

362724_1.txt
SEQUENCE LISTING

<110> University of Canberra
<120> IMMUNOPOTENTIATING COMPOSITIONS AND USES THEREFOR
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<140> Unassigned
<141> 2018-11-27
<150> AU2017904811
<151> 2017-11-29
<160> 56
<170> PatentIn version 3.5
<210> 1
<211> 852
<212> PRT
<213> Homo sapiens
<400> 1

Met Leu Ser Gly Lys Lys Ala Ala Ala Ala Ala Ala Ala Ala Ala
1 5 10 15

Ala Ala Thr Gly Thr Glu Ala Gly Pro Gly Thr Ala Gly Gly Ser Glu
20 25 30

Asn Gly Ser Glu Val Ala Ala Gln Pro Ala Gly Leu Ser Gly Pro Ala
35 40 45

Glu Val Gly Pro Gly Ala Val Gly Glu Arg Thr Pro Arg Lys Lys Glu
50 55 60

Pro Pro Arg Ala Ser Pro Pro Gly Gly Leu Ala Glu Pro Pro Gly Ser
65 70 75 80

Ala Gly Pro Gln Ala Gly Pro Thr Val Val Pro Gly Ser Ala Thr Pro
85 90 95

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Met Glu Thr Gly Ile Ala Glu Thr Pro Glu Gly Arg Arg Thr Ser Arg
100 105 110

Arg Lys Arg Ala Lys Val Glu Tyr Arg Glu Met Asp Glu Ser Leu Ala
115 120 125

Asn Leu Ser Glu Asp Glu Tyr Tyr Ser Glu Glu Glu Arg Asn Ala Lys
130 135 140

Ala Glu Lys Glu Lys Lys Leu Pro Pro Pro Pro Pro Gln Ala Pro Pro
145 150 155 160

Glu Glu Glu Asn Glu Ser Glu Pro Glu Glu Pro Ser Gly Val Glu Gly
165 170 175

Ala Ala Phe Gln Ser Arg Leu Pro His Asp Arg Met Thr Ser Gln Glu
180 185 190

Ala Ala Cys Phe Pro Asp Ile Ile Ser Gly Pro Gln Gln Thr Gln Lys
195 200 205

Val Phe Leu Phe Ile Arg Asn Arg Thr Leu Gln Leu Trp Leu Asp Asn
210 215 220

Pro Lys Ile Gln Leu Thr Phe Glu Ala Thr Leu Gln Gln Leu Glu Ala
225 230 235 240

Pro Tyr Asn Ser Asp Thr Val Leu Val His Arg Val His Ser Tyr Leu
245 250 255

Glu Arg His Gly Leu Ile Asn Phe Gly Ile Tyr Lys Arg Ile Lys Pro
260 265 270

Leu Pro Thr Lys Lys Thr Gly Lys Val Ile Ile Ile Gly Ser Gly Val
275 280 285

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Ser Gly Leu Ala Ala Ala Arg Gln Leu Gln Ser Phe Gly Met Asp Val
290 295 300

Thr Leu Leu Glu Ala Arg Asp Arg Val Gly Gly Arg Val Ala Thr Phe
305 310 315 320

Arg Lys Gly Asn Tyr Val Ala Asp Leu Gly Ala Met Val Val Thr Gly
325 330 335

Leu Gly Gly Asn Pro Met Ala Val Val Ser Lys Gln Val Asn Met Glu
340 345 350

Leu Ala Lys Ile Lys Gln Lys Cys Pro Leu Tyr Glu Ala Asn Gly Gln
355 360 365

Ala Val Pro Lys Glu Lys Asp Glu Met Val Glu Gln Glu Phe Asn Arg
370 375 380

Leu Leu Glu Ala Thr Ser Tyr Leu Ser His Gln Leu Asp Phe Asn Val
385 390 395 400

Leu Asn Asn Lys Pro Val Ser Leu Gly Gln Ala Leu Glu Val Val Ile
405 410 415

Gln Leu Gln Glu Lys His Val Lys Asp Glu Gln Ile Glu His Trp Lys
420 425 430

Lys Ile Val Lys Thr Gln Glu Glu Leu Lys Glu Leu Leu Asn Lys Met
435 440 445

Val Asn Leu Lys Glu Lys Ile Lys Glu Leu His Gln Gln Tyr Lys Glu
450 455 460

Ala Ser Glu Val Lys Pro Pro Arg Asp Ile Thr Ala Glu Phe Leu Val
465 470 475 480

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Lys Ser Lys His Arg Asp Leu Thr Ala Leu Cys Lys Glu Tyr Asp Glu
485 490 495

Leu Ala Glu Thr Gln Gly Lys Leu Glu Glu Lys Leu Gln Glu Leu Glu
500 505 510

Ala Asn Pro Pro Ser Asp Val Tyr Leu Ser Ser Arg Asp Arg Gln Ile
515 520 525

Leu Asp Trp His Phe Ala Asn Leu Glu Phe Ala Asn Ala Thr Pro Leu
530 535 540

Ser Thr Leu Ser Leu Lys His Trp Asp Gln Asp Asp Asp Phe Glu Phe
545 550 555 560

Thr Gly Ser His Leu Thr Val Arg Asn Gly Tyr Ser Cys Val Pro Val
565 570 575

Ala Leu Ala Glu Gly Leu Asp Ile Lys Leu Asn Thr Ala Val Arg Gln
580 585 590

Val Arg Tyr Thr Ala Ser Gly Cys Glu Val Ile Ala Val Asn Thr Arg
595 600 605

Ser Thr Ser Gln Thr Phe Ile Tyr Lys Cys Asp Ala Val Leu Cys Thr
610 615 620

Leu Pro Leu Gly Val Leu Lys Gln Gln Pro Pro Ala Val Gln Phe Val
625 630 635 640

Pro Pro Leu Pro Glu Trp Lys Thr Ser Ala Val Gln Arg Met Gly Phe
645 650 655

Gly Asn Leu Asn Lys Val Val Leu Cys Phe Asp Arg Val Phe Trp Asp
660 665 670

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Pro Ser Val Asn Leu Phe Gly His Val Gly Ser Thr Thr Ala Ser Arg
675 680 685

Gly Glu Leu Phe Leu Phe Trp Asn Leu Tyr Lys Ala Pro Ile Leu Leu
690 695 700

Ala Leu Val Ala Gly Glu Ala Ala Gly Ile Met Glu Asn Ile Ser Asp
705 710 715 720

Asp Val Ile Val Gly Arg Cys Leu Ala Ile Leu Lys Gly Ile Phe Gly
725 730 735

Ser Ser Ala Val Pro Gln Pro Lys Glu Thr Val Val Ser Arg Trp Arg
740 745 750

Ala Asp Pro Trp Ala Arg Gly Ser Tyr Ser Tyr Val Ala Ala Gly Ser
755 760 765

Ser Gly Asn Asp Tyr Asp Leu Met Ala Gln Pro Ile Thr Pro Gly Pro
770 775 780

Ser Ile Pro Gly Ala Pro Gln Pro Ile Pro Arg Leu Phe Phe Ala Gly
785 790 795 800

Glu His Thr Ile Arg Asn Tyr Pro Ala Thr Val His Gly Ala Leu Leu
805 810 815

Ser Gly Leu Arg Glu Ala Gly Arg Ile Ala Asp Gln Phe Leu Gly Ala
820 825 830

Met Tyr Thr Leu Pro Arg Gln Ala Thr Pro Gly Val Pro Ala Gln Gln
835 840 845

Ser Pro Ser Met
850

<210> 2
 <211> 11
 <212> PRT
 <213> Artificial

<220>
 <223> Formula XIX embodiment peptide

<400> 2

Arg Arg Thr Ser Arg Arg Lys Arg Ala Lys Val
 1 5 10

<210> 3
 <211> 11
 <212> PRT
 <213> Artificial

<220>
 <223> Formula XIX embodiment peptide

<400> 3

Arg Arg Thr Ala Arg Arg Lys Arg Ala Lys Val
 1 5 10

<210> 4
 <211> 13
 <212> PRT
 <213> Artificial

<220>
 <223> Formula XIX embodiment peptide

<400> 4

Arg Trp Arg Arg Thr Ala Arg Arg Lys Arg Ala Lys Val
 1 5 10

<210> 5
 <211> 14
 <212> PRT
 <213> Artificial

<220>

<223> Formula XIX embodiment peptide

<400> 5

Glu	Gly	Arg	Arg	Thr	Ser	Arg	Arg	Lys	Arg	Ala	Lys	Val	Glu
1				5					10				

<210> 6

<211> 11

<212> PRT

<213> Artificial

<220>

<223> Cell-penetrating peptide

<400> 6

Tyr	Gly	Arg	Lys	Lys	Arg	Pro	Gln	Arg	Arg	Arg
1				5					10	

<210> 7

<211> 17

<212> PRT

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<220>

<223> Cell-penetrating peptide

<220>

<221> VARIANT

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<223> X = W or R

<400> 7

Arg	Arg	Trp	Arg	Arg	Trp	Trp	Arg	Arg	Trp	Trp	Arg	Arg	Trp	Arg	Arg
1				5					10					15	

Xaa

<210> 8

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<211> 40

<212> PRT

<213> Artificial

<220>

<223> Cell-penetrating peptide

<400> 8

Cys Trp Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys
1 5 10 15

Lys Lys Lys Lys Cys Trp Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys
20 25 30

Lys Lys Lys Lys Lys Lys Lys Lys
35 40

<210> 9

<211> 60

<212> PRT

<213> Artificial

<220>

<223> Cell-penetrating peptide

<400> 9

Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys
1 5 10 15

Lys Lys Trp Cys Cys Trp Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys
20 25 30

Lys Lys Lys Lys Lys Lys Lys Lys Cys Trp Lys Lys Lys Lys Lys Lys
35 40 45

Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys
50 55 60

<210> 10

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

<220>
 <223> Cell-penetrating peptide

<400> 10

Trp Thr Leu Asn Ser Ala Gly Tyr Leu Leu Gly Lys Ile Asn Leu Lys
 1 5 10 15

Ala Leu Ala Ala Leu Ala Lys Lys Ile Leu
 20 25

<210> 11
 <211> 13
 <212> PRT
 <213> Artificial

<220>
 <223> Cell-penetrating peptide

<400> 11

Gly Leu Phe Glu Ala Leu Glu Glu Leu Trp Glu Ala Lys
 1 5 10

<210> 12
 <211> 65
 <212> PRT
 <213> Artificial

<220>
 <223> Cell-penetrating peptide

<400> 12

Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys
 1 5 10 15

Gly Gly Cys Arg Gly Asp Met Phe Gly Cys Ala Lys Lys Lys Lys Lys
 20 25 30

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Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Arg Gly Asp Lys Lys
35 40 45

Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Arg Gly
50 55 60

Asp
65

<210> 13
<211> 25
<212> PRT
<213> Artificial

<220>
<223> Cell-penetrating peptide

<400> 13

Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys
1 5 10 15

Gly Gly Cys Met Phe Gly Cys Gly Gly
20 25

<210> 14
<211> 31
<212> PRT
<213> Artificial

<220>
<223> Cell-penetrating peptide

<400> 14

Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys
1 5 10 15

Ile Cys Arg Arg Ala Arg Gly Asp Asn Pro Asp Asp Arg Cys Thr
20 25 30

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<210> 15
 <211> 19
 <212> PRT
 <213> Artificial

<220>
 <223> Cell-penetrating peptide

<400> 15

Lys Lys Trp Lys Met Arg Arg Asn Gln Phe Trp Val Lys Val Gln Arg
 1 5 10 15

Asx Ala Lys

<210> 16
 <211> 30
 <212> PRT
 <213> Artificial

<220>
 <223> Cell-penetrating peptide

<400> 16

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

Val Lys Gly Arg Phe Thr Arg Gln Lys Tyr Asn Lys Arg Ala
 20 25 30

<210> 17
 <211> 32
 <212> PRT
 <213> Artificial

<220>
 <223> Cell-penetrating peptide

<400> 17

Ile Gly Arg Ile Asp Pro Ala Asn Gly Lys Thr Lys Tyr Ala Pro Lys

1 5 10 15

Phe Gln Asp Lys Ala Thr Arg Ser Asn Tyr Tyr Gly Asn Ser Pro Ser
20 25 30

<210> 18
<211> 21
<212> PRT
<213> Artificial

<220>
<223> Cell-penetrating peptide

<400> 18

Lys Glu Thr Trp Trp Glu Thr Trp Trp Thr Glu Trp Ser Gln Pro Lys
1 5 10 15

Lys Lys Arg Lys Val
20

<210> 19
<211> 12
<212> PRT
<213> Artificial

<220>
<223> Cell-penetrating peptide

<400> 19

Pro Leu Ala Glu Ile Asp Gly Ile Glu Leu Thr Tyr
1 5 10

<210> 20
<211> 30
<212> PRT
<213> Artificial

<220>
<223> Cell-penetrating peptide

<400> 20

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Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys
1 5 10 15

Gly Gly Pro Leu Ala Glu Ile Asp Gly Ile Glu Leu Gly Ala
20 25 30

<210> 21
<211> 30
<212> PRT
<213> Artificial

<220>
<223> Cell-penetrating peptide

<400> 21

Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys
1 5 10 15

Gly Gly Pro Leu Ala Glu Ile Asp Gly Ile Glu Leu Cys Ala
20 25 30

<210> 22
<211> 28
<212> PRT
<213> Artificial

<220>
<223> Cell-penetrating peptide

<400> 22

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

Gly Ala Trp Ser Gln Pro Lys Ser Lys Arg Lys Val
20 25

<210> 23
<211> 28
<212> PRT

<213> Artificial

<220>

<223> Cell-penetrating peptide

<400> 23

Trp Glu Ala Lys Leu Ala Lys Ala Leu Ala Lys Ala Leu Ala Lys His
1 5 10 15

Leu Ala Lys Ala Leu Ala Lys Ala Leu Lys Ala Cys
20 25

<210> 24

<211> 48

<212> PRT

<213> Artificial

<220>

<223> Cell-penetrating peptide

<400> 24

Leu Ala Arg Leu Leu Ala Arg Leu Leu Ala Arg Leu Leu Ala Arg Leu
1 5 10 15

Leu Ala Arg Leu Leu Ala Arg Leu Leu Ala Arg Leu Leu Ala Arg Leu
20 25 30

Leu Ala Arg Leu Leu Ala Arg Leu Leu Ala Arg Leu Leu Ala Arg Leu
35 40 45

<210> 25

<211> 16

<212> PRT

<213> Artificial

<220>

<223> Cell-penetrating peptide

<400> 25

Lys Leu Leu Lys Leu Leu Leu Lys Leu Trp Leu Leu Lys Leu Leu Leu

1 5 10 15

<210> 26
 <211> 13
 <212> PRT
 <213> Artificial

<220>
 <223> Cell-penetrating peptide

<400> 26

Lys Lys Lys Lys Lys Lys Lys Lys Gly Gly Cys Lys Lys
 1 5 10

<210> 27
 <211> 14
 <212> PRT
 <213> Artificial

<220>
 <223> Cell-penetrating peptide

<400> 27

Lys Trp Lys Lys Lys Trp Lys Lys Gly Cys Cys Lys Trp Lys
 1 5 10

<210> 28
 <211> 14
 <212> PRT
 <213> Artificial

<220>
 <223> Cell-penetrating peptide

<400> 28

Arg Trp Arg Arg Arg Trp Arg Arg Gly Gly Cys Arg Trp Arg
 1 5 10

<210> 29
 <211> 12
 <212> PRT

<213> Artificial

<220>

<223> Cell-penetrating peptide

<400> 29

Pro	Glu	Val	Lys	Lys	Lys	Arg	Lys	Pro	Glu	Tyr	Pro
1				5					10		

<210> 30

<211> 12

<212> PRT

<213> Artificial

<220>

<223> Cell-penetrating peptide

<400> 30

Thr	Pro	Pro	Lys	Lys	Lys	Arg	Lys	Val	Glu	Asp	Pro
1				5					10		

<210> 31

<211> 13

<212> PRT

<213> Artificial

<220>

<223> Cell-penetrating peptide

<400> 31

Gly	Gly	Gly	Gly	Pro	Lys	Lys	Lys	Arg	Lys	Val	Gly	Gly
1				5					10			

<210> 32

<211> 13

<212> PRT

<213> Artificial

<220>

<223> Cell-penetrating peptide

<400> 32

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Gly Gly Gly Phe Ser Thr Ser Leu Arg Ala Arg Lys Ala
1 5 10

<210> 33
<211> 17
<212> PRT
<213> Artificial

<220>
<223> Cell-penetrating peptide

<400> 33

Cys Lys Lys Lys Lys Lys Lys Ser Glu Asp Glu Tyr Pro Tyr Val Pro
1 5 10 15

Asn

<210> 34
<211> 28
<212> PRT
<213> Artificial

<220>
<223> Cell-penetrating peptide

<400> 34

Cys Lys Lys Lys Lys Lys Lys Lys Ser Glu Asp Glu Tyr Pro Tyr Val
1 5 10 15

Pro Asn Phe Ser Thr Ser Leu Arg Ala Arg Lys Ala
20 25

<210> 35
<211> 25
<212> PRT
<213> Artificial

<220>
<223> Cell-penetrating peptide

362724_1.txt

<400> 35

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

Lys Asp Ala Lys Lys Ser Lys Gln Glu
20 25

<210> 36

<211> 13

<212> PRT

<213> Artificial

<220>

<223> Cell-penetrating peptide

<400> 36

Gly Arg Lys Lys Arg Arg Gln Arg Arg Arg Pro Pro Gln
1 5 10

<210> 37

<211> 16

<212> PRT

<213> Artificial

<220>

<223> Cell-penetrating peptide

<400> 37

Arg Gln Ile Lys Ile Trp Phe Gln Asn Arg Arg Met Lys Trp Lys Lys
1 5 10 15

<210> 38

<211> 21

<212> PRT

<213> Artificial

<220>

<223> Cell-penetrating peptide

<400> 38

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

Arg Leu Leu Arg Lys
20

<210> 39
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Cell-penetrating peptide

<400> 39

Lys Arg Val Ser Arg Asn Lys Ser Glu Lys Lys Arg Arg
1 5 10

<210> 40
<211> 18
<212> PRT
<213> Artificial

<220>
<223> Cell-penetrating peptide

<400> 40

Lys Leu Ala Leu Lys Leu Ala Leu Lys Ala Leu Lys Ala Ala Leu Lys
1 5 10 15

Leu Ala

<210> 41
<211> 16
<212> PRT
<213> Artificial

<220>
<223> Cell-penetrating peptide

362724_1.txt

<400> 41

Ala Ala Val Ala Leu Leu Pro Ala Val Leu Leu Ala Leu Leu Ala Pro
1 5 10 15

<210> 42

<211> 28

<212> PRT

<213> Artificial

<220>

<223> Cell-penetrating peptide

<400> 42

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

Thr Asp Val Gly Leu Cys Lys Lys Arg Pro Lys Pro
20 25

<210> 43

<211> 18

<212> PRT

<213> Artificial

<220>

<223> Cell-penetrating peptide

<400> 43

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

Ser Lys

<210> 44

<211> 21

<212> PRT

<213> Artificial

<220>

<223> Cell-penetrating peptide

<400> 44

Lys	Glu	Thr	Trp	Trp	Glu	Thr	Trp	Trp	Thr	Glu	Trp	Ser	Gln	Pro	Lys
1				5					10					15	

Lys	Lys	Arg	Lys	Val
			20	

<210> 45

<211> 18

<212> PRT

<213> Artificial

<220>

<223> Cell-penetrating peptide

<400> 45

Arg	Gly	Gly	Arg	Leu	Ser	Tyr	Ser	Arg	Arg	Arg	Phe	Ser	Thr	Ser	Thr
1				5					10					15	

Gly Arg

<210> 46

<211> 27

<212> PRT

<213> Artificial

<220>

<223> Cell-penetrating peptide

<400> 46

Gly	Trp	Thr	Leu	Asn	Ser	Ala	Gly	Tyr	Leu	Leu	Gly	Lys	Ile	Asn	Leu
1				5					10					15	

Lys	Ala	Leu	Ala	Ala	Leu	Ala	Lys	Lys	Ile	Leu
			20					25		

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<210> 47
 <211> 21
 <212> PRT
 <213> Artificial

<220>
 <223> Cell-penetrating peptide

<400> 47

Ala Gly Tyr Leu Leu Gly Lys Ile Asn Leu Lys Ala Leu Ala Ala Leu
 1 5 10 15

Ala Lys Lys Ile Leu
 20

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

<220>
 <223> Cell-penetrating peptide

<400> 48

Gly Leu Trp Arg Ala Leu Trp Arg Leu Leu Arg Ser Leu Trp Arg Leu
 1 5 10 15

Leu Trp Arg Ala
 20

<210> 49
 <211> 15
 <212> PRT
 <213> Artificial

<220>
 <223> Cell-penetrating peptide

<400> 49

Ser Asp Leu Trp Glu Met Met Met Val Ser Leu Ala Cys Gln Tyr

1 5 10 15

<210> 50
 <211> 12
 <212> PRT
 <213> Artificial

<220>
 <223> Cell-penetrating peptide

<400> 50

Thr Ser Pro Leu Asn Ile His Asn Gly Gln Lys Leu
 1 5 10

<210> 51
 <211> 26
 <212> PRT
 <213> Artificial

<220>
 <223> Cell-penetrating peptide

<400> 51

Asp Pro Lys Gly Asp Pro Lys Gly Val Thr Val Thr Val Thr Val Thr
 1 5 10 15

Val Thr Gly Lys Gly Asp Pro Lys Pro Asp
 20 25

<210> 52
 <211> 16
 <212> PRT
 <213> Artificial

<220>
 <223> Cell-penetrating peptide

<400> 52

Arg Val Ile Arg Val Trp Phe Gln Asn Lys Arg Cys Lys Asp Lys Lys
 1 5 10 15

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<210> 53
 <211> 440
 <212> PRT
 <213> Artificial

<220>
 <223> Nivolumab heavy chain variable region

<400> 53

Gln Val Gln Leu Val Glu Ser Gly Gly Gly Val Val Gln Pro Gly Arg
 1 5 10 15

Ser Leu Arg Leu Asp Cys Lys Ala Ser Gly Ile Thr Phe Ser Asn Ser
 20 25 30

Gly Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
 35 40 45

Ala Val Ile Trp Tyr Asp Gly Ser Lys Arg Tyr Tyr Ala Asp Ser Val
 50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Phe
 65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
 85 90 95

Ala Thr Asn Asp Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser
 100 105 110

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

Arg Ser Thr Ser Glu Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp
 130 135 140

Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr

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145 150 155 160

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

Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Lys
180 185 190

Thr Tyr Thr Cys Asn Val Asp His Lys Pro Ser Asn Thr Lys Val Asp
195 200 205

Lys Arg Val Glu Ser Lys Tyr Gly Pro Pro Cys Pro Pro Cys Pro Ala
210 215 220

Pro	Glu	Phe	Leu	Gly	Gly	Pro	Ser	Val	Phe	Leu	Phe	Pro	Pro	Lys	Pro
225					230					235					240

Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val
245 250 255

Val	Asp	Val	Ser	Gln	Glu	Asp	Pro	Glu	Val	Gln	Phe	Asn	Trp	Tyr	Val
			260					265					270		

Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln
275 280 285

Phe Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln
290 295 300

Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly
305 310 315 320

Leu Pro Ser Ser Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro
325 330 335

Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Gln Glu Glu Met Thr

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340

345

350

Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser
355 360 365

Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr
370 375 380

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

Ser Arg Leu Thr Val Asp Lys Ser Arg Trp Gln Glu Gly Asn Val Phe
405 410 415

Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys
420 425 430

Ser Leu Ser Leu Ser Leu Gly Lys
435 440

<210> 54
<211> 214
<212> PRT
<213> Artificial

<220>
<223> Nivolumab light chain variable region

<400> 54

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

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Tyr
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
35 40 45

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Tyr Asp Ala Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65 70 75 80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Ser Ser Asn Trp Pro Arg
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala Ala
100 105 110

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

Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro Arg Glu Ala
130 135 140

Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln
145 150 155 160

Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser
165 170 175

Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr
180 185 190

Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser
195 200 205

Phe Asn Arg Gly Glu Cys
210

<210> 55
<211> 447
<212> PRT

<213> Artificial

<220>

<223> Pembrolizumab heavy chain variable region

<400> 55

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

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asn Tyr
 20 25 30

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

Gly Gly Ile Asn Pro Ser Asn Gly Gly Thr Asn Phe Asn Glu Lys Phe
 50 55 60

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

Met Glu Leu Lys Ser Leu Gln Phe Asp Asp Thr Ala Val Tyr Tyr Cys
 85 90 95

Ala Arg Arg Asp Tyr Arg Phe Asp Met Gly Phe Asp Tyr Trp Gly Gln
 100 105 110

Gly Thr Thr Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val
 115 120 125

Phe Pro Leu Ala Pro Cys Ser Arg Ser Thr Ser Glu Ser Thr Ala Ala
 130 135 140

Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser
 145 150 155 160

Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val

165

170

175

Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro
 180 185 190

Ser Ser Ser Leu Gly Thr Lys Thr Tyr Thr Cys Asn Val Asp His Lys
 195 200 205

Pro Ser Asn Thr Lys Val Asp Lys Arg Val Glu Ser Lys Tyr Gly Pro
 210 215 220

Pro Cys Pro Pro Cys Pro Ala Pro Glu Phe Leu Gly Gly Pro Ser Val
 225 230 235 240

Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr
 245 250 255

Pro Glu Val Thr Cys Val Val Val Asp Val Ser Gln Glu Asp Pro Glu
 260 265 270

Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys
 275 280 285

Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Tyr Arg Val Val Ser
 290 295 300

Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys
 305 310 315 320

Cys Lys Val Ser Asn Lys Gly Leu Pro Ser Ser Ile Glu Lys Thr Ile
 325 330 335

Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro
 340 345 350

Pro Ser Gln Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu

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355

360

365

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

Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser
385 390 395 400

Asp Gly Ser Phe Phe Leu Tyr Ser Arg Leu Thr Val Asp Lys Ser Arg
405 410 415

Trp Gln Glu Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu
420 425 430

His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Leu Gly Lys
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<211> 218

<212> PRT

<213> Artificial

<220>

<223> Pembrolizumab light chain variable region

<400> 56

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Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Lys Gly Val Ser Thr Ser
20 25 30

Gly Tyr Ser Tyr Leu His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro
35 40 45

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

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Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
65 70 75 80

Ser Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln His Ser Arg
85 90 95

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

Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln
115 120 125

Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr
130 135 140

Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
145 150 155 160

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

Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys
180 185 190

His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro
195 200 205

Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
210 215