

SEQUENCE LISTING

<110> CHO Pharma USA

<120> Chimeric Antigen Receptors that Bind to SSEA4 and Uses Thereof

<130> 218407-0014

<160> 11

<170> PatentIn version 3.5

<210> 1

<211> 3972

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic construct

<220>

<221> CDS

<222> (1354)..(3972)

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Gln Glu Ser Gly Pro Gly Leu Val Lys Pro Ser Glu Thr Leu Ser Leu	
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Val Arg Gln Pro Pro Gly Lys Gly Leu Glu Trp Ile Gly Val Ile Trp	
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Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala Lys His Glu Val	
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ttt aag caa ccc ttc atg agg cct gtg cag act act caa gag gag gac Phe Lys Gln Pro Phe Met Arg Pro Val Gln Thr Thr Gln Glu Glu Asp 360 365 370 375	2478
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cgc gtg aaa ttc agc cgc agc gca gat gct cca gcc tac aag cag ggg Arg Val Lys Phe Ser Arg Ser Ala Asp Ala Pro Ala Tyr Lys Gln Gly 395 400 405	2574
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cct gaa aac agg acg gac ctc cat gcc ttt gag aac cta gaa atc ata Pro Glu Asn Arg Thr Asp Leu His Ala Phe Glu Asn Leu Glu Ile Ile 620 625 630			3246
cgc ggc agg acc aag caa cat ggt cag ttt tct ctt gca gtc gtc agc Arg Gly Arg Thr Lys Gln His Gly Gln Phe Ser Leu Ala Val Val Ser 635 640 645			3294
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gga gat gtg ata att tca gga aac aaa aat ttg tgc tat gca aat aca Gly Asp Val Ile Ile Ser Gly Asn Lys Asn Leu Cys Tyr Ala Asn Thr 665 670 675			3390
ata aac tgg aaa aaa ctg ttt ggg acc tcc ggt cag aaa acc aaa att Ile Asn Trp Lys Lys Leu Phe Gly Thr Ser Gly Gln Lys Thr Lys Ile 680 685 690 695			3438
ata agc aac aga ggt gaa aac agc tgc aag gcc aca ggc cag gtc tgc Ile Ser Asn Arg Gly Glu Asn Ser Cys Lys Ala Thr Gly Gln Val Cys 700 705 710			3486
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Asp Gly Pro His Cys Val Lys Thr Cys Pro Ala Gly Val Met Gly Glu	
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Asn Asn Thr Leu Val Trp Lys Tyr Ala Asp Ala Gly His Val Cys His	
810 815 820	
ctg tgc cat cca aac tgc acc tac gga tgc act ggg cca ggt ctt gaa	3870
Leu Cys His Pro Asn Cys Thr Tyr Gly Cys Thr Gly Pro Gly Leu Glu	
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ggc tgt cca acg aat ggg cct aag atc ccg tcc atc gcc act ggg atg	3918
Gly Cys Pro Thr Asn Gly Pro Lys Ile Pro Ser Ile Ala Thr Gly Met	
840 845 850 855	
gtg ggg gcc ctc ctc ttg ctg ctg gtg gtg gcc ctg ggg atc ggc ctc	3966
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<220>
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Pro Ser Glu Thr Leu Ser Leu Thr Cys Thr Val Ser Gly Phe Ser Leu
35 40 45

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

Glu Trp Ile Gly Val Ile Trp Gly Gly Gly Ser Thr Asn Tyr Asn Ser
65 70 75 80

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

Val Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr
100 105 110

Tyr Cys Ala Lys His Glu Val Leu Arg Gly Tyr Ala Leu Asp Tyr Trp
115 120 125

Gly Gln Gly Thr Leu Val Thr Val Ser Ser Gly Gly Gly Gly Ser Gly
130 135 140

Gly Gly Gly Ser Gly Gly Gly Gly Ser Leu Thr Gln Ser Pro Ala Thr
145 150 155 160

Leu Ser Leu Ser Pro Gly Glu Arg Ala Thr Leu Ser Cys Ser Ala Ser
165 170 175

Pro Ser Val Ser Tyr Met His Trp Tyr Gln Gln Lys Pro Gly Gln Ala
180 185 190

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

Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile
210 215 220

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

Ser Gly Phe Pro Leu Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
245 250 255

Thr Thr Thr Pro Ala Pro Arg Pro Pro Thr Pro Ala Pro Thr Ile Ala
260 265 270

Ser Gln Pro Leu Ser Leu Arg Pro Glu Ala Cys Arg Pro Ala Ala Gly
275 280 285

Gly Ala Val His Thr Arg Gly Leu Asp Phe Ala Cys Asp Ile Tyr Ile

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Ile	Thr	Leu	Tyr	Cys	Ile	Tyr	Ile	Trp	Ala	Pro	Leu	Ala	Gly	Thr	Cys
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Gly	Val	Leu	Leu	Leu	Ser	Leu	Val	Ile	Thr	Leu	Tyr	Cys	Lys	Arg	Gly
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Arg	Lys	Lys	Leu	Leu	Tyr	Ile	Phe	Lys	Gln	Pro	Phe	Met	Arg	Pro	Val
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Ala	Pro	Ala	Tyr	Lys	Gln	Gly	Gln	Asn	Gln	Leu	Tyr	Asn	Glu	Leu	Asn
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Leu	Gly	Arg	Arg	Glu	Glu	Tyr	Asp	Val	Leu	Asp	Lys	Arg	Arg	Gly	Arg
			420					425						430	
Asp	Pro	Glu	Met	Gly	Gly	Lys	Pro	Arg	Arg	Lys	Asn	Pro	Gln	Glu	Gly
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Ile	Gly	Met	Lys	Gly	Glu	Arg	Arg	Arg	Gly	Lys	Gly	His	Asp	Gly	Leu
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Tyr	Gln	Gly	Leu	Ser	Thr	Ala	Thr	Lys	Asp	Thr	Tyr	Asp	Ala	Leu	His
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Gly Asp Val Glu Glu Asn Pro Gly Pro Met Trp Leu Gln Ser Leu Leu
515 520 525

Leu Leu Gly Thr Val Ala Cys Ser Ile Ser Arg Lys Val Cys Asn Gly
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Ile Gly Ile Gly Glu Phe Lys Asp Ser Leu Ser Ile Asn Ala Thr Asn
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Ile Lys His Phe Lys Asn Cys Thr Ser Ile Ser Gly Asp Leu His Ile
565 570 575

Leu Pro Val Ala Phe Arg Gly Asp Ser Phe Thr His Thr Pro Pro Leu
580 585 590

Asp Pro Gln Glu Leu Asp Ile Leu Lys Thr Val Lys Glu Ile Thr Gly
595 600 605

Phe Leu Leu Ile Gln Ala Trp Pro Glu Asn Arg Thr Asp Leu His Ala
610 615 620

Phe Glu Asn Leu Glu Ile Ile Arg Gly Arg Thr Lys Gln His Gly Gln
625 630 635 640

Phe Ser Leu Ala Val Val Ser Leu Asn Ile Thr Ser Leu Gly Leu Arg
645 650 655

Ser Leu Lys Glu Ile Ser Asp Gly Asp Val Ile Ile Ser Gly Asn Lys
660 665 670

Asn Leu Cys Tyr Ala Asn Thr Ile Asn Trp Lys Lys Leu Phe Gly Thr
675 680 685

Ser Gly Gln Lys Thr Lys Ile Ile Ser Asn Arg Gly Glu Asn Ser Cys
690 695 700

Lys Ala Thr Gly Gln Val Cys His Ala Leu Cys Ser Pro Glu Gly Cys
705 710 715 720

Trp Gly Pro Glu Pro Arg Asp Cys Val Ser Cys Arg Asn Val Ser Arg

725

730

735

Gly Arg Glu Cys Val Asp Lys Cys Asn Leu Leu Glu Gly Glu Pro Arg
 740 745 750

Glu Phe Val Glu Asn Ser Glu Cys Ile Gln Cys His Pro Glu Cys Leu
 755 760 765

Pro Gln Ala Met Asn Ile Thr Cys Thr Gly Arg Gly Pro Asp Asn Cys
 770 775 780

Ile Gln Cys Ala His Tyr Ile Asp Gly Pro His Cys Val Lys Thr Cys
 785 790 795 800

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

Asp Ala Gly His Val Cys His Leu Cys His Pro Asn Cys Thr Tyr Gly
 820 825 830

Cys Thr Gly Pro Gly Leu Glu Gly Cys Pro Thr Asn Gly Pro Lys Ile
 835 840 845

Pro Ser Ile Ala Thr Gly Met Val Gly Ala Leu Leu Leu Leu Leu Val
 850 855 860

Val Ala Leu Gly Ile Gly Leu Phe Met
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 <212> PRT
 <213> Artificial Sequence

<220>
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Ile	Trp	Gly	Gly	Gly	Ser	Thr	Asn	Tyr	Asn	Ser	Ala	Leu	Met	Ser	Arg
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Leu	Thr	Ile	Ser	Lys	Asp	Asn	Ser	Lys	Ser	Gln	Val	Ser	Leu	Lys	Leu
65					70					75					80
Ser	Ser	Val	Thr	Ala	Ala	Asp	Thr	Ala	Val	Tyr	Tyr	Cys	Ala	Lys	His
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Glu	Val	Leu	Arg	Gly	Tyr	Ala	Leu	Asp	Tyr	Trp	Gly	Gln	Gly	Thr	Leu
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Val	Thr	Val	Ser	Ser	Gly	Gly	Gly	Gly	Ser	Gly	Gly	Gly	Gly	Ser	Gly
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Gly	Gly	Gly	Ser	Leu	Thr	Gln	Ser	Pro	Ala	Thr	Leu	Ser	Leu	Ser	Pro
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Gly	Glu	Arg	Ala	Thr	Leu	Ser	Cys	Ser	Ala	Ser	Pro	Ser	Val	Ser	Tyr
145					150					155					160
Met	His	Trp	Tyr	Gln	Gln	Lys	Pro	Gly	Gln	Ala	Pro	Arg	Leu	Leu	Ile
				165					170					175	
Tyr	Asp	Thr	Tyr	Lys	Leu	Ala	Ser	Gly	Ile	Pro	Ala	Arg	Phe	Ser	Gly
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Ser	Gly	Ser	Gly	Thr	Asp	Phe	Thr	Leu	Thr	Ile	Ser	Ser	Leu	Glu	Pro
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Glu	Asp	Phe	Ala	Val	Tyr	Tyr	Cys	Phe	Gln	Gly	Ser	Gly	Phe	Pro	Leu
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Thr	Phe	Gly	Gln	Gly	Thr	Lys	Val	Glu	Ile	Lys					
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His Ala Ala Arg Pro Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Lys
 20 25 30

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

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

Glu Trp Ile Gly Val Ile Trp Gly Gly Gly Ser Thr Asn Tyr Asn Ser
 65 70 75 80

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

Val Ser Leu Lys Leu Ser Ser Val Thr Ala Ala Asp Thr Ala Val Tyr
 100 105 110

Tyr Cys Ala Lys His Glu Val Leu Arg Gly Tyr Ala Leu Asp Tyr Trp
 115 120 125

Gly Gln Gly Thr Leu Val Thr Val Ser Ser Gly Gly Gly Gly Ser Gly
 130 135 140

Gly Gly Gly Ser Gly Gly Gly Gly Ser Leu Thr Gln Ser Pro Ala Thr
 145 150 155 160

Leu Ser Leu Ser Pro Gly Glu Arg Ala Thr Leu Ser Cys Ser Ala Ser
 165 170 175

Pro Ser Val Ser Tyr Met His Trp Tyr Gln Gln Lys Pro Gly Gln Ala
180 185 190

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

Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile
210 215 220

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

Ser Gly Phe Pro Leu Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
245 250 255

Thr Thr Thr Pro Ala Pro Arg Pro Pro Thr Pro Ala Pro Thr Ile Ala
260 265 270

Ser Gln Pro Leu Ser Leu Arg Pro Glu Ala Cys Arg Pro Ala Ala Gly
275 280 285

Gly Ala Val His Thr Arg Gly Leu Asp Phe Ala Cys Asp Lys Arg Gly
290 295 300

Arg Lys Lys Leu Leu Tyr Ile Phe Lys Gln Pro Phe Met Arg Pro Val
305 310 315 320

Gln Thr Thr Gln Glu Glu Asp Gly Cys Ser Cys Arg Phe Pro Glu Glu
325 330 335

Glu Glu Gly Gly Cys Glu Leu Arg Val Lys Phe Ser Arg Ser Ala Asp
340 345 350

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

Leu Gly Arg Arg Glu Glu Tyr Asp Val Leu Asp Lys Arg Arg Gly Arg
370 375 380

Asp Pro Glu Met Gly Gly Lys Pro Arg Arg Lys Asn Pro Gln Glu Gly

385 390 395 400
 Leu Tyr Asn Glu Leu Gln Lys Asp Lys Met Ala Glu Ala Tyr Ser Glu
 405 410 415
 Ile Gly Met Lys Gly Glu Arg Arg Arg Gly Lys Gly His Asp Gly Leu
 420 425 430
 Tyr Gln Gly Leu Ser Thr Ala Thr Lys Asp Thr Tyr Asp Ala Leu His
 435 440 445
 Met Gln Ala Leu Pro Pro Arg Glu Gly Arg Gly Ser Leu Leu Thr Cys
 450 455 460
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 Leu Ser Ile Asn Ala Thr Asn Ile Lys His Phe Lys Asn Cys Thr Ser
 35 40 45

 Ile Ser Gly Asp Leu His Ile Leu Pro Val Ala Phe Arg Gly Asp Ser
 50 55 60

 Phe Thr His Thr Pro Pro Leu Asp Pro Gln Glu Leu Asp Ile Leu Lys

65		70		75		80									
Thr	Val	Lys	Glu	Ile	Thr	Gly	Phe	Leu	Leu	Ile	Gln	Ala	Trp	Pro	Glu
			85					90						95	
Asn	Arg	Thr	Asp	Leu	His	Ala	Phe	Glu	Asn	Leu	Glu	Ile	Ile	Arg	Gly
			100					105					110		
Arg	Thr	Lys	Gln	His	Gly	Gln	Phe	Ser	Leu	Ala	Val	Val	Ser	Leu	Asn
		115					120					125			
Ile	Thr	Ser	Leu	Gly	Leu	Arg	Ser	Leu	Lys	Glu	Ile	Ser	Asp	Gly	Asp
	130					135					140				
Val	Ile	Ile	Ser	Gly	Asn	Lys	Asn	Leu	Cys	Tyr	Ala	Asn	Thr	Ile	Asn
145					150				155						160
Trp	Lys	Lys	Leu	Phe	Gly	Thr	Ser	Gly	Gln	Lys	Thr	Lys	Ile	Ile	Ser
			165					170						175	
Asn	Arg	Gly	Glu	Asn	Ser	Cys	Lys	Ala	Thr	Gly	Gln	Val	Cys	His	Ala
			180					185					190		
Leu	Cys	Ser	Pro	Glu	Gly	Cys	Trp	Gly	Pro	Glu	Pro	Arg	Asp	Cys	Val
		195					200					205			
Ser	Cys	Arg	Asn	Val	Ser	Arg	Gly	Arg	Glu	Cys	Val	Asp	Lys	Cys	Asn
	210					215					220				
Leu	Leu	Glu	Gly	Glu	Pro	Arg	Glu	Phe	Val	Glu	Asn	Ser	Glu	Cys	Ile
225					230					235					240
Gln	Cys	His	Pro	Glu	Cys	Leu	Pro	Gln	Ala	Met	Asn	Ile	Thr	Cys	Thr
			245						250					255	
Gly	Arg	Gly	Pro	Asp	Asn	Cys	Ile	Gln	Cys	Ala	His	Tyr	Ile	Asp	Gly
			260					265					270		
Pro	His	Cys	Val	Lys	Thr	Cys	Pro	Ala	Gly	Val	Met	Gly	Glu	Asn	Asn
		275					280					285			

Thr Leu Val Trp Lys Tyr Ala Asp Ala Gly His Val Cys His Leu Cys
 290 295 300

His Pro Asn Cys Thr Tyr Gly Cys Thr Gly Pro Gly Leu Glu Gly Cys
 305 310 315 320

Pro Thr Asn Gly Pro Lys Ile Pro Ser Ile Ala Thr Gly Met Val Gly
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Ala Leu Leu Leu Leu Leu Val Val Ala Leu Gly Ile Gly Leu Phe Met
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