

SEQUENCE LISTING

<110> National University of Singapore

<120> STIMULATORY CELL LINES FOR EX VIVO EXPANSION AND ACTIVATION OF
NATURAL KILLER CELLS

<130> NKT.008W0

<150> 62/477311

<151> 2017-03-27

<160> 26

<170> PatentIn version 3.5

<210> 1

<211> 615

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Nucleic Acid sequence for mbIL15

<400> 1

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catattgatg ctactttata tacggaaagt gatgttcacc ccagttgcaa agtaacagca	180
atgaagtgct ttctcttgga gttacaagtt atttcacttg agtccggaga tgcaagtatt	240
catgatacag tagaaaatct gatcatccta gcaaacaaca gtttgtcttc taatgggaat	300
gtaacagaat ctggatgcaa agaattgtgag gaactggagg aaaaaaatat taaagaattt	360
ttgcagagtt ttgtacatat tgtccaaatg ttcatcaaca cttctaccac gacgccagcg	420
ccgcgaccac caacaccggc gccaccatc gcgtcgcagc ccctgtccct gcgcccagag	480
gcgtgccggc cagcggcggg gggcgcagtg cacacgaggg ggctggactt cgcctgtgat	540
atctacatct gggcgccctt ggccgggact tgtgggggtcc ttctcctgtc actggttatc	600
accctttact gctaa	615

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

<220>
<221> MISC_FEATURE
<223> Amion Acid sequence for mbIL15

<400> 2

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

His Ala Ala Arg Pro Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys
20 25 30

Ile Glu Asp Leu Ile Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr
35 40 45

Glu Ser Asp Val His Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe
50 55 60

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

His Asp Thr Val Glu Asn Leu Ile Ile Leu Ala Asn Asn Ser Leu Ser
85 90 95

Ser Asn Gly Asn Val Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu
100 105 110

Glu Glu Lys Asn Ile Lys Glu Phe Leu Gln Ser Phe Val His Ile Val
115 120 125

Gln Met Phe Ile Asn Thr Ser Thr Thr Thr Pro Ala Pro Arg Pro Pro
130 135 140

Thr Pro Ala Pro Thr Ile Ala Ser Gln Pro Leu Ser Leu Arg Pro Glu
145 150 155 160

Ala Cys Arg Pro Ala Ala Gly Gly Ala Val His Thr Arg Gly Leu Asp
165 170 175

Phe Ala Cys Asp Ile Tyr Ile Trp Ala Pro Leu Ala Gly Thr Cys Gly
180 185 190

Val Leu Leu Leu Ser Leu Val Ile Thr Leu Tyr Cys
195 200

<210> 3
<211> 867
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<223> Nucleic Acid sequence for mbIL12A

<400> 3
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caaaacctgc tgagggccgt cagcaacatg ctccagaagg ccagacaaac tctagaatit 180
tacccttgca cttctgaaga gattgatcat gaagatatca caaaagataa aaccagcaca 240
gtggaggcct gtttaccatt ggaattaacc aagaatgaga gttgcctaaa ttccagagag 300
acctctttca taactaatgg gagttgcctg gcctccagaa agacctcttt tatgatggcc 360
ctgtgcctta gtagtatit 420
aatgcaaagc ttctgatgga tcctaagagg cagatctttc tagatcaaaa catgctggca 480
gttattgatg agctgatgca ggccctgaat ttcaacagtg agactgtgcc acaaaaatcc 540
tcccttgaag aaccggatit 600
ttcaggattc gggcagtgac tattgataga gtgatgagct atctgaatgc ttccaagccc 660
accacgacgc cagcgccgcg accaccaaca ccggcgccca ccatcgcgtc gcagcccctg 720
tccctgcgcc cagaggcgtg ccggccagcg gcggggggcg cagtgcacac gagggggctg 780

gacttcgcct gtgatatcta catctgggcg cccttgccg ggacttgtgg ggtccttctc 840
 ctgtcactgg ttatcacccct ttactaa 867

<210> 4
 <211> 288
 <212> PRT
 <213> Homo sapiens

<220>
 <221> MISC_FEATURE
 <223> Amino Acid sequence for mbIL12A

<400> 4

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

His Ala Ala Arg Pro Arg Asn Leu Pro Val Ala Thr Pro Asp Pro Gly
 20 25 30

Met Phe Pro Cys Leu His His Ser Gln Asn Leu Leu Arg Ala Val Ser
 35 40 45

Asn Met Leu Gln Lys Ala Arg Gln Thr Leu Glu Phe Tyr Pro Cys Thr
 50 55 60

Ser Glu Glu Ile Asp His Glu Asp Ile Thr Lys Asp Lys Thr Ser Thr
 65 70 75 80

Val Glu Ala Cys Leu Pro Leu Glu Leu Thr Lys Asn Glu Ser Cys Leu
 85 90 95

Asn Ser Arg Glu Thr Ser Phe Ile Thr Asn Gly Ser Cys Leu Ala Ser
 100 105 110

Arg Lys Thr Ser Phe Met Met Ala Leu Cys Leu Ser Ser Ile Tyr Glu
 115 120 125

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

Leu Met Asp Pro Lys Arg Gln Ile Phe Leu Asp Gln Asn Met Leu Ala
145 150 155 160

Val Ile Asp Glu Leu Met Gln Ala Leu Asn Phe Asn Ser Glu Thr Val
165 170 175

Pro Gln Lys Ser Ser Leu Glu Glu Pro Asp Phe Tyr Lys Thr Lys Ile
180 185 190

Lys Leu Cys Ile Leu Leu His Ala Phe Arg Ile Arg Ala Val Thr Ile
195 200 205

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

Ala Pro Arg Pro Pro Thr Pro Ala Pro Thr Ile Ala Ser Gln Pro Leu
225 230 235 240

Ser Leu Arg Pro Glu Ala Cys Arg Pro Ala Ala Gly Gly Ala Val His
245 250 255

Thr Arg Gly Leu Asp Phe Ala Cys Asp Ile Tyr Ile Trp Ala Pro Leu
260 265 270

Ala Gly Thr Cys Gly Val Leu Leu Leu Ser Leu Val Ile Thr Leu Tyr
275 280 285

<210> 5
<211> 1194
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<223> Nucleic Acid sequence for mbIL12B

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cctggagaaa tgggtggtcct cacctgtgac acccctgaag aagatggat cacctggacc 180
ttggaccaga gcagtgaggt cttaggctct ggcaaaaccc tgaccatcca agtcaaagag 240
tttggagatg ctggccagta cacctgtcac aaaggaggcg aggttctaag ccattcgctc 300
ctgctgcttc acaaaaagga agatggaatt tgggtccactg atattttaaa ggaccagaaa 360
gaacccaaaa ataagacctt tctaagatgc gaggccaaga attattctgg acgtttcacc 420
tgctgggtggc tgacgacaat cagtactgat ttgacattca gtgtcaaaag cagcagaggc 480
tcttctgacc cccaaggggt gacgtgcgga gctgctacac tctctgcaga gagagtcaga 540
ggggacaaca aggagtatga gtactcagtg gagtgccagg aggacagtgc ctgcccagct 600
gctgaggaga gtctgcccac tgaggatcatg gtggatgccg ttcacaagct caagtatgaa 660
aactacacca gcagcttctt catcaggagc atcatcaaac ctgaccacc caagaacttg 720
cagctgaagc cattaaagaa ctctcggcag gtggagggtca gctgggagta ccctgacacc 780
tggagtactc cacattccta cttctccctg acattctgcg ttcagggtcca gggcaagagc 840
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<210> 6
<211> 397
<212> PRT
<213> Homo sapiens

<220>
<221> MISC_FEATURE

<223> Amino Acid sequence for mbIL12B

<400> 6

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

His Ala Ala Arg Pro Ile Trp Glu Leu Lys Lys Asp Val Tyr Val Val
20 25 30

Glu Leu Asp Trp Tyr Pro Asp Ala Pro Gly Glu Met Val Val Leu Thr
35 40 45

Cys Asp Thr Pro Glu Glu Asp Gly Ile Thr Trp Thr Leu Asp Gln Ser
50 55 60

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

Phe Gly Asp Ala Gly Gln Tyr Thr Cys His Lys Gly Gly Glu Val Leu
85 90 95

Ser His Ser Leu Leu Leu Leu His Lys Lys Glu Asp Gly Ile Trp Ser
100 105 110

Thr Asp Ile Leu Lys Asp Gln Lys Glu Pro Lys Asn Lys Thr Phe Leu
115 120 125

Arg Cys Glu Ala Lys Asn Tyr Ser Gly Arg Phe Thr Cys Trp Trp Leu
130 135 140

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

Ser Ser Asp Pro Gln Gly Val Thr Cys Gly Ala Ala Thr Leu Ser Ala
165 170 175

Glu Arg Val Arg Gly Asp Asn Lys Glu Tyr Glu Tyr Ser Val Glu Cys
180 185 190

Gln Glu Asp Ser Ala Cys Pro Ala Ala Glu Glu Ser Leu Pro Ile Glu
195 200 205

Val Met Val Asp Ala Val His Lys Leu Lys Tyr Glu Asn Tyr Thr Ser
210 215 220

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

Gln Leu Lys Pro Leu Lys Asn Ser Arg Gln Val Glu Val Ser Trp Glu
245 250 255

Tyr Pro Asp Thr Trp Ser Thr Pro His Ser Tyr Phe Ser Leu Thr Phe
260 265 270

Cys Val Gln Val Gln Gly Lys Ser Lys Arg Glu Lys Lys Asp Arg Val
275 280 285

Phe Thr Asp Lys Thr Ser Ala Thr Val Ile Cys Arg Lys Asn Ala Ser
290 295 300

Ile Ser Val Arg Ala Gln Asp Arg Tyr Tyr Ser Ser Ser Trp Ser Glu
305 310 315 320

Trp Ala Ser Val Pro Cys Ser Lys Pro Thr Thr Thr Pro Ala Pro Arg
325 330 335

Pro Pro Thr Pro Ala Pro Thr Ile Ala Ser Gln Pro Leu Ser Leu Arg
340 345 350

Pro Glu Ala Cys Arg Pro Ala Ala Gly Gly Ala Val His Thr Arg Gly
355 360 365

Leu Asp Phe Ala Cys Asp Ile Tyr Ile Trp Ala Pro Leu Ala Gly Thr
370 375 380

Cys Gly Val Leu Leu Leu Ser Leu Val Ile Thr Leu Tyr
385 390 395

<210> 7
<211> 747
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<223> Nucleic Acid sequence for mbIL18

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ctcttcattg accaaggaaa tcggcctcta tttgaagata tgactgattc tgactgtaga 180
gataatgcac cccggaccat atttattata agtatgtata aagatagcca gcctagaggt 240
atggctgtaa ctatctctgt gaagtgtgag aaaatttcaa ctctctcctg tgagaacaaa 300
attatttcct ttaaggaaat gaatcctcct gataacatca aggatacaaa aagtgacatc 360
atattctttc agagaagtgt cccaggacat gataataaga tgcaatttga atcttcatca 420
tacgaaggat actttctagc ttgtgaaaaa gagagagacc tttttaaact cattttgaaa 480
aaagaggatg aattggggga tagatctata atgttcactg ttcaaaacga agacaagccc 540
accacgacgc cagcgccgcg accaccaaca ccggcgccca ccatcgcgtc gcagcccctg 600
tccttgcgcc cagaggcgtg ccggccagcg gcggggggcg cagtgcacac gagggggctg 660
gacttcgcct gtgatatcta catctgggcg cccttggccg ggacttgtgg ggtccttctc 720
ctgtcactgg ttatcaccct ttactaa 747

<210> 8
<211> 248
<212> PRT
<213> Homo sapiens

<220>
<221> MISC_FEATURE

<223> Amino Acid sequence for mbIL18

<400> 8

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

His Ala Ala Arg Pro Tyr Phe Gly Lys Leu Glu Ser Lys Leu Ser Val
20 25 30

Ile Arg Asn Leu Asn Asp Gln Val Leu Phe Ile Asp Gln Gly Asn Arg
35 40 45

Pro Leu Phe Glu Asp Met Thr Asp Ser Asp Cys Arg Asp Asn Ala Pro
50 55 60

Arg Thr Ile Phe Ile Ile Ser Met Tyr Lys Asp Ser Gln Pro Arg Gly
65 70 75 80

Met Ala Val Thr Ile Ser Val Lys Cys Glu Lys Ile Ser Thr Leu Ser
85 90 95

Cys Glu Asn Lys Ile Ile Ser Phe Lys Glu Met Asn Pro Pro Asp Asn
100 105 110

Ile Lys Asp Thr Lys Ser Asp Ile Ile Phe Phe Gln Arg Ser Val Pro
115 120 125

Gly His Asp Asn Lys Met Gln Phe Glu Ser Ser Ser Tyr Glu Gly Tyr
130 135 140

Phe Leu Ala Cys Glu Lys Glu Arg Asp Leu Phe Lys Leu Ile Leu Lys
145 150 155 160

Lys Glu Asp Glu Leu Gly Asp Arg Ser Ile Met Phe Thr Val Gln Asn
165 170 175

Glu Asp Lys Pro Thr Thr Thr Pro Ala Pro Arg Pro Pro Thr Pro Ala
180 185 190

Pro Thr Ile Ala Ser Gln Pro Leu Ser Leu Arg Pro Glu Ala Cys Arg
195 200 205

Pro Ala Ala Gly Gly Ala Val His Thr Arg Gly Leu Asp Phe Ala Cys
210 215 220

Asp Ile Tyr Ile Trp Ala Pro Leu Ala Gly Thr Cys Gly Val Leu Leu
225 230 235 240

Leu Ser Leu Val Ile Thr Leu Tyr
245

<210> 9
<211> 706
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<223> Nucleic Acid sequence for mbIL21

<220>
<221> misc_feature
<223> Nucleic Acid sequence for IL21

<400> 9
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aaatcaagct cccaagggtca agatcgccac atgattagaa tgcgtcaact tatagatatt 180
gttgatcagc tgaaaaatta tgtgaatgac ttgggtccctg aatttctgcc agctccagaa 240
gatgtagaga caaactgtga gtggtcagct ttttcctgct ttcagaaggc ccaactaaag 300
tcagcaaata caggaaacaa tgaaaggata atcaatgtat caattaaaaa gctgaagagg 360
aaaccacctt ccacaaatgc agggagaaga cagaaacaca gactaacatg cccttcatgt 420
gattcttatg agaaaaaacc acccaaagaa ttcctagaaa gattcaaadc acttctccaa 480
aaggtatcta ccttaagttt catttgattt tctgctttat ctttacctat ccagatttgc 540

ttcttagtta ctcacggtat actattttcca cagatgattc atcagcatct gtcctctaga	600
acacacggaa gtgaagattc ctgaggatct aacttgcagt tggacactat gttacatact	660
ctaatatagt agtgaaagtc atttctttgt attccaagtg gaggag	706

<210> 10
 <211> 155
 <212> PRT
 <213> Homo sapiens

<220>
 <221> MISC_FEATURE
 <223> Amino Acid sequence for mbIL21

<220>
 <221> MISC_FEATURE
 <223> Amino Acid sequence for IL21

<400> 10

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

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

Arg	Gln	Leu	Ile	Asp	Ile	Val	Asp	Gln	Leu	Lys	Asn	Tyr	Val	Asn	Asp
		35					40					45			

Leu	Val	Pro	Glu	Phe	Leu	Pro	Ala	Pro	Glu	Asp	Val	Glu	Thr	Asn	Cys
	50					55					60				

Glu	Trp	Ser	Ala	Phe	Ser	Cys	Phe	Gln	Lys	Ala	Gln	Leu	Lys	Ser	Ala
65					70				75					80	

Asn	Thr	Gly	Asn	Asn	Glu	Arg	Ile	Ile	Asn	Val	Ser	Ile	Lys	Lys	Leu
			85					90					95		

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

Leu Thr Cys Pro Ser Cys Asp Ser Tyr Glu Lys Lys Pro Pro Lys Glu
115 120 125

Phe Leu Glu Arg Phe Lys Ser Leu Leu Gln Lys Met Ile His Gln His
130 135 140

Leu Ser Ser Arg Thr His Gly Ser Glu Asp Ser
145 150 155

<210> 11
<211> 1147
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<223> Nucleic Acid sequence for IL22

<400> 11
cgaccagggtt ctccttcccc agtcaccagt tgctcgagtt agaattgtct gcaatggccg 60
ccctgcagaa atctgtgagc tctttcctta tggggaccct ggccaccagc tgcctccttc 120
tcttggccct cttggtacag ggaggagcag ctgcgcccac cagctccac tgcaggcttg 180
acaagtccaa cttccagcag ccctatatca ccaaccgcac cttcatgctg gctaaggagg 240
ctagcttggc tgataacaac acagacgttc gtctcattgg ggagaaactg ttccacggag 300
tcagtatgag tgagcgctgc tatctgatga agcagggtgct gaacttcacc cttgaagaag 360
tgctgttccc tcaatctgat aggttccagc cttatatgca ggaggtggtg cccttcctgg 420
ccaggctcag caacaggcta agcacatgtc atattgaagg tgatgacctg catatccaga 480
ggaatgtgca aaagctgaag gacacagtga aaaagcttgg agagagtgga gagatcaaag 540
caattggaga actggatttg ctgtttatgt ctctgagaaa tgcctgcatt tgaccagagc 600
aaagctgaaa aatgaataac taacccccctt tccctgctag aaataacaat tagatgcccc 660
aaagcgattt tttttaacca aaaggaagat gggaagccaa actccatcat gatgggtgga 720
ttccaaatga acccctgcgt tagttacaaa ggaaaccaat gccacttttg tttataagac 780

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cagaaggtag actttctaag catagatatt tattgataac atttcattgt aactggtgtt      840
ctatacacag aaaacaattht attttttaaa taattgtctt tttccataaa aaagattact      900
ttccattcct ttaggggaaa aaaccctaa atagcttcat gtttccataa tcagtacttt      960
atatttataa atgtatttat tattattata agactgcatt ttatttatat cattttatta     1020
atatggattt atttatagaa acatcattcg atattgctac ttgagtgtaa ggctaattatt     1080
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gatatcc                                           1147

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<210> 12
<211> 179
<212> PRT
<213> Homo sapiens

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<220>
<221> MISC_FEATURE
<223> Amino acid sequence for IL22

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<400> 12

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

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Ala Thr Ser Cys Leu Leu Leu Leu Ala Leu Leu Val Gln Gly Gly Ala
          20           25           30

```

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Ala Ala Pro Ile Ser Ser His Cys Arg Leu Asp Lys Ser Asn Phe Gln
          35           40           45

```

```

Gln Pro Tyr Ile Thr Asn Arg Thr Phe Met Leu Ala Lys Glu Ala Ser
          50           55           60

```

```

Leu Ala Asp Asn Asn Thr Asp Val Arg Leu Ile Gly Glu Lys Leu Phe
65           70           75           80

```

```

His Gly Val Ser Met Ser Glu Arg Cys Tyr Leu Met Lys Gln Val Leu
          85           90           95

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

Pro Tyr Met Gln Glu Val Val Pro Phe Leu Ala Arg Leu Ser Asn Arg
115 120 125

Leu Ser Thr Cys His Ile Glu Gly Asp Asp Leu His Ile Gln Arg Asn
130 135 140

Val Gln Lys Leu Lys Asp Thr Val Lys Lys Leu Gly Glu Ser Gly Glu
145 150 155 160

Ile Lys Ala Ile Gly Glu Leu Asp Leu Leu Phe Met Ser Leu Arg Asn
165 170 175

Ala Cys Ile

<210> 13
<211> 765
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<223> Nucleic Acid sequence for 4-1BB ligand

<400> 13
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gctcgcgcct gccgcgtact gccttgggcc ctggtcgcgg ggctgctgct gctgctgctg 120
ctcgtctgccg cctgcgccgt cttcctcgcc tgcccctggg ccgtgtccgg ggctcgcgcc 180
tcgcccggct ccgcggccag cccgagactc cgcgagggtc ccgagctttc gcccgacgat 240
cccgccggcc tcttggacct gcggcagggc atgtttgcgc agctgggtggc ccaaaatgtt 300
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acgggggggcc tgagctacaa agaggacacg aaggagctgg tgggtggcaa ggctggagtc 420

tactatgtct tctttcaact agagctgcgg cgcgtggtgg ccggcgaggg ctcaggctcc	480
gtttcacttg cgctgcacct gcagccactg cgctctgctg ctggggccgc cgccctggct	540
ttgaccgtgg acctgccacc cgcctcctcc gaggctcgga actcggcctt cggtttccag	600
ggccgcttgc tgcacctgag tgccggccag cgcctgggcg tccatcttca cactgaggcc	660
agggcacgcc atgcctggca gcttaccag ggcgccacag tcttgggact cttccgggtg	720
acccccgaaa tcccagccgg actcccttca ccgaggtcgg aataa	765

<210> 14
 <211> 254
 <212> PRT
 <213> Homo sapiens

<220>
 <221> MISC_FEATURE
 <223> Amino Acid sequence for 4-1BB ligand

<400> 14

Met	Glu	Tyr	Ala	Ser	Asp	Ala	Ser	Leu	Asp	Pro	Glu	Ala	Pro	Trp	Pro
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Pro	Ala	Pro	Arg	Ala	Arg	Ala	Cys	Arg	Val	Leu	Pro	Trp	Ala	Leu	Val
			20					25					30		

Ala	Gly	Leu	Leu	Leu	Leu	Leu	Leu	Ala	Ala	Ala	Cys	Ala	Val	Phe	
		35					40				45				

Leu	Ala	Cys	Pro	Trp	Ala	Val	Ser	Gly	Ala	Arg	Ala	Ser	Pro	Gly	Ser
	50					55					60				

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

Pro	Ala	Gly	Leu	Leu	Asp	Leu	Arg	Gln	Gly	Met	Phe	Ala	Gln	Leu	Val
				85					90					95	

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

Pro Gly Leu Ala Gly Val Ser Leu Thr Gly Gly Leu Ser Tyr Lys Glu
115 120 125

Asp Thr Lys Glu Leu Val Val Ala Lys Ala Gly Val Tyr Tyr Val Phe
130 135 140

Phe Gln Leu Glu Leu Arg Arg Val Val Ala Gly Glu Gly Ser Gly Ser
145 150 155 160

Val Ser Leu Ala Leu His Leu Gln Pro Leu Arg Ser Ala Ala Gly Ala
165 170 175

Ala Ala Leu Ala Leu Thr Val Asp Leu Pro Pro Ala Ser Ser Glu Ala
180 185 190

Arg Asn Ser Ala Phe Gly Phe Gln Gly Arg Leu Leu His Leu Ser Ala
195 200 205

Gly Gln Arg Leu Gly Val His Leu His Thr Glu Ala Arg Ala Arg His
210 215 220

Ala Trp Gln Leu Thr Gln Gly Ala Thr Val Leu Gly Leu Phe Arg Val
225 230 235 240

Thr Pro Glu Ile Pro Ala Gly Leu Pro Ser Pro Arg Ser Glu
245 250

<210> 15
<211> 1534
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<223> Nucleic Acid sequence for CD3 Receptor epsilon subunit

<400> 15

tattgtcaga gtcctcttgt ttggccttct aggaaggctg tgggacccag ctttcttcaa	60
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agaggcctct ctacttcctg tgtgggggtc agaaaccctc ctcccctccc agcctcaggt	180
gcctgcttca gaaaatgaag tagtaagtct gctggcctcc gccatcttag taaagtaaca	240
gtcccatgaa acaaagatgc agtcgggcac tctactggaga gttctgggcc tctgcctctt	300
atcagttggc gtttgggggc aagatggtaa tgaagaaatg ggtggtatta cacagacacc	360
atataaagtc tccatctctg gaaccacagt aatattgaca tgccctcagt atcctggatc	420
tgaaatacta tggcaacaca atgataaaaa cataggcggg gatgaggatg ataaaaacat	480
aggcagtgat gaggatcacc tgtcactgaa ggaattttca gaattggagc aaagtgggta	540
ttatgtctgc taccacagag gaagcaaacc agaagatgcg aacttttatc tctacctgag	600
ggcaagagtg tgtgagaact gcatggagat ggatgtgatg tcggtggcca caattgtcat	660
agtggacatc tgcatcactg ggggcttgct gctgctgggt tactactgga gcaagaatag	720
aaaggccaag gccaaagcctg tgacacgagg agcgggtgct ggcggcaggc aaaggggaca	780
aaacaaggag aggccaccac ctgttcccaa cccagactat gagcccatcc ggaaaggcca	840
gcgggacctg tattctggcc tgaatcagag acgcatctga ccctctggag aacactgcct	900
cccgtggcc caggctcct ctccagtcct cctgcgactc cctgtttcct gggctagtct	960
tggacccac gagagagaat cgttcctcag cctcatgggt aactcgcgcc ctccagcctg	1020
atccccgct ccctcctccc tgccttctct gctggtagcc agtcctaaaa tattgtctgt	1080
tcctcttcct ttgaagcatc atcagtagtc acaccctcac agctggcctg ccctcttgcc	1140
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cctccttttc ttgcatgtaa gttgtcccc atcccaaagt attccatcta cttttctatc	1260
gccgtcccct tttgcagccc tctctgggga tggactgggt aaatgttgac agaggccctg	1320
ccccgttcac agatcctggc cctgagccag ccctgtgctc ctccctcccc caacactccc	1380
taccaacccc ctaatcccct actccctcca cccccctcc actgtaggcc actggatgggt	1440
catttgcac tccgtaaagtg tgctctgctc ctcagctgag agagaaaaaa ataaactgta	1500

tttggctgca agaaaaaaaa aaaaaaaaaa aaaa

1534

<210> 16
<211> 1017
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<223> Nucleic Acid sequence for mb-anti-CD3 scFv

<400> 16
atggccttac cagtgaccgc cttgctcctg ccgctggcct tgctgctcca cgccgccagg 60
ccgcaaattg ttctcaccca gtctccagca atcatgtctg catctccagg ggagaaggtc 120
accatgacct gcagtgccag ctcaagtgtg agttacatga actggtacca gcagaagtca 180
ggcacctccc caaaagatg gatttatgac acatccaaac tggcttctgg agtccctgct 240
cacttcaggg gcagtgggtc tgggacctct tactctctca caatcagcgg catggaggct 300
gaagatgctg ccacttatta ctgccagcag tggagtagta acccattcac gttcggctcg 360
gggacaaagt tggaaataaa ccgggggtgg ggtggttctg gtggtggtgg ttctggcggc 420
ggcggctccg gtggtggtgg atccgaggtc cagctgcagc agtctggggc tgaactggca 480
agacctgggg cctcagtga gatgtcctgc aaggcttctg gctacacctt tactaggtac 540
acgatgcact gggtaaaaca gaggcctgga cagggtctgg aatggattgg atacattaat 600
cctagccgtg gttatactaa ttacaatcag aagttcaagg acaaggccac attgactaca 660
gacaaatcct ccagcacagc ctacatgcaa ctgagcagcc tgacatctga ggactctgca 720
gtctattact gtgcaagata ttatgatgat cattactgcc ttgactactg gggccaaggc 780
accactctca cagtctcctc agccaagccc accacgacgc cagcgccgcg accaccaaca 840
ccggcgccca ccatcgcgtc gcagcccctg tccctgcgcc cagaggcgtg ccggccagcg 900
gcggggggcg cagtgcacac gagggggctg gacttcgcct gtgatatcta catctgggcg 960
cccttggccg ggacttgtgg ggtccttctc ctgtcactgg ttatcaccct ttactaa 1017

<210> 17
<211> 338
<212> PRT
<213> Homo sapiens

<220>
<221> MISC_FEATURE
<223> Amino Acid sequence for mb-anti-CD3 scFv

<400> 17

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

His Ala Ala Arg Pro Gln Ile Val Leu Thr Gln Ser Pro Ala Ile Met
20 25 30

Ser Ala Ser Pro Gly Glu Lys Val Thr Met Thr Cys Ser Ala Ser Ser
35 40 45

Ser Val Ser Tyr Met Asn Trp Tyr Gln Gln Lys Ser Gly Thr Ser Pro
50 55 60

Lys Arg Trp Ile Tyr Asp Thr Ser Lys Leu Ala Ser Gly Val Pro Ala
65 70 75 80

His Phe Arg Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser
85 90 95

Gly Met Glu Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser
100 105 110

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

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
130 135 140

Gly Gly Gly Ser Glu Val Gln Leu Gln Gln Ser Gly Ala Glu Leu Ala
145 150 155 160

Arg Pro Gly Ala Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr
165 170 175

Phe Thr Arg Tyr Thr Met His Trp Val Lys Gln Arg Pro Gly Gln Gly
180 185 190

Leu Glu Trp Ile Gly Tyr Ile Asn Pro Ser Arg Gly Tyr Thr Asn Tyr
195 200 205

Asn Gln Lys Phe Lys Asp Lys Ala Thr Leu Thr Thr Asp Lys Ser Ser
210 215 220

Ser Thr Ala Tyr Met Gln Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala
225 230 235 240

Val Tyr Tyr Cys Ala Arg Tyr Tyr Asp Asp His Tyr Cys Leu Asp Tyr
245 250 255

Trp Gly Gln Gly Thr Thr Leu Thr Val Ser Ser Ala Lys Pro Thr Thr
260 265 270

Thr Pro Ala Pro Arg Pro Pro Thr Pro Ala Pro Thr Ile Ala Ser Gln
275 280 285

Pro Leu Ser Leu Arg Pro Glu Ala Cys Arg Pro Ala Ala Gly Gly Ala
290 295 300

Val His Thr Arg Gly Leu Asp Phe Ala Cys Asp Ile Tyr Ile Trp Ala
305 310 315 320

Pro Leu Ala Gly Thr Cys Gly Val Leu Leu Leu Ser Leu Val Ile Thr
325 330 335

Leu Tyr

<210> 18
<211> 45
<212> PRT
<213> Homo sapiens

<220>
<221> MISC_FEATURE
<223> Amino Acid sequence for CD8 alpha transmembrane domain

<400> 18

Thr Thr Thr Pro Ala Pro Arg Pro Pro Thr Pro Ala Pro Thr Ile Ala
1 5 10 15

Ser Gln Pro Leu Ser Leu Arg Pro Glu Ala Cys Arg Pro Ala Ala Gly
20 25 30

Gly Ala Val His Thr Arg Gly Leu Asp Phe Ala Cys Asp
35 40 45

<210> 19
<211> 8
<212> PRT
<213> Homo sapiens

<220>
<221> MISC_FEATURE
<223> Amino Acid sequence for FLAG tag

<400> 19

Asp Tyr Lys Asp Asp Asp Asp Lys
1 5

<210> 20
<211> 6
<212> PRT
<213> Homo sapiens

<220>
<221> MISC_FEATURE
<223> Amino Acid sequence for His tag

<400> 20

His His His His His His
1 5

<210> 21

<211> 638

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Nucleic acid cloning construct for mbIL15

<400> 21

gaattcgccc ttccaccatg gccttaccag tgaccgcctt gtcctgccg ctggccttgc	60
tgctccacgc cgccaggccg aactgggtga atgtaataag tgatttgaaa aaaattgaag	120
atcttattca atctatgcat attgatgcta ctttatatac ggaaagtgat gttcacccca	180
gttgcaaagt aacagcaatg aagtgccttc tcttggagtt acaagttatt tcacttgagt	240
ccggagatgc aagtattcat gatacagtag aaaatctgat catcctagca aacaacagtt	300
tgtcttctaa tgggaatgta acagaatctg gatgcaaaga atgtgaggaa ctggaggaaa	360
aaaatattaa agaatttttg cagagttttg tacatattgt ccaaagtgtc atcaacactt	420
ctaccacgac gccagcgccg cgaccaccaa caccggcgcc caccatcgcg tcgcagcccc	480
tgtccctgcg ccagaggcg tgccggccag cggcgggggg cgcagtgcac acgagggggc	540
tggacttcgc ctgtgatatc tacatctggg cgcccttggc cgggacttgt ggggtccttc	600
tcctgtcact ggttatcacc ctttactgct aactcgag	638

<210> 22

<211> 788

<212> DNA

<213> Homo sapiens

<220>

<221> misc_feature

<223> Nucleic acid cloning construct for 4-1BB ligand

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<400> 22
gaattcgccc ttccaccatg gaatacgctt ctgacgcttc actggacccc gaagccccgt      60
ggcctcccg c gccccgcgct cgcgccctgcc gcgtactgcc ttggggccctg gtcgcggggc    120
tgctgctgct gctgctgctc gctgccgcct gcgccgtctt cctcgccctgc ccctggggccg    180
tgtccggggc tcgcgcctcg cccggctccg cggccagccc gagactccgc gaggggtcccg      240
agctttcgcc cgacgatccc gccggcctct tggacctgcg gcagggcattg tttgcgcagc      300
tgggtggccca aaatgttctg ctgatcgatg ggcccctgag ctggtacagt gacccaggcc      360
tggcaggcgt gtccctgacg gggggcctga gctacaaaga ggacacgaag gagctggtgg      420
tggccaaggc tggagtctac tatgtcttct ttcaactaga gctgcggcgc gtggtggccg      480
gcgaggggctc aggctccgtt tcacttgccg tgccacctgca gccactgcgc tctgctgctg    540
gggccgcccgc cctggccttg accgtggacc tgccacccgc ctccctccgag gctcgggaact    600
cggccttcgg tttccagggc cgcttgctgc acctgagtgc cggccagcgc ctgggcgtcc      660
atcttcacac tgaggccagg gcacgccatg cctggcagct taccagggc gccacagtct      720
tgggactctt ccgggtgacc cccgaaatcc cagccggact cccttcaccg aggtcggaat      780
aactcgag                                         788

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<210> 23
<211> 889
<212> DNA
<213> Homo sapiens

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<220>
<221> misc_feature
<223> Nucleic acid cloning construct for mbIL12A

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<400> 23
gaattcggct tccaccatgg ccttaccagt gaccgccttg ctccctgccg tggccttgct      60
gctccacgcc gccaggccga gaaacctccc cgtggccact ccagaccagc gaatgttccc      120
atgccttcac cactcccaaa acctgctgag ggccgtcagc aacatgctcc agaaggccag      180
acaaactcta gaattttacc cttgcacttc tgaagagatt gatcatgaag atatcacaaa      240
agataaaacc agcacagtgg aggctgttt accattggaa ttaaccaaga atgagagttg      300

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cctaaattcc agagagacct ctttcataac taatgggagt tgcctggcct ccagaaagac	360
ctcttttatg atggccctgt gccttagtag tatttatgaa gacttgaaga tgtaccaggt	420
ggagttcaag accatgaatg caaagcttct gatggatcct aagaggcaga tctttctaga	480
tcaaaacatg ctggcagtta ttgatgagct gatgcaggcc ctgaatttca acagtgagac	540
tgtgccacaa aaatcctccc ttgaagaacc ggatttttat aaaactaaaa tcaagctctg	600
catacttctt catgctttca ggattcgggc agtgactatt gatagagtga tgagctatct	660
gaatgcttcc aagcccacca cgacgccagc gccgcgacca ccaacaccgg cgcccaccat	720
cgcgtcgcag cccctgtccc tgcgcccaga ggcgtgccgg ccagcggcgg ggggcgcagt	780
gcacacgagg gggctggact tcgcctgtga tatctacatc tgggcgccct tggccgggac	840
ttgtgggggtc cttctcctgt cactggttat caccctttac taactcgag	889

<210> 24
 <211> 1216
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <223> Nucleic acid cloning construct for mbIL12B

<400> 24	
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gctccacgcc gccaggccga tatgggaact gaagaaagat gtttatgtcg tagaattgga	120
ttggtatccg gatgcccctg gagaaatggg ggtcctcacc tgtgacaccc ctgaagaaga	180
tggtatcacc tggaccttgg accagagcag tgaggtctta ggctctggca aaaccctgac	240
catccaagtc aaagagtttg gagatgctgg ccagtacacc tgtcacaaag gaggcgaggt	300
tctaagccat tcgctcctgc tgcttcacaa aaaggaagat ggaatttggt cactgatat	360
tttaaaggac cagaaaagaac caaaaaataa gacctttcta agatgcgagg ccaagaatta	420
ttctggacgt ttcacctgct ggtggctgac gacaatcagt actgatttga cattcagtg	480
caaaagcagc agaggctctt ctgaccccca aggggtgacg tgcggagctg ctacactctc	540

tgcagagaga	gtcagagggg	acaacaagga	gtatgagtac	tcagtggagt	gccaggagga	600
cagtgcctgc	ccagctgctg	aggagagtct	gcccattgag	gtcatggtgg	atgccgttca	660
caagctcaag	tatgaaaact	acaccagcag	cttcttcatc	agggacatca	tcaaacctga	720
cccacccaag	aacttgcagc	tgaagccatt	aaagaactct	cggcaggtgg	aggtcagctg	780
ggagtaccct	gacacctgga	gtactccaca	ttctacttct	tccctgacat	tctgcgttca	840
ggtccagggc	aagagcaaga	gagaaaagaa	agatagagtc	ttcacggaca	agacctcagc	900
cacggtcatc	tgccgcaaaa	atgccagcat	tagcgtgcgg	gcccaggacc	gctactatag	960
ctcatcttgg	agcgaatggg	catctgtgcc	ctgcagtaag	cccaccacga	cgccagcgcc	1020
gcgaccacca	acaccggcgc	ccaccatcgc	gtcgcagccc	ctgtccctgc	gccagaggc	1080
gtgccggcca	gcggcggggg	gcgcagtgca	cacgaggggg	ctggacttcg	cctgtgatat	1140
ctacatctgg	gcgcccttgg	ccgggacttg	tggggtcctt	ctcctgtcac	tggttatcac	1200
cctttactaa	ctcgag					1216

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<220>
<221> misc_feature
<223> Nucleic acid cloning construct for mbIL18
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atttgaatct tcatcatacg aaggatactt tctagcttgt gaaaaagaga gagacctttt	480
taaactcatt ttgaaaaaag aggatgaatt gggggataga tctataatgt tctactgttca	540
aaacgaagac aagcccacca cgacgccagc gccgcgacca ccaacaccgg cgcccaccat	600
cgcgctgcag cccctgtccc tgcgcccaga ggcggtgccgg ccagcggcgg ggggcgcagt	660
gcacacgagg gggctggact tcgcctgtga tatctacatc tgggcgccct tggccgggac	720
ttgtggggtc cttctcctgt cactggttat caccctttac taactcgag	769

<210> 26
 <211> 1039
 <212> DNA
 <213> Homo sapiens

<220>
 <221> misc_feature
 <223> Nucleic acid cloning construct for mb-anti CD3 scFv

<400> 26	
gaattcggct tccaccatgg ccttaccagt gaccgccttg ctcttgccgc tggccttgct	60
gctccacgcc gccaggccgc aaattgttct caccagctct ccagcaatca tgtctgcatc	120
tccaggggag aaggtcacca tgacctgcag tgccagctca agtctaagtt acatgaactg	180
gtaccagcag aagtcaggca cctcccccaa aagatggatt tatgacacat ccaaactggc	240
ttctggagtc cctgctcact tcaggggcag tgggtctggg acctcttact ctctcacaat	300
cagcggcatg gaggctgaag atgctgccac ttattactgc cagcagtgga gtagtaaccc	360
attcacgttc ggctcgggga caaagttgga aataaaccgg ggtggtggtg gttctggtgg	420
tggtggttct ggcggcggcg gctccggtgg tggtggatcc gaggtccagc tgcagcagtc	480
tggggctgaa ctggcaagac ctggggcctc agtgaagatg tcctgcaagg cttctggcta	540
cacctttact aggtacacga tgcaactgggt aaaacagagg cctggacagg gtctggaatg	600
gattggatac attaatccta gccgtgggta tactaattac aatcagaagt tcaaggacaa	660
ggccacattg actacagaca aatcctccag cacagcctac atgcaactga gcagcctgac	720
atctgaggac tctgcagtct attactgtgc aagatattat gatgatcatt actgccttga	780

ctactggggc caaggcacca ctctcacagt ctctcagcc aagcccacca cgacgccagc	840
gccgcgacca ccaacaccgg cgcccaccat cgcgtcgcag cccctgtccc tgcgcccaga	900
ggcgtgccgg ccagcggcgg ggggcgcagt gcacacgagg gggctggact tcgcctgtga	960
tatctacatc tgggcgccct tggccgggac ttgtggggtc cttctcctgt cactggttat	1020
caccctttac taactcgag	1039