leu Tyr Arg Met Lys Arg Ala Glu Thr Tyr Cys Pro

1	5	10	15
Arg	Pro	Leu	Leu
Ala	Ile	His	Pro
Thr	Glu	Ala	Arg
His	Lys	Gln	Lys
20	25	30	

Ile	Val	Ala	Pro	Val	Lys	Gln	Thr
35					40		

<210> 60
 <211> 18
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Self-cleaving polypeptide comprising 2A site

<400> 60

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

Gly Pro

<210> 61
 <211> 40
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Self-cleaving polypeptide comprising 2A site

<400> 61

Leu	Leu	Ala	Ile	His	Pro	Thr	Glu	Ala	Arg	His	Lys	Gln	Lys	Ile	Val
1				5				10						15	

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

Asp	Val	Glu	Ser	Asn	Pro	Gly	Pro
35						40	

<210> 62
<211> 33
<212> PRT
<213> Artificial Sequence

<220>
<223> Self-cleaving polypeptide comprising 2A site

<400> 62

Glu Ala Arg His Lys Gln Lys Ile Val Ala Pro Val Lys Gln Thr Leu
1 5 10 15

Asn Phe Asp Leu Leu Lys Leu Ala Gly Asp Val Glu Ser Asn Pro Gly
20 25 30

Pro

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