

FIG. 1A

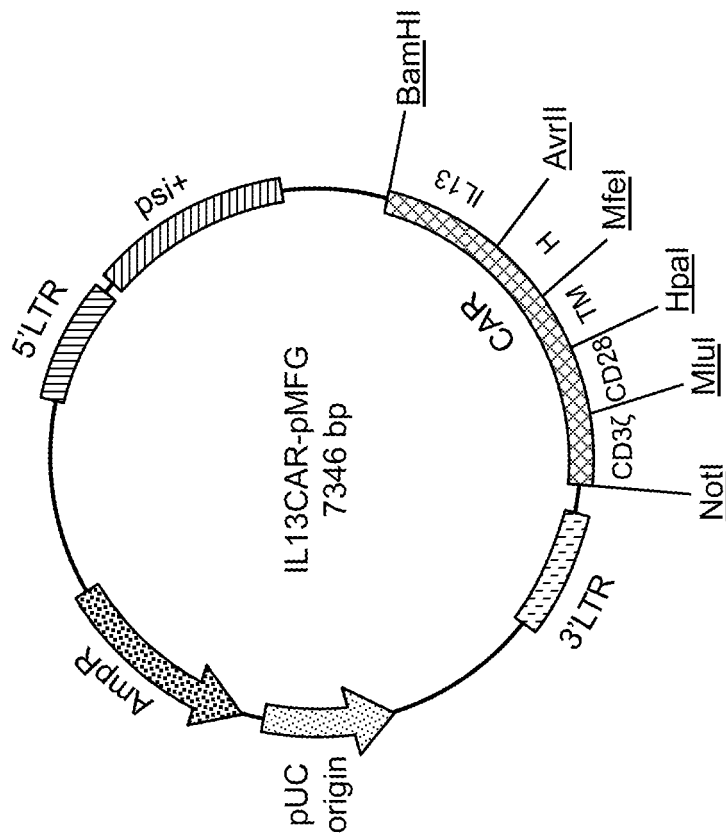


FIG. 1B

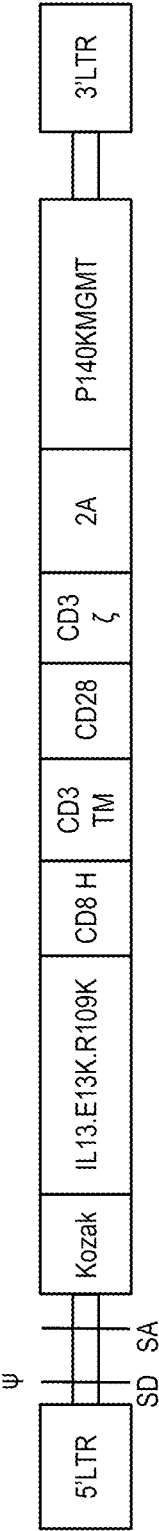


FIG. 2A

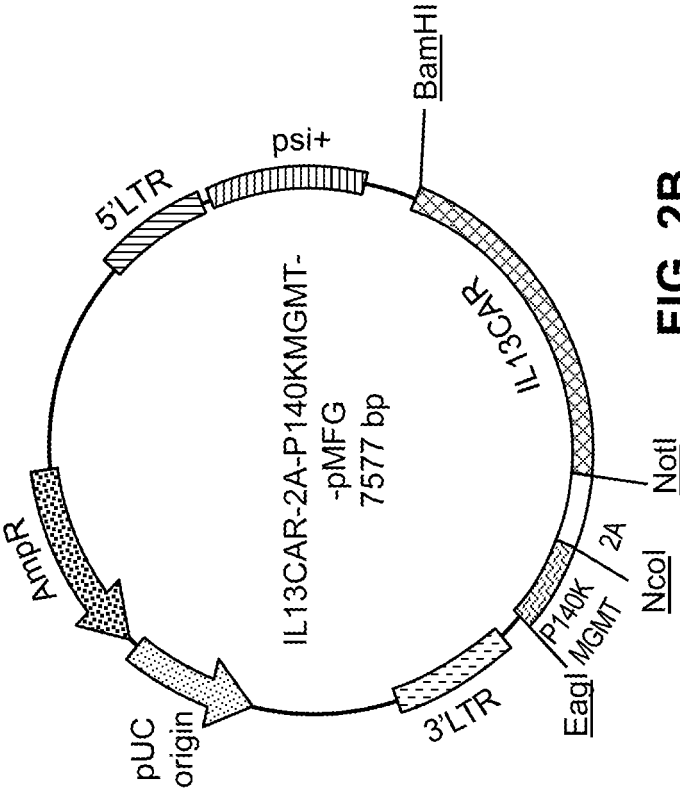


FIG. 2B

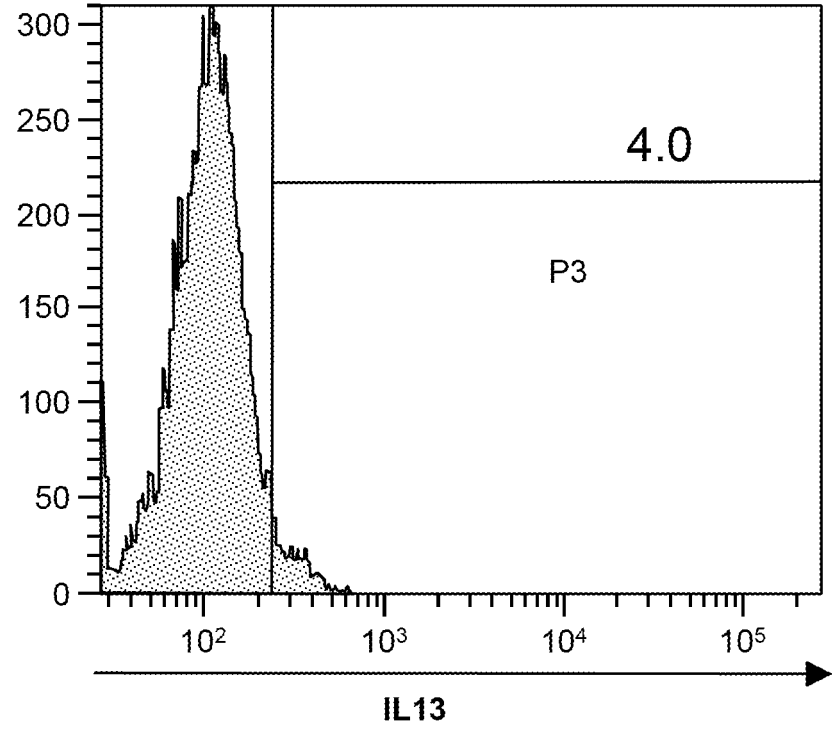
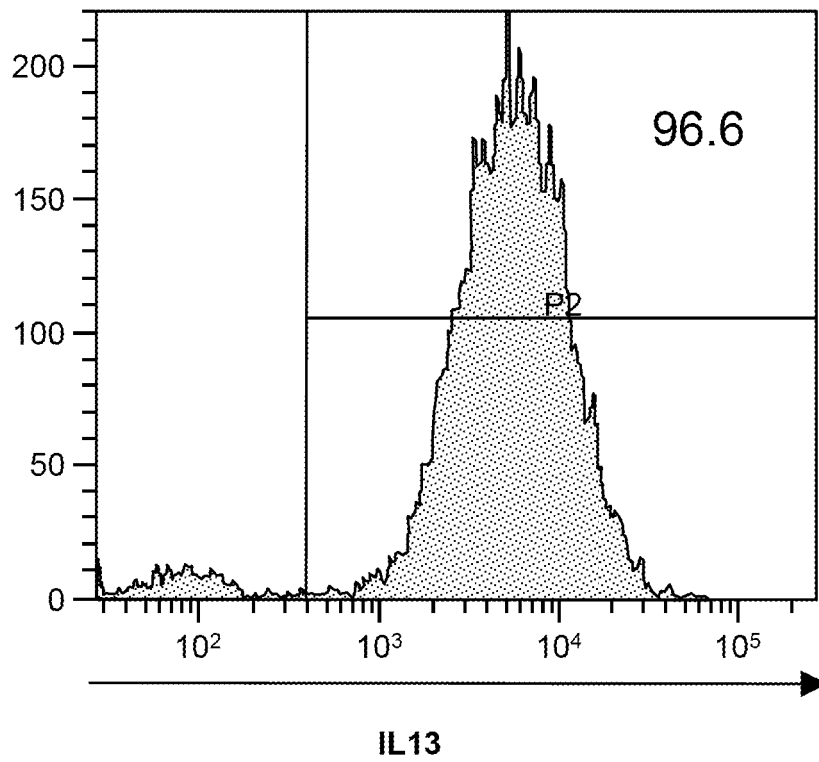
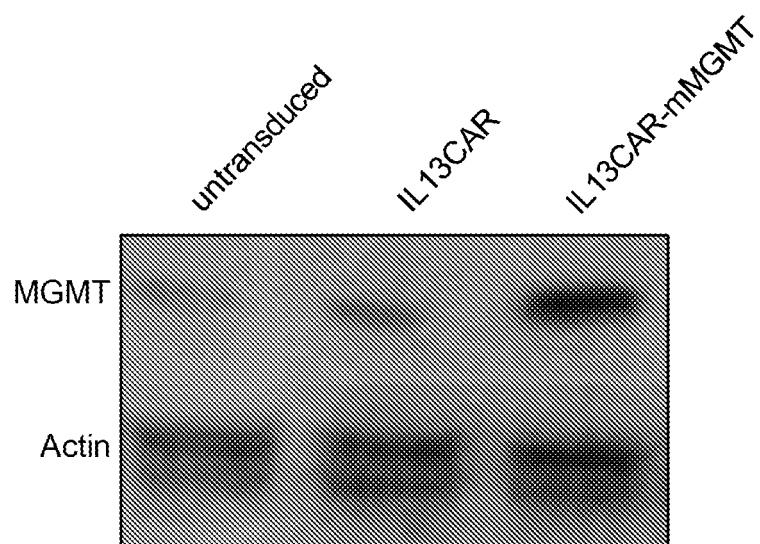


FIG. 3A

**FIG. 3B****FIG. 3C**

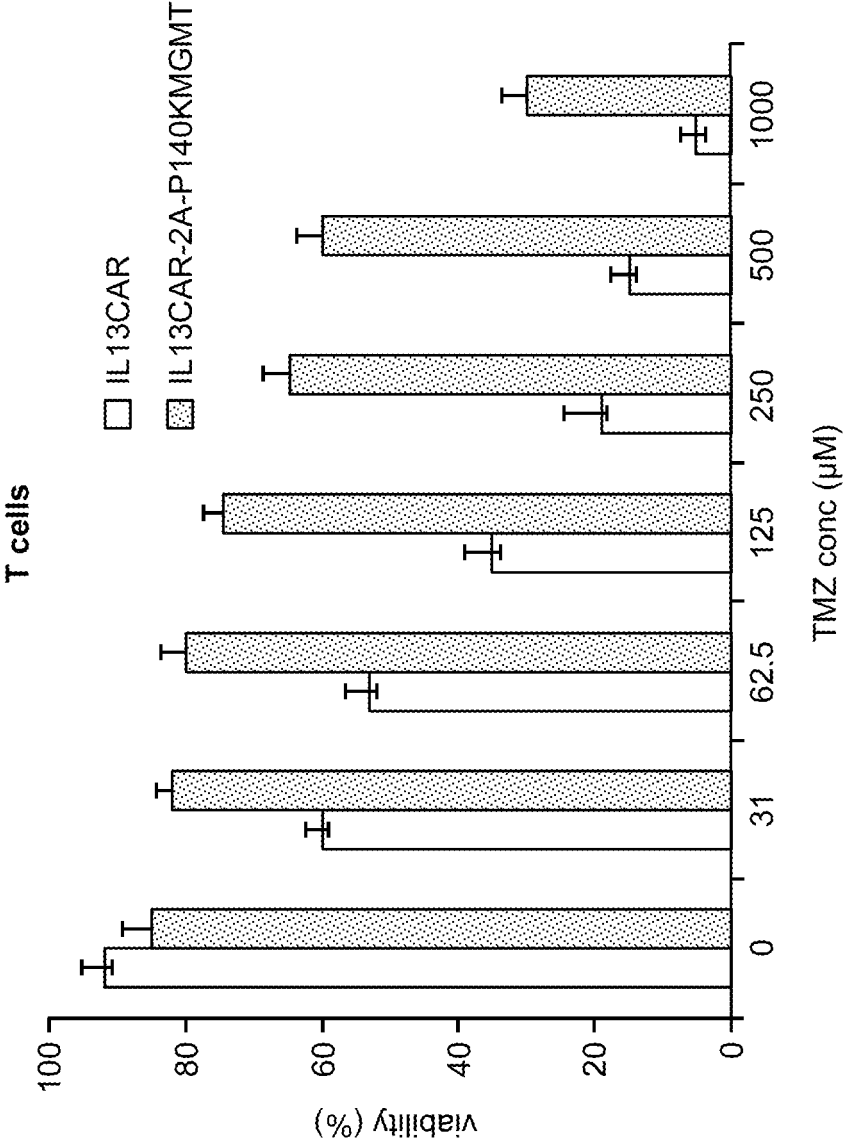


FIG. 4

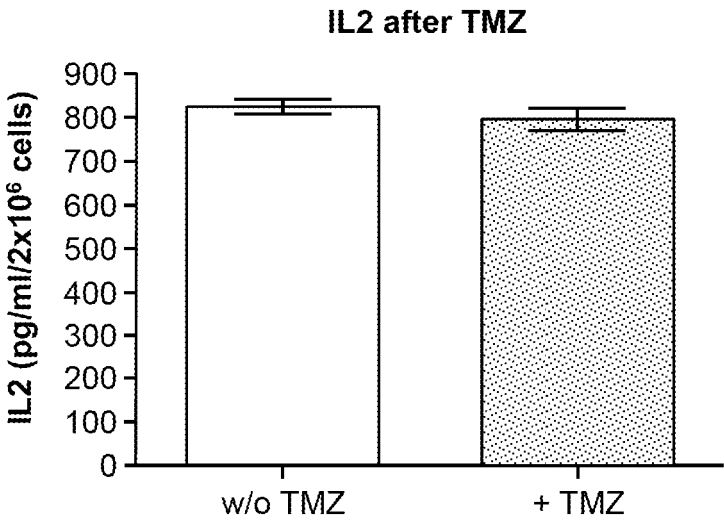


FIG. 5A

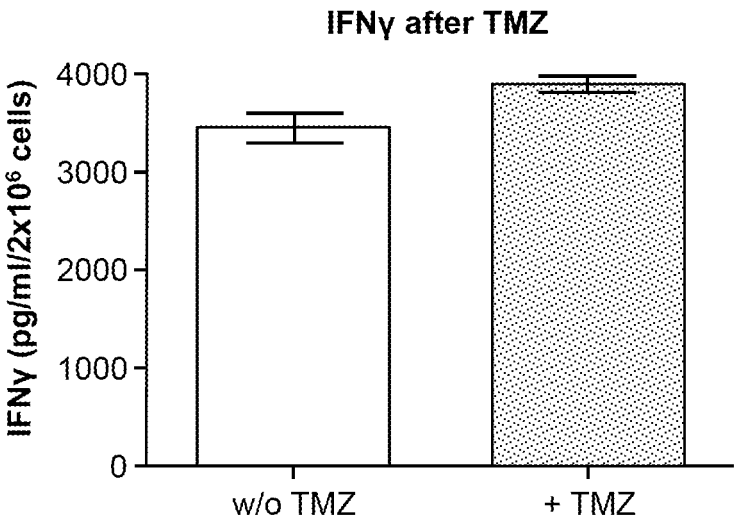


FIG. 5B

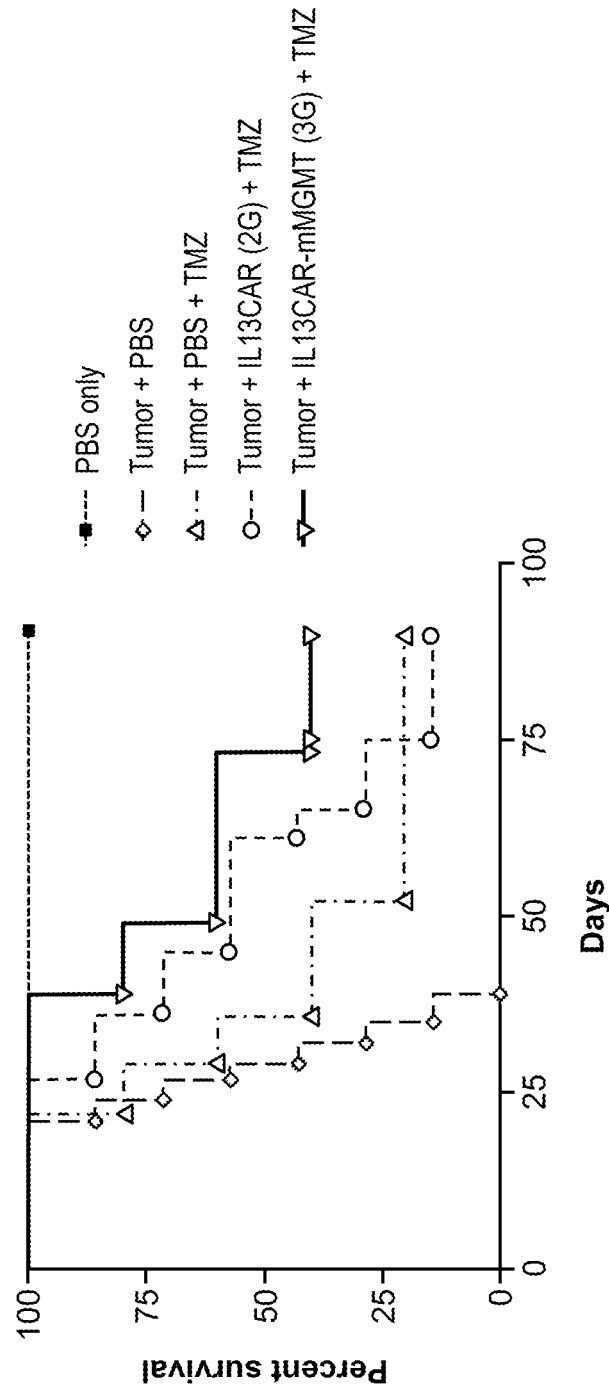


FIG. 6

DNA Sequence of IL13CAR-P140KMGMT SEQ ID NO:1

GGA TCC	GCC ACC	ATG	CAT CCG CTC CTC AAT CCT CTC CTG TTG GCA	Signal					
CTG GGC CTC ATG GCG CTT	TTG TTG ACC ACG GTC ATT GCT CTC ACT								
TGC CTT GGC GGC TTT GCC	TCC CCA GGC CCT GTG CCT CCC TCT ACA								
GCC CTC AGG GAG CTC ATT GAG GAG CTG GTC AAC ATC ACC CAG AAC	IL13(WT)								
CAG AAG GCT CCG CTC TGC AAT GGC AGC ATG GTA TGG AGC ATC AAC									
CTG ACA GCT GGC ATG TAC TGT GCA GCC CTG GAA TCC CTG ATC AAC									
GTG TCA GGC TGC AGT GCC ATC GAG AAG ACC CAG AGG ATG CTG AGC									
GGA TTC TGC CCG CAC AAG GTC TCA GCT GGG CAG TTT TCC AGC TTG									
CAT GTC CGA GAC ACC AAA ATC GAG GTG GCC CAG TTT GTA AAG GAC									
CTG CTC TTA CAT TTA AAG AAA CTT TTT CGC GAG GGA CAG TTC AAC									
CCT AGG	AAG CCC ACC ACG ACG CCA GCG CCG CGA CCA CCA ACA CCG GCG	Hinge							
CCC ACC ATC GCG TCG CAG CCC CTG TCC CTG CGC CCA GAG GCG TGC CGG									
CCA GCG GCG GGG GGC GCA GTG CAC ACG AGG GGG CTG GAC TTC GCC									
CAA TTG	CTC TGC TAC CTG CTG GAT GGA ATC CTC TTC ATC TAT GGT GTC	TM							
ATT CTC ACT GCC TTG TTC CTG AGA GTG	GTT AAC								
AAG AGG AGC AGG CTC CTG CAC AGT GAC TAC ATG AAC ATG ACT CCC CGC	CD28								
CGC CCC GGG CCC ACC CGC					AAG CAT TAC CAG CCC TAT GCC CCA CCA CGC				
GAC TTC GCA GCC TAT CGC					TCC ACG				
CGT AAG TTC AGC AGG AGC GCA GAC									
GCC CCC GCG TAC CAG CAG GGC CAG AAC CAG CTC TAT AAC GAG CTC AAT									
CTA GGA CGA AGA GAG GAG TAC GAT GTT TTG GAC AAG AGA CGT GGC CGG									
GAC CCT GAG ATG GGG GGA AAG CCG AGA AGG AAG AAC CCT CAG GAA GGC									
CTG TAC AAT GAA CTG CAG AAA GAT AAG ATG GCG GAG GCC TAC AGT GAG	CD3ζ								
ATT GGG ATG AAA GGC GAG CGC CGG AGG GGC AAG GGG CAC GAT GGC CTT									
TAC CAG GGT CTC AGT ACA GCC ACC AAG GAC ACC TAC GAC GCC CTT CAC									
ATG CAG GCC CTG CCC CCT CGC					TAA	CAG CCA	GCG GCC GC	A	
GGA AGT CTT CTA ACA TGC GGT GAC GTG GAG GAG AAT CCC GGC CCT					CCA				
TGG					ATG	GAC AAA GAT TGC GAG ATG AAG CGG ACC ACA CTG GAC TCC CCC	P140K MGMT		
CTG GGC AAA CTG GAG CTG TCT GGC TGT GAA CAG GGG CTG CAC GAG ATC									
AAA CTG CTG GGA AAG GGC ACT AGC GCC GCT GAT GCT GTG GAA GTG CCA									
GCT CCA GCT GCT GTG CTG GGA GGA CCT GAG CCA CTG ATG CAG TGC ACC									
GCC TGG CTG AAC GCT TAC TTC CAT CAG CCT GAA GCC ATC GAG GAA TTT									
CCC GTG CCT GCC CTG CAC CAT CCA GTG TTC CAG CAG GAG AGT TTT ACA									
AGG CAG GTG CTG TGG AAG CTG CTG AAA GTG GTG AAG TTC GGG GAA GTG									
ATT TCC TAC CAG CAG CTG GCT GCT CTG GCT GGA AAC CCA AAA GCT GCT									
CGG GCC GTG GGA GGA GCT ATG AGA GGC AAT CCA GTG	AAA	ATC CTG ATT							
CCC TGC CAC AGG GTG GTG TGT AGC TCC GGA GCT GTG GGG AAC TAT TCT									
GGG GGA CTG GCC GTG AAA GAA TGG CTG CTG GCT CAC GAG GGA CAT AGG									
CTG GGA AAG CCT GGC CTG GGA GGG TCT AGT GGA CTG GCT GGA GCT TGG									
CTG AAG GGA GCT GGA GCT ACC TCA GGA AGC CCA CCT GCC GGC CGG AAT									
TGA	CGG CCG								

FIG. 7A

Peptide Sequence of IL13CAR-P140KMGMT SEQ ID NO:4

MHPLLNP LLLALGLMALLLT TVIALTCLGGFA	SPGPVPPSTALRELIEELVNITQNQKAPL	IL13
CNGSMVWSINLTAGMYCAALES LINVSGCSAIEKTQRMLSGFCPHKVSAGQFSSLHVR		
DTKIEVAQFVKDLLLHLKKLFREGQFN	PRKPTTTPAPRPPTPAPTIASQPLSLRPEAC	Hinge
RPAAGGAVHTRGLDFA	QLLCYLLDGILFIYGVILTALFLRV	TM/CD28
VNFWVRSKRSRLLHSDYM		
NMTPRRPGPTRKHYQPYAPPRDFAAYRS	TRKFSRSADAPAYQQGQNQLYNELNLGR	CD3ζ
REEYDVLDKRRGRDPEMGGKPRRKNPQEGLYNELQDKMAEAYSEIGMKGERRRGK		
GHDGLYQGLSTATKDTYDALHMQALPPR	STOPQPIAAAEGRGSLT CGDVEENPGP	A2
M		
DKDCEMKRTTLDSP LGKLELSGCEQGLHEIKLLGKGTSAADAVEVPAPAAVLGGPEPL		P140K
MQCTAWLNAYFHQPEAIEEFVPALHHPVFQQESFTRQVLWLLKVKFGEVISYQQL		MGMT
AALAGNPKAARAVGGAMRGNPV	KILIPCHRVVCSSGAVGNYSGLAVKEWLLAHEGH	
RLGKPGLGGSSGLAGAWLKGAGATSGSPAGRN	STOP	

FIG. 7B

DNA Sequence of IL13 (E13Y) CAR-P140KMGMT SEQ ID NO:2

GGA TCC	GCC ACC	ATG	CAT CCG CTC CTC AAT CCT CTC CTG TTG GCA	Signal									
CTG GGC CTC ATG GCG CTT TTG TTG ACC ACG GTC ATT GCT CTC ACT													
TGC CTT GGC GGC TTT GCC	TCC CCA GGC CCT GTG CCT CCC TCT ACA												
GCC CTC AGG TAC CTC ATT GAG GAG CTG GTC AAC ATC ACC CAG AAC	IL13(E13y)		CAG AAG GCT CCG CTC TGC AAT GGC AGC ATG GTA TGG AGC ATC AAC										
CTG ACA GCT GGC ATG TAC TGT GCA GCC CTG GAA TCC CTG ATC AAC			GTG TCA GGC TGC AGT GCC ATC GAG AAG ACC CAG AGG ATG CTG AGC										
GGA TTC TGC CCG CAC AAG GTC TCA GCT GGG CAG TTT TCC AGC TTG			CAT GTC CGA GAC ACC AAA ATC GAG GTG GCC CAG TTT GTA AAG GAC										
CTG CTC TTA CAT TTA AAG AAA CTT TTT CGC GAG GGA CAG TTC AAC													
CCT AGG			AAG CCC ACC ACG ACG CCA GCG CCG CGA CCA CCA ACA CCG GCG										
CCC ACC ATC GCG TCG CAG CCC CTG TCC CTG CGC CCA GAG GCG TGC CGG	Hinge		CCA GCG GCG GGG GGC GCA GTG CAC ACG AGG GGG CTG GAC TTC GCC										
CAA TTG			CTC TGC TAC CTG CTG GAT GGA ATC CTC TTC ATC TAT GGT GTC										
ATT CTC ACT GCC TTG TTC CTG AGA GTG	GTT AAC	TTC TGG GTG AGG AGT	CD28										
AAG AGG AGC AGG CTC CTG CAC AGT GAC TAC ATG AAC ATG ACT CCC CGC													
CGC CCC GGG CCC ACC CGC AAG CAT TAC CAG CCC TAT GCC CCA CCA CGC	TCC ACG	CGT AAG TTC AGC AGG AGC GCA GAC		CD3ζ									
GAC TTC GCA GCC TAT CGC													
GCC CCC GCG TAC CAG CAG GGC CAG AAC CAG CTC TAT AAC GAG CTC AAT													
CTA GGA CGA AGA GAG GAG TAC GAT GTT TTG GAC AAG AGA CGT GGC CGG													
GAC CCT GAG ATG GGG GGA AAG CCG AGA AGG AAG AAC CCT CAG GAA GGC													
CTG TAC AAT GAA CTG CAG AAA GAT AAG ATG GCG GAG GCC TAC AGT GAG													
ATT GGG ATG AAA GGC GAG CGC CGG AGG GGC AAG GGG CAC GAT GGC CTT													
TAC CAG GGT CTC AGT ACA GCC ACC AAG GAC ACC TAC GAC GCC CTT CAC	TAA	CAG CCA	GCG GCC GC	A	GAG GGC AGA	A2							
ATG CAG GCC CTG CCC CCT CGC													
GGA AGT CTT CTA ACA TGC GGT GAC GTG GAG GAG AAT CCC GGC CCT	CCA	P140K MGMT											
TGG	ATG		GAC AAA GAT TGC GAG ATG AAG CGG ACC ACA CTG GAC TCC CCC										
CTG GGC AAA CTG GAG CTG TCT GGC TGT GAA CAG GGG CTG CAC GAG ATC													
AAA CTG CTG GGA AAG GGC ACT AGC GCC GCT GAT GCT GTG GAA GTG CCA													
GCT CCA GCT GCT GTG CTG GGA GGA CCT GAG CCA CTG ATG CAG TGC ACC													
GCC TGG CTG AAC GCT TAC TTC CAT CAG CCT GAA GCC ATC GAG GAA TTT													
CCC GTG CCT GCC CTG CAC CAT CCA GTG TTC CAG CAG GAG AGT TTT ACA													
AGG CAG GTG CTG TGG AAG CTG CTG AAA GTG GTG AAG TTC GGG GAA GTG													
ATT TCC TAC CAG CAG CTG GCT GCT CTG GCT GGA AAC CCA AAA GCT GCT													
CGG GCC GTG GGA GGA GCT ATG AGA GGC AAT CCA GTG								AAA	ATC CTG ATT				
CCC TGC CAC AGG GTG GTG TGT AGC TCC GGA GCT GTG GGG AAC TAT TCT													
GGG GGA CTG GCC GTG AAA GAA TGG CTG CTG GCT CAC GAG GGA CAT AGG													
CTG GGA AAG CCT GGC CTG GGA GGG TCT AGT GGA CTG GCT GGA GCT TGG													
CTG AAG GGA GCT GGA GCT ACC TCA GGA AGC CCA CCT GCC GGC CGG AAT													
TGA													

FIG. 8A

Peptide Sequence of IL13 (E13Y) CAR-P140KMGMT SEQ ID NO:5

MHPLLNP LLLALGLMALLTTVIALTCLGGFA	SPGPVPPSTALRYLIEELVNITQNQKAPL	IL13			
CNGSMVWSINLTAGMYCAALESINVSGCSAIEKTQRM LSGFCPHKVSAGQFSSLHVR		(E13y)			
DTKIEVAQFVKDLLHLKKLFREGQFN	PRKPTTTPAPRPPTPAPTIASQPLSLRPEAC	Hinge			
RPAAGGAVHTRGLDFA	QLLCYLLDGILFIYGVILTALFLRV	VMFWVRSKRSRLLHSDYM	TM/CD28		
NMTPRRPGPTRKHYQPYAPPRDFAAYRS	TRKFSRSADAPAYQQGQNQLYNELNLGR		CD3ζ		
REEYDVLDKRRGRDPEMGGKPRRKNPQEGLYNELQKDKMAEAYSEIGMKGERRRGK					
GHDGLYQGLSTATKDTYDALHMQALPPR	STOP	QPAAA	EGRGSLLTCGDVEENPGP	M	A2
DKDCMKRTTLDSP LGKLELSGCEQGLHEIKLLGKGTSAADAVEVPAPAAVLGGPEPL					
MQCTAWLNAYFHQPEAIEEFPVPALHHPVFQQESFTRQVLWKLLKVVKFGEVISYQQL					P140K
AALAGNPKAARAVGGAMRGNPV	K	ILIPCHRVCSSGAVGNYSGLAVKEWLLAHEGH			MGMT
RLGKPG LGGSSGLAGAWLKGAGATSGSPAGRN	STOP				

FIG. 8B

DNA Sequence of IL13 (E13K.R109K) CAR-P140KMGMT SEQ ID NO:3

GGA TCC	GCC ACC	ATG	CAT CCG CTC CTC AAT CCT CTC CTG TTG GCA	Signal		
CTG GGC CTC ATG GCG CTT TTG TTG ACC ACG GTC ATT GCT CTC ACT						
TGC CTT GGC GGC TTT GCC	TCC CCA GGC CCT GTG CCT CCC TCT ACA					
GCC CTC AGG AAG CTC ATT GAG GAG CTG GTC AAC ATC ACC CAG AAC				IL13 (E13K R109K)		
CAG AAG GCT CCG CTC TGC AAT GGC AGC ATG GTA TGG AGC ATC AAC						
CTG ACA GCT GGC ATG TAC TGT GCA GCC CTG GAA TCC CTG ATC AAC						
GTG TCA GGC TGC AGT GCC ATC GAG AAG ACC CAG AGG ATG CTG AGC						
GGA TTC TGC CCG CAC AAG GTC TCA GCT GGG CAG TTT TCC AGC TTG						
CAT GTC CGA GAC ACC AAA ATC GAG GTG GCC CAG TTT GTA AAG GAC						
CTG CTC TTA CAT TTA AAG AAA CTT TTT AAG GAG GGA CAG TTC AAC						
CCT AGG	AAG CCC ACC ACG ACG CCA GCG CCG CGA CCA CCA ACA CCG GCG			Hinge		
CCC ACC ATC GCG TCG CAG CCC CTG TCC CTG CGC CCA GAG GCG TGC CGG						
CCA GCG GCG GGG GGC GCA GTG CAC ACG AGG GGG CTG GAC TTC GCC						
CAA TTG	CTC TGC TAC CTG CTG GAT GGA ATC CTC TTC ATC TAT GGT GTC			TM		
ATT CTC ACT GCC TTG TTC CTG AGA GTG	GTT AAC	TTC TGG GTG AGG AGT		CD28		
AAG AGG AGC AGG CTC CTG CAC AGT GAC TAC ATG AAC ATG ACT CCC CGC						
CGC CCC GGG CCC ACC CGC AAG CAT TAC CAG CCC TAT GCC CCA CCA CGC						
GAC TTC GCA GCC TAT CGC	TCC ACG	CGT AAG TTC AGC AGG AGC GCA GAC		CD3ζ		
GCC CCC GCG TAC CAG CAG GGC CAG AAC CAG CTC TAT AAC GAG CTC AAT						
CTA GGA CGA AGA GAG GAG TAC GAT GTT TTG GAC AAG AGA CGT GGC CGG						
GAC CCT GAG ATG GGG GGA AAG CCG AGA AGG AAG AAC CCT CAG GAA GGC						
CTG TAC AAT GAA CTG CAG AAA GAT AAG ATG GCG GAG GCC TAC AGT GAG						
ATT GGG ATG AAA GGC GAG CGC CGG AGG GGC AAG GGG CAC GAT GGC CTT						
TAC CAG GGT CTC AGT ACA GCC ACC AAG GAC ACC TAC GAC GCC CTT CAC						
ATG CAG GCC CTG CCC CCT CGC	TAA	CAG CCA	GCG GCC GC	A	GAG GGC AGA	A2
GGA AGT CTT CTA ACA TGC GGT GAC GTG GAG GAG AAT CCC GGC CCT	CCA					
TGG	ATG	GAC AAA GAT TGC GAG ATG AAG CGG ACC ACA CTG GAC TCC CCC				P140K MGMT
CTG GGC AAA CTG GAG CTG TCT GGC TGT GAA CAG GGG CTG CAC GAG ATC						
AAA CTG CTG GGA AAG GGC ACT AGC GCC GCT GAT GCT GTG GAA GTG CCA						
GCT CCA GCT GCT GTG CTG GGA GGA CCT GAG CCA CTG ATG CAG TGC ACC						
GCC TGG CTG AAC GCT TAC TTC CAT CAG CCT GAA GCC ATC GAG GAA TTT						
CCC GTG CCT GCC CTG CAC CAT CCA GTG TTC CAG CAG GAG AGT TTT ACA						
AGG CAG GTG CTG TGG AAG CTG CTG AAA GTG GTG AAG TTC GGG GAA GTG						
ATT TCC TAC CAG CAG CTG GCT GCT CTG GCT GGA AAC CCA AAA GCT GCT						
CGG GCC GTG GGA GGA GCT ATG AGA GGC AAT CCA GTG	AAA	ATC CTG ATT				
CCC TGC CAC AGG GTG GTG TGT AGC TCC GGA GCT GTG GGG AAC TAT TCT						
GGG GGA CTG GCC GTG AAA GAA TGG CTG CTG GCT CAC GAG GGA CAT AGG						
CTG GGA AAG CCT GGC CTG GGA GGG TCT AGT GGA CTG GCT GGA GCT TGG						
CTG AAG GGA GCT GGA GCT ACC TCA GGA AGC CCA CCT GCC GGC CGG AAT						
TGA	CGG CCG					

FIG. 9A

Peptide Sequence of IL13 (E13K.R109K) CAR-P140KMGMT SEQ ID NO:6

MHPLLNPLLLALGLMALLTTVIALTCLGGFA	SPGPVPPSTALRKLEELVNITQNQKAPL	IL13
CNGSMVWSINLTAGMYCAALESINVS	GCSAIEKTQRM	(E13K R109K)
DTKIEVAQFVKDLLLHLKKLFKEGQFN	PR	Hinge
RPAAGGAVHTRGLDFA	QL	TM/CD28
LCYLLDGILFIYGVILTALFLRV	VN	
NMTPRRPGPTRKHYPYAPPRDFAAYRS	TR	CD3ζ
REEYDVLDKRRGRDPEMGGKPRRKNPQEGLYNELQKDKMAEAYSEIGMKGERRRGK		
GHDGLYQGLSTATKDTYDALHMQALPPR	STOP	A2
DKDCMKRTTLDSP	LGKLELSGCEQGLHEIKLLGKGTSAADAVEVPAPAAVLGGPEPL	P140K
MQCTAWLNAYFHQPEAIEEFVPALHHPVFQQESFTRQVLWKLLKVVKFGEVISYQQL		MGMT
AALAGNPKAARAVGGAMRGNPV	K	
RLGKPGLGGSSGLAGAWLKGAGATSGSP	PAGRN	
	STOP	

FIG. 9B