Anti-CD22 12C5 VH

V segment: 7-4.1
D segment: 3-3
J segment: JH6b

```
   Q  V  Q  L  V  Q  S  G  S  E  L  K  K  P  G  A  S  V
1  CAG GTG CAG CTG GTG CAA TCT GGG TCT GAG TTG AAG AAG CCT GGG GCC TCA GTG

                                                CDR1
                                              ~~~~~~~~~~~~~~~~~~
   K  V  S  C  K  A  S  G  Y  T  F  T  S  Y  A  M  N  W
55 AAG GTT TCC TGC AAG GCT TCT GGA TAC ACC TTC ACT AGT TAT GCT ATG AAT TGG

                                                   CDR2
                                                 ~~~~~~~~~~~~~~~~~~~~
   V  R  Q  A  P  G  Q  G  L  E  W  M  G  W  I  N  T  N
109 GTG CGA CAG GCC CCT GGA CAA GGG CTT GAG TGG ATG GGA TGG ATC AAC ACC AAC

                    CDR2
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   T  G  N  P  T  Y  A  Q  G  F  T  G  R  F  V  F  S  L
163 ACT GGG AAC CCA ACG TAT GCC CAG GGC TTC ACA GGA CGG TTT GTC TTC TCC TTG

   D  T  S  V  S  T  A  Y  L  Q  I  S  S  L  K  A  E  D
217 GAC ACC TCT GTC AGC ACG GCA TAT CTG CAG ATC AGC AGC CTA AAG GCT GAG GAC

                                          CDR3
                                        ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   T  A  V  Y  Y  C  A  R  L  F  Y  Y  Y  F  G  M  D  V
271 ACT GCC GTG TAT TAC TGT GCT AGG TTA TTC TAC TAC TAC TTC GGT ATG GAC GTC

   W  G  Q  G  T  T  V  T  V  S  S
325 TGG GGC CAA GGG ACC ACG GTC ACC GTC TCC TCA
```

FIGURE 1A

Anti-CD22 12C5 Vλ

V segment: 2b2
J segment: JL2

```
   Q   S   A   L   T   Q   P   A   S   V   S   G   S   P   G   Q   S   I
1 CAG TCT GCC CTG ACT CAG CCT GCC TCC GTG TCT GGG TCT CCT GGA CAG TCG ATC

                                CDR1
                  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   T   I   S   C   T   G   T   S   S   D   V   G   S   Y   N   L   V   S
55 ACC ATC TCC TGC ACT GGA ACC AGC AGT GAT GTT GGG AGT TAT AAC CTT GTC TCC

                                                                CDR2
                                                                ~~~~~~~~~~~
   W   Y   Q   L   H   P   G   K   A   P   K   L   M   I   Y   E   V   S
109 TGG TAC CAA CTG CAC CCA GGC AAA GCC CCC AAA CTC ATG ATT TAT GAG GTC AGT

        CDR2
    ~~~~~~~~~~~~~~~~
   K   R   P   S   G   V   S   N   R   F   S   G   S   R   S   G   N   T
163 AAG CGG CCC TCA GGG GTT TCT AAT CGC TTC TCT GGC TCC AGG TCT GGC AAC ACG

   A   S   L   T   I   S   G   L   Q   A   E   D   E   A   D   Y   Y   C
217 GCC TCC CTG ACA ATC TCT GGG CTC CAG GCT GAG GAC GAG GCT GAT TAT TAC TGC

                CDR3
    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   C   S   Y   A   N   S   S   T   L   V   F   G   G   G   T   K   L   T
271 TGC TCA TAT GCA AAT AGT AGC ACT TTG GTA TTC GGC GGA GGG ACC AAG CTG ACC

   V   L
325 GTC CTA
```

FIGURE 1B

Anti- CD22 19A3 VH
Anti- CD22 CD22.1 VH

V segment: 4-34
D segment: 3-9
J segment: JH4b

```
   Q   V   Q   L   Q   Q   W   G   A   G   L   L   K   P   S   E   T   L
1 CAG GTG CAG CTA CAG CAG TGG GGC GCA GGA CTG TTG AAG CCT TCG GAG ACC CTG

                                                    CDR1
                                                    ~~~~~~~~~~~~~~~~~~~
   S   L   T   C   A   V   Y   G   R   S   F   S   S   Y   Y   W   S   W
55 TCC CTC ACC TGC GCT GTC TAT GGT AGG TCC TTC AGT AGT TAC TAC TGG AGC TGG

                                                        CDR2
                                                        ~~~~~~~~~~~~~~~~~~~
   I   R   Q   P   P   G   K   G   L   E   W   I   G   D   I   N   H   S
109 ATC CGC CAG CCC CCA GGG AAG GGG CTG GAG TGG ATT GGG GAC ATC AAT CAT AGT

                    CDR2
    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   G   S   T   N   Y   N   P   S   L   K   S   R   V   T   I   S   V   D
163 GGA AGC ACC AAC TAC AAC CCG TCC CTC AAG AGT CGA GTC ACC ATA TCA GTA GAC

   T   S   K   N   Q   F   S   L   K   L   S   S   V   T   A   A   D   T
217 ACG TCC AAG AAC CAG TTC TCC CTG AAG CTG AGC TCT GTG ACC GCC GCG GAC ACG

                                        CDR3
                                        ~~~~~~~~~~~~~~~~~~~
```

Anti- CD22 19A3 VK
Anti- CD22 CD22.1 VK
Anti- CD22 CD22.2 VK

V segment: L6
J segment: JK1

```
   E   I   V   L   T   Q   S   P   A   T   L   S   L   S   P   G   E   R
1 GAA ATT GTG TTG ACA CAG TCT CCA GCC ACC CTG TCT TTG TCT CCA GGG GAA AGA

                                CDR1
                    ----------------------------------------
   A   T   L   S   C   R   A   S   Q   S   V   S   S   Y   L   A   W   Y
55 GCC ACC CTC TCC TGC AGG GCC AGT CAG AGT GTT AGC AGC TAC TTA GCC TGG TAC

                                                        CDR2
                                                    ------------------
   Q   Q   K   P   G   Q   A   P   R   L   L   I   Y   D   A   S   N   R
109 CAA CAG AAA CCT GGC CAG GCT CCC AGG CTC CTC ATC TAT GAT GCA TCC AAC AGG

    CDR2
    -------
   A   T   G   I   P   A   R   F   S   G   S   G   S   G   T   D   F   T
163 GCC ACT GGC ATC CCA GCC AGG TTC AGT GGC AGT GGG TCT GGG ACA GAC TTC ACT

                                                                CDR3
                                                                -------
   L   T   I   S   S   L   E   P   E   D   F   A   V   Y   Y   C   Q   Q
217 CTC ACC ATC AGC AGC CTA GAG CCT GAA GAT TTT GCA GTT TAT TAC TGT CAG CAG

            CDR3
    ------------------------
   R   S   N   W   P   T   F   G   Q   G   T   K   V   E   I   K
271 CGT AGC AAC TGG CCT ACG TTC GGC CAA GGG ACC AAG GTG GAA ATC AAA
```

FIGURE 2B

Anti- CD22 CD22.2 VH

V segment: 4-34
D segment: 3-9
J segment: JH4b

```
   Q   V   Q   L   Q   Q   W   G   A   G   L   L   K   P   S   E   T   L
1 CAG GTG CAG CTA CAG CAG TGG GGC GCA GGA CTG TTG AAG CCT TCG GAG ACC CTG

                                                    CDR1
                                                    ~~~~~~~~~~~~~~~~~~
   S   L   T   C   A   V   Y   G   R   S   F   S   S   Y   Y   W   S   W
55 TCC CTC ACC TGC GCT GTC TAT GGT AGG TCC TTC AGT AGT TAC TAC TGG AGC TGG

                                                        CDR2
                                                        ~~~~~~~~~~~~~~~~~~
   I   R   Q   P   P   G   K   G   L   E   W   I   G   D   I   Q   H   S
109 ATC CGC CAG CCC CCA GGG AAG GGG CTG GAG TGG ATT GGG GAC ATC CAA CAT AGT

                CDR2
    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   G   S   T   N   Y   N   P   S   L   K   S   R   V   T   I   S   V   D
163 GGA AGC ACC AAC TAC AAC CCG TCC CTC AAG AGT CGA GTC ACC ATA TCA GTA GAC

   T   S   K   N   Q   F   S   L   K   L   S   S   V   T   A   A   D   T
217 ACG TCC AAG AAC CAG TTC TCC CTG AAG CTG AGC TCT GTG ACC GCC GCG GAC ACG

                                        CDR3
                                        ~~~~~~~~~~~~~~~~~~~
```

Anti-CD22 16F7 VH

V segment: 5-51
D segment: 3-10
J segment: JH3b

```
   E   V   Q   L   V   Q   S   G   A   E   V   K   K   P   G   E   S   L
1 GAG GTG CAG CTG GTG CAG TCT GGA GCA GAG GTG AAA AAG CCC GGG GAG TCT CTG

                                                        CDR1
                                                    ~~~~~~~~~~~~~~~~~~~
   K   I   S   C   K   G   S   G   Y   N   F   T   S   Y   W   I   G   W
55 AAG ATC TCC TGT AAG GGT TCT GGA TAC AAC TTT ACC AGC TAC TGG ATC GGC TGG

                                                            CDR2
                                                    ~~~~~~~~~~~~~~~~~~~
   V   R   Q   M   P   G   K   G   L   E   W   M   G   I   I   Y   P   G
109 GTG CGC CAG ATG CCC GGG AAA GGC CTG GAG TGG ATG GGG ATC ATC TAT CCT GGT

                    CDR2
   ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   D   S   D   T   R   Y   S   P   S   F   Q   G   Q   V   T   I   S   A
163 GAC TCT GAT ACC AGA TAC AGC CCG TCC TTC CAA GGC CAG GTC ACC ATC TCA GCC

   D   K   S   I   S   T   A   Y   L   Q   W   S   S   L   K   A   S   D
217 GAC AAG TCC ATC AGC ACC GCC TAC CTG CAG TGG AGC AGC CTG AAG GCC TCG GAC

                                                CDR3
                                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   T   A   M   Y   Y   C   A   T   P   T   Y   Y   F   G   S   V   A   F
271 ACC GCC ATG TAT TAC TGT GCG ACC CCG ACG TAT TAC TTT GGT TCG GTG GCT TTT

   CDR3
   ~~~~~~~
   D   I   W   G   Q   G   T   M   V   T   V   S   S
325 GAT ATC TGG GGC CAA GGG ACA ATG GTC ACC GTC TCT TCA
```

FIGURE 3A

Anti-CD22 16F7 VK1

V segment: A27
J segment: JK1

```
   E  I  V  L  T  Q  S  P  G  T  L  S  L  S  P  G  E  R
1  GAA ATT GTG TTG ACG CAG TCT CCA GGC ACC CTG TCT TTG TCT CCA GGG GAA AGA

                                CDR1
                     ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   A  T  L  S  C  R  A  S  Q  S  V  S  S  S  Y  L  A  W
55 GCC ACC CTC TCC TGC AGG GCC AGT CAG AGT GTT AGC AGC AGC TAC TTA GCC TGG

                                                        CDR2
                                                        ~~~~~~~~~~~~~~~~
   Y  Q  Q  K  P  G  Q  A  P  R  L  L  I  Y  G  A  S  S
109 TAC CAG CAG AAA CCT GGC CAG GCT CCC AGG CTC CTC ATC TAT GGT GCA TCC AGC

     CDR2
    ~~~~~~~~~~~~
   R  A  T  G  I  P  D  R  F  S  G  S  G  S  G  T  D  F
163 AGG GCC ACT GGC ATC CCA GAC AGG TTC AGT GGC AGT GGG TCT GGG ACA GAC TTC

    CDR3
                                                        ~~~
   T  L  T  I  S  R  L  E  P  E  D  F  A  V  Y  Y  C  Q
217 ACT CTC ACC ATC AGC AGA CTG GAG CCT GAA GAT TTT GCA GTG TAT TAC TGT CAG

                CDR3
    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   Q  Y  G  S  S  P  P  T  F  G  Q  G  T  K  V  E  I  K
271 CAG TAT GGT AGC TCA CCT CCG ACG TTC GGC CAA GGG ACC AAG GTG GAA ATC AAA
```

FIGURE 3B

Anti-CD22 16F7 VK2

V segment: A10
J segment: JK2

```
   E  I  V  L  T  Q  S  P  D  F  Q  S  V  T  P  K  E  K
1  GAA ATT GTG CTG ACT CAG TCT CCA GAC TTT CAG TCT GTG ACT CCA AAG GAG AAA

                              CDR1
                  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   V  T  I  T  C  R  A  S  Q  S  I  G  S  S  L  H  W  Y
55 GTC ACC ATC ACC TGC CGG GCC AGT CAG AGC ATT GGT AGT AGC TTA CAC TGG TAC

                                                   CDR2
                                                   ~~~~~~~~~~~~~~~~~~~
   Q  Q  K  P  D  Q  S  P  K  L  L  I  K  Y  A  S  Q  S
109 CAG CAG AAA CCA GAT CAG TCT CCA AAG CTC CTC ATC AAG TAT GCT TCC CAG TCC

    CDR2
    ~~~~~~~
   F  S  G  V  P  S  R  F  S  G  S  G  S  G  T  D  F  T
163 TTC TCA GGG GTC CCC TCG AGG TTC AGT GGC AGT GGA TCT GGG ACA GAT TTC ACC

                                                      CDR3
                                                      ~~~~~~~
   L  T  I  N  S  L  E  A  E  D  A  A  A  Y  Y  C  H  Q
217 CTC ACC ATC AAT AGC CTG GAA GCT GAA GAT GCT GCA GCG TAT TAC TGT CAT CAG

          CDR3
   ~~~~~~~~~~~~~~~~~~~~~~~~~~~
   S  S  S  L  P  Y  T  F  G  Q  G  T  K  L  E  I  K
271 AGT AGT AGT TTA CCG TAC ACT TTT GGC CAG GGG ACC AAG CTG GAG ATC AAA
```

FIGURE 3C

Anti-CD22 23C6 VH

V segment: 1-69
D segment: 2-15
J segment: JH6b

```
   Q  V  Q  L  V  Q  S  G  A  E  V  K  K  T  G  S  S  V
1  CAG GTC CAG CTG GTG CAG TCT GGG GCT GAG GTG AAA AAG ACT GGG TCC TCG GTG

                                          CDR 1
                                          ~~~~~~~~~~~~~~~~~~~
   K  V  S  C  K  A  S  G  G  T  F  S  S  Y  G  I  N  W
55 AAG GTC TCC TGC AAG GCT TCT GGA GGC ACC TTC AGC AGC TAT GGT ATC AAC TGG

                                                CDR 2
                                                ~~~~~~~~~~~~~~~~~~~
   V  R  Q  A  P  G  Q  G  L  E  W  M  G  E  I  I  P  I
109 GTG CGA CAG GCC CCT GGA CAA GGG CTT GAA TGG ATG GGA GAG ATC ATC CCT ATC

                  CDR 2
   ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   F  G  T  A  N  Y  A  Q  K  F  Q  G  R  V  T  I  T  A
163 TTT GGT ACA GCA AAC TAC GCA CAG AAG TTC CAG GGC AGA GTC ACG ATT ACC GCG

   D  E  S  T  S  T  V  Y  M  E  L  S  S  L  R  A  E  D
217 GAC GAA TCC ACG AGC ACA GTC TAC ATG GAG CTG AGC AGC CTG AGA GCT GAG GAC

                                          CDR 3
                                          ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   T  A  V  Y  Y  C  A  R  D  Q  G  V  V  V  V  A  A  T
271 ACG GCC GTG TAT TAC TGT GCG AGA GAT CAG GGT GTA GTG GTG GTA GCT GCA ACC

            CDR 3
   ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   H  Y  Y  Y  Y  G  M  D  V  W  G  Q  G  T  T  V  T  V
325 CAC TAC TAC TAC TAC GGT ATG GAC GTC TGG GGC CAA GGG ACC ACG GTC ACC GTC

   S  S
379 TCC TCA
```

FIGURE 4A

Anti-CD22 23C6 VK1

V segment: L6
J segment: JK1

```
   E   I   V   L   T   Q   S   P   A   T   L   S   L   S   P   G   E   R
1 GAA ATT GTG TTG ACA CAG TCT CCA GCC ACC CTG TCT TTG TCT CCA GGG GAA AGA

                                CDR 1
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   A   T   L   S   C   R   A   S   Q   S   V   S   S   Y   L   A   W   Y
55 GCC ACC CTC TCC TGC AGG GCC AGT CAG AGT GTT AGC AGC TAC TTA GCC TGG TAC

                                                        CDR 2
                                                    ~~~~~~~~~~~~~~~~~~~
   Q   Q   K   P   G   Q   A   P   R   L   L   I   Y   D   A   S   N   R
109 CAA CAG AAA CCT GGC CAG GCT CCC AGG CTC CTC ATC TAT GAT GCA TCC AAC AGG

    CDR 2
    ~~~~~~~
   A   T   G   I   P   A   R   F   S   G   S   G   S   G   T   D   F   T
163 GCC ACT GGC ATC CCA GCC AGG TTC AGT GGC AGT GGG TCT GGG ACA GAC TTC ACT

                                                                CDR 3
                                                                ~~~~~~~
   L   T   I   S   S   L   E   P   E   D   F   A   V   Y   Y   C   Q   Q
217 CTC ACC ATC AGC AGC CTA GAG CCT GAA GAT TTT GCA GTT TAT TAC TGT CAG CAG

            CDR 3
    ~~~~~~~~~~~~~~~~~~~~~~~~~~~
   R   S   N   W   P   W   T   F   G   Q   G   T   K   V   E   I   K
271 CGT AGC AAC TGG CCG TGG ACG TTC GGC CAA GGG ACC AAG GTG GAA ATC AAA
```

FIGURE 4B

Anti-CD22 23C6 VK2

V segment: L6
J segment: JK1

```
   E   I   V   L   T   Q   S   P   A   T   L   S   L   S   P   G   E   R
1 GAA ATT GTG TTG ACA CAG TCT CCA GCC ACC CTG TCT TTG TCT CCA GGG GAA AGA

                              CDR 1
                  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   A   T   L   S   C   R   A   S   Q   S   V   S   N   F   L   A   W   Y
55 GCC ACC CTC TCC TGC AGG GCC AGT CAG AGT GTT AGC AAC TTC TTA GCC TGG TAC

                                                          CDR 2
                                                  ~~~~~~~~~~~~~~~~~~~~
   Q   Q   K   P   G   Q   A   P   R   L   L   I   Y   D   A   S   N   R
109 CAA CAG AAA CCT GGC CAG GCT CCC AGG CTC CTC ATC TAT GAT GCA TCC AAC AGG

    CDR 2
    ~~~~~~~
   A   T   G   I   P   A   R   F   S   G   S   G   S   G   T   D   F   T
163 GCC ACT GGC ATC CCA GCC AGG TTC AGT GGC AGT GGG TCT GGG ACA GAC TTC ACT

                                                              CDR 3
                                                              ~~~~~~~
   L   T   I   S   S   L   E   P   E   D   F   A   V   Y   Y   C   Q   Q
217 CTC ACC ATC AGC AGC CTA GAG CCT GAA GAT TTT GCA GTT TAT TAC TGT CAG CAG

            CDR 3
    ~~~~~~~~~~~~~~~~~~~~~~~~~~~
   R   S   N   W   P   P   T   F   G   Q   G   T   K   V   E   I   K
271 CGT AGC AAC TGG CCT CCG ACG TTC GGC CAA GGG ACC AAG GTG GAA ATC AAA
```

FIGURE 4C

Anti-CD22 12C5 VH

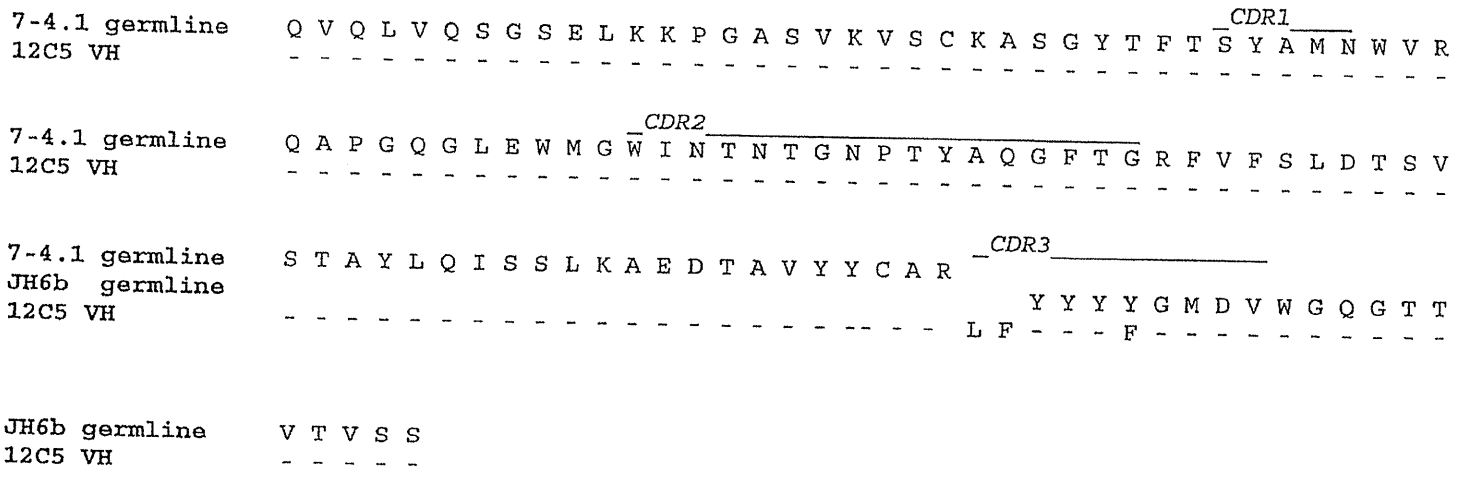


FIGURE 5A

Anti-CD22 12C5 Vλ

																						CDR1							
2b2 germline	Q	S	A	L	T	Q	P	A	S	V	S	G	S	P	G	Q	S	I	T	I	S	C	T	G	T	S	S	D	V	G
12C5 Vλ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
																						CDR2							
2b2 germline	S	Y	N	L	V	S	W	Y	Q	Q	H	P	G	K	A	P	K	L	M	I	Y	E	V	S	K	R	P	S	G	V
12C5 Vλ	-	-	-	-	-	-	-	-	-	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2b2 germline	S	N	R	F	S	G	S	K	S	G	N	T	A	S	L	T	I	S	G	L	Q	A	E	D	E	A	D	Y	Y	C
12C5 Vλ	-	-	-	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CDR3																												
2b2 germline	C	S	Y	A	G	S	S	T																					
JL2 germline									V	V	F	G	G	G	T	K	L	T	V	L									
12C5 Vλ	-	-	-	-	N	-	-	-	L	-	-	-	-	-	-	-	-	-	-	-									

FIGURE 5B

Anti- CD22 19A3 VH
Anti- CD22 CD22.1 VH

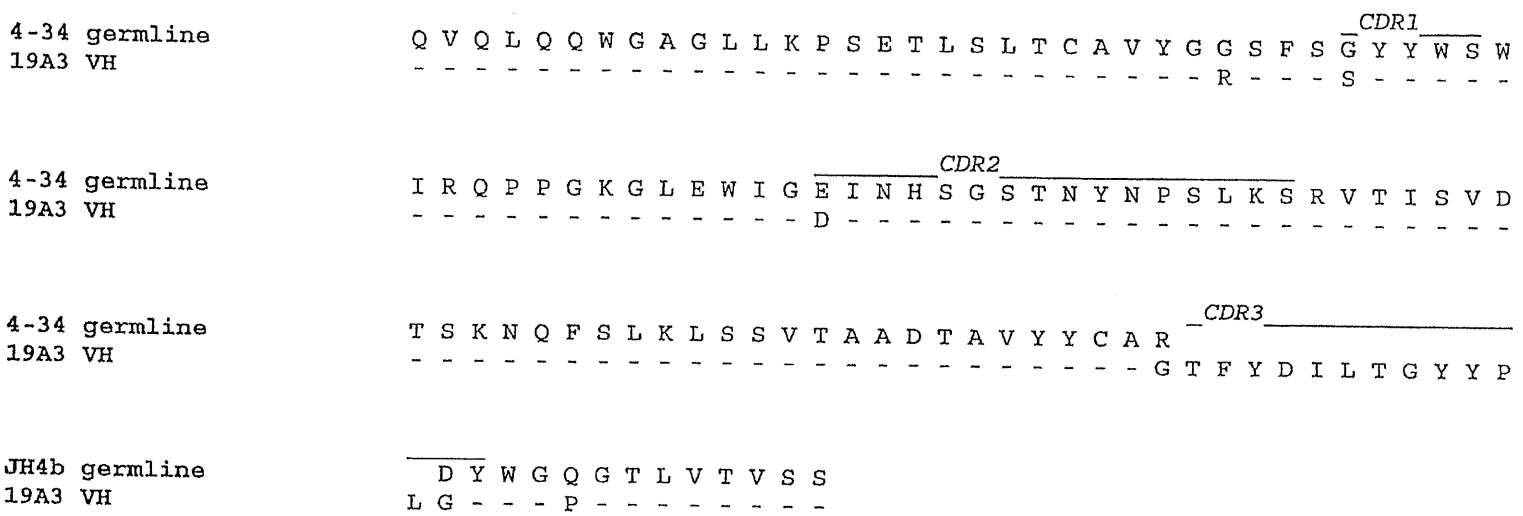


FIGURE 6A

Anti- CD22 19A3 VK
Anti- CD22 CD22.1 VK
Anti- CD22 CD22.2 VK

```
L6    germline                                                  CDR1
                E I V L T Q S P A T L S L S P G E R A T L S C R A S Q S V S S
19A3  VK        - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

                                                          CDR2
L6    germline  Y L A W Y Q Q K P G Q A P R L L I Y D A S N R A T G I P A R F
19A3  VK        - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

                                                                  CDR3
L6    germline  S G S G S G T D F T L T I S S L E P E D F A V Y Y C Q Q R S N
19A3  VK        - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

L6    germline  W P
JK1   germline      T F G Q G T K V E I K
19A3  VK        - - - - - - - - - - - -
```

FIGURE 6B

Anti-CD22 19A3 N57Q VH (CD22.2)

V segment: 4-34
D segment: 3-9
J segment: JH4b

```
4-34 germline      Q V Q L Q Q W G A G L L K P S E T L
CD22.2 VH          - - - - - - - - - - - - - - - - - -

                                        _CDR1____
4-34 germline      S L T C A V Y G G S F S G Y Y W S W
CD22.2 VH          - - - - - - - - R - - - S - - - - -

                                              _CDR2____
4-34 germline      I R Q P P G K G L E W I G E I N H S
CD22.2 VH          - - - - - - - - - - - - - D - Q - -

                   ____CDR2_____________
4-34 germline      G S T N Y N P S L K S R V T I S V D
CD22.2 VH          - - - - - - - - - - - - - - - - - -

4-34 germline      T S K N Q F S L K L S S V T A A D T
CD22.2 VH          - - - - - - - - - - - - - - - - - -

                                  _CDR3_____________
4-34 germline      A V Y Y C A R
CD22.2 VH          - - - - - - G T F Y D I L T G Y Y P

                   _____
JH4b germline        D Y W G Q G T L V T V S S
CD22.2 VH          L G - - - P - - - - - - - -
```

FIGURE 6C

Anti-CD22 16F7 VH

```
                                                
```

Anti-CD22 16F7 VK1

```
                                                
```

Anti-CD22 16F7 VK2

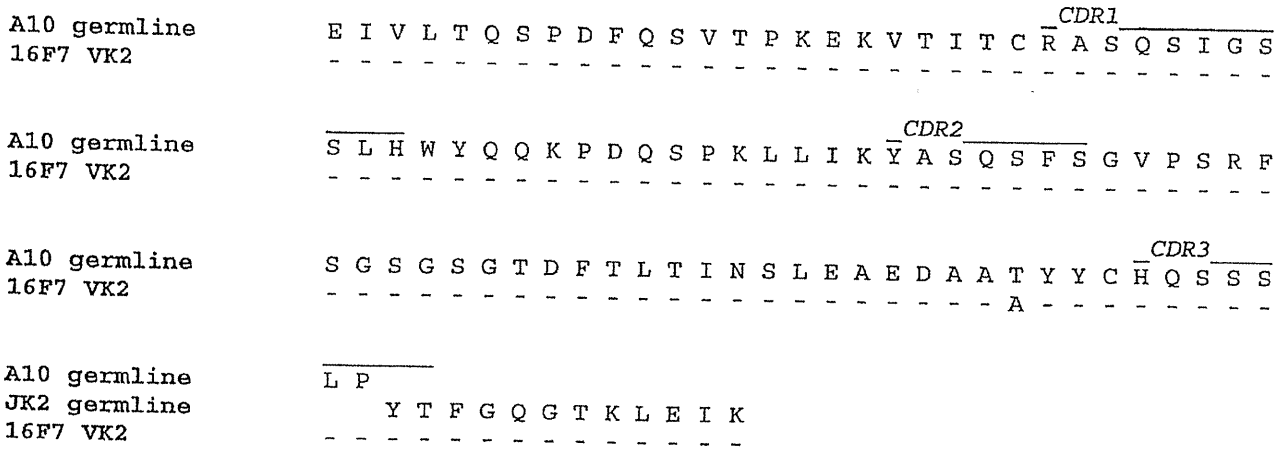


FIGURE 7C

Anti-CD22 23C6 VH

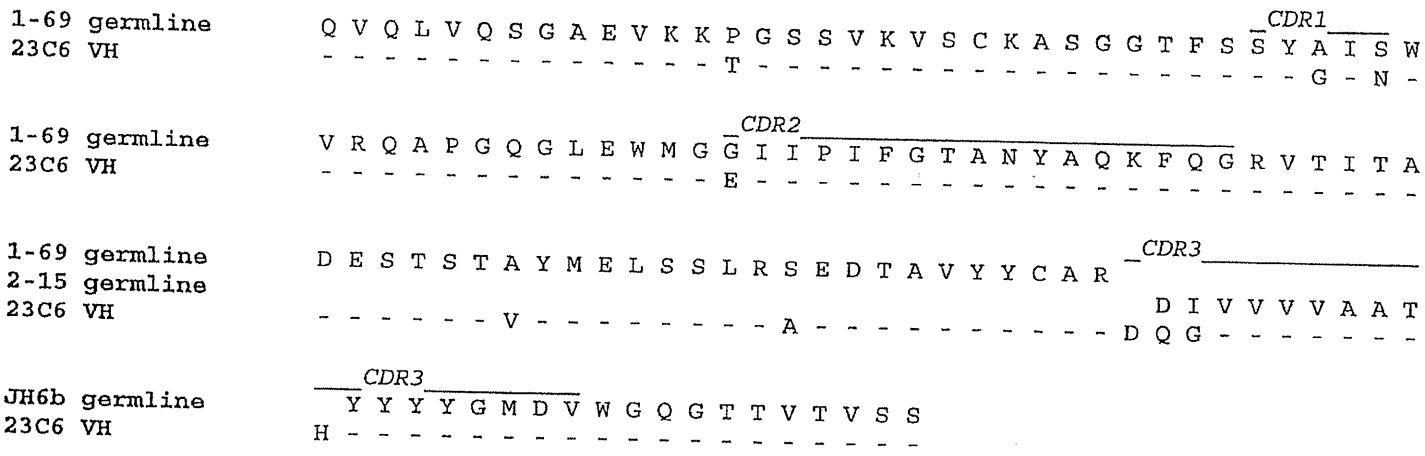


FIGURE 8A

Anti-CD22 23C6 VK1/VK2

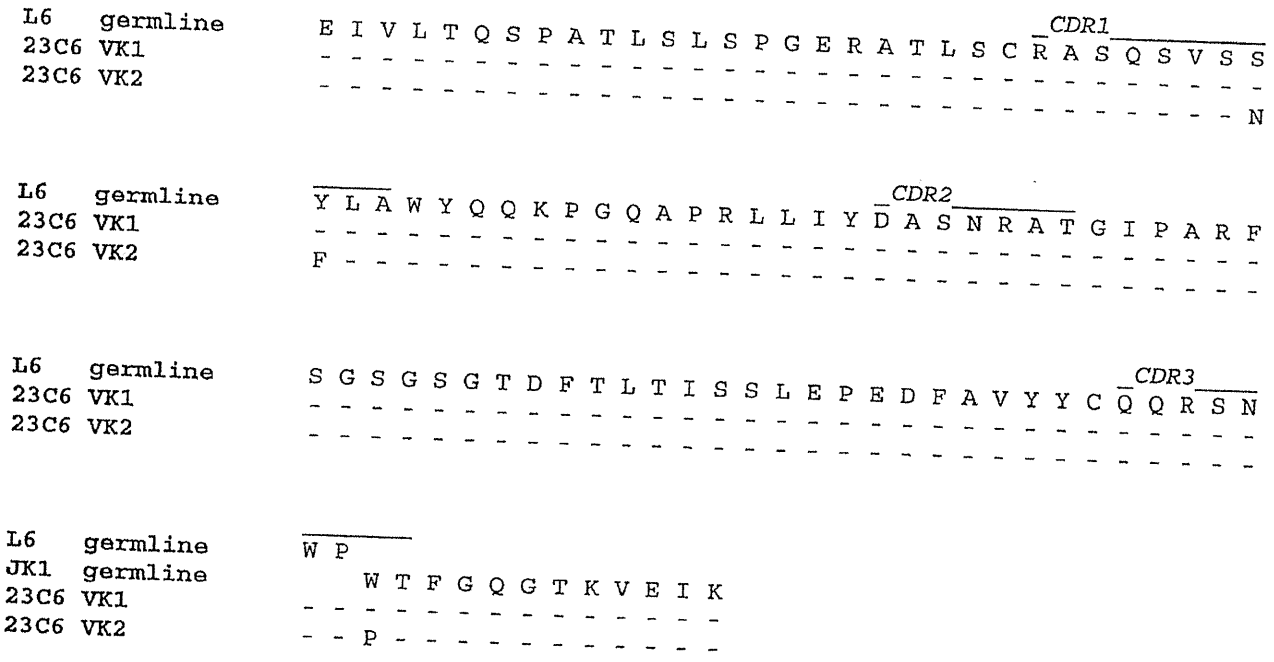


FIGURE 8B

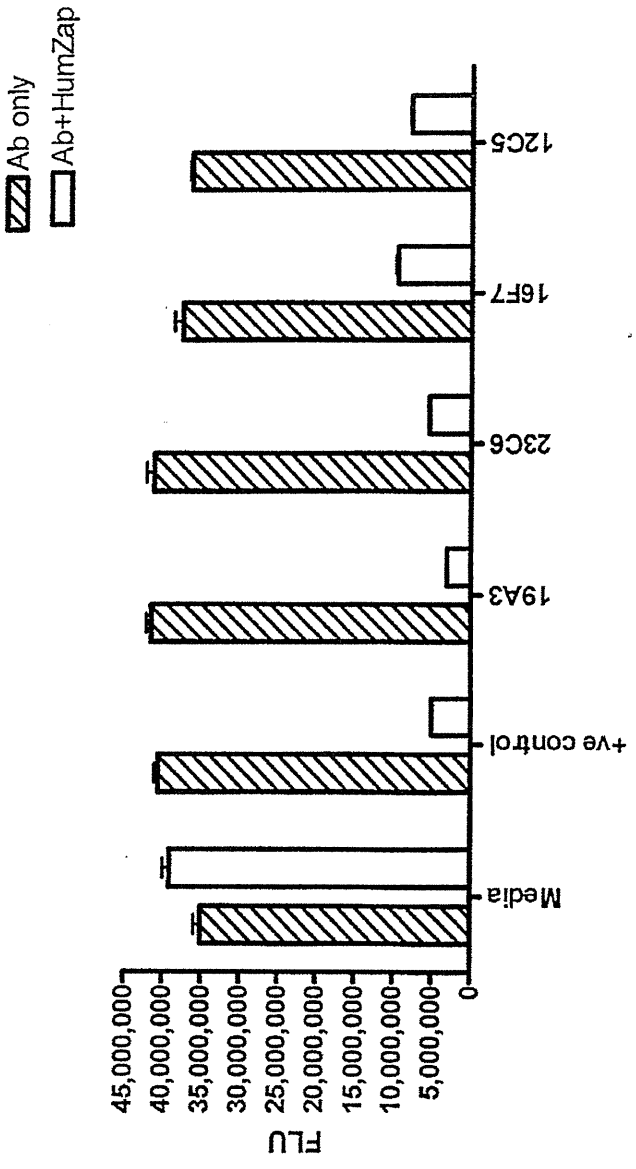

Ab only
Ab+HumZap
FLU
45,000,000
40,000,000
35,000,000
30,000,000
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
Media
+ve control
19A3
23C6
16F7
12C5

FIGURE 9

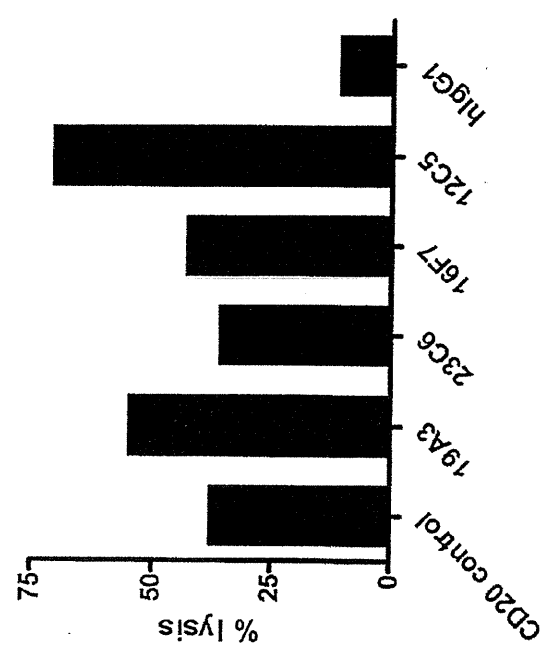


Fig. 10A

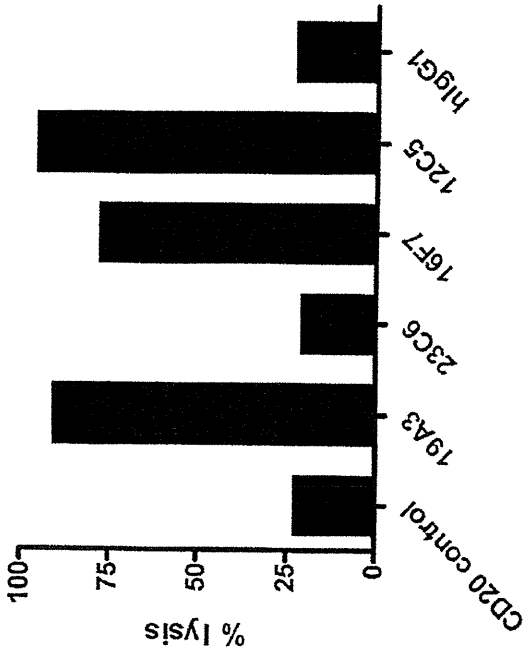


Fig. 10B

FIGURE 11

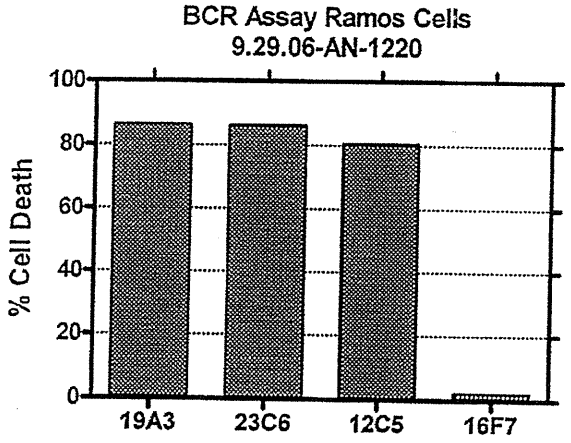

BCR Assay Ramos Cells
9.29.06-AN-1220
% Cell Death
100
80
60
40
20
0
19A3
23C6
12C5
16F7

Figure 12

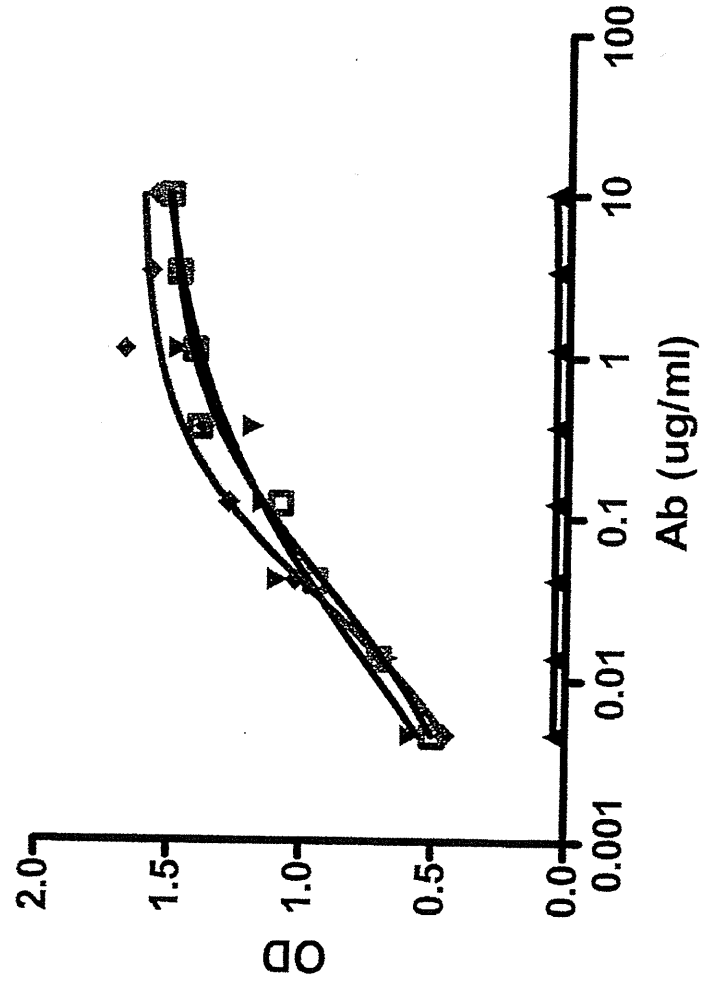

ELISA vs CD22 ECD
HuIgG1
CD22.1.g1f
CD22.2.g1f
19A3
OD
2.0
1.5
1.0
0.5
0.0
0.001
0.01
0.1
1
10
100
Ab (ug/ml)

Figure 13

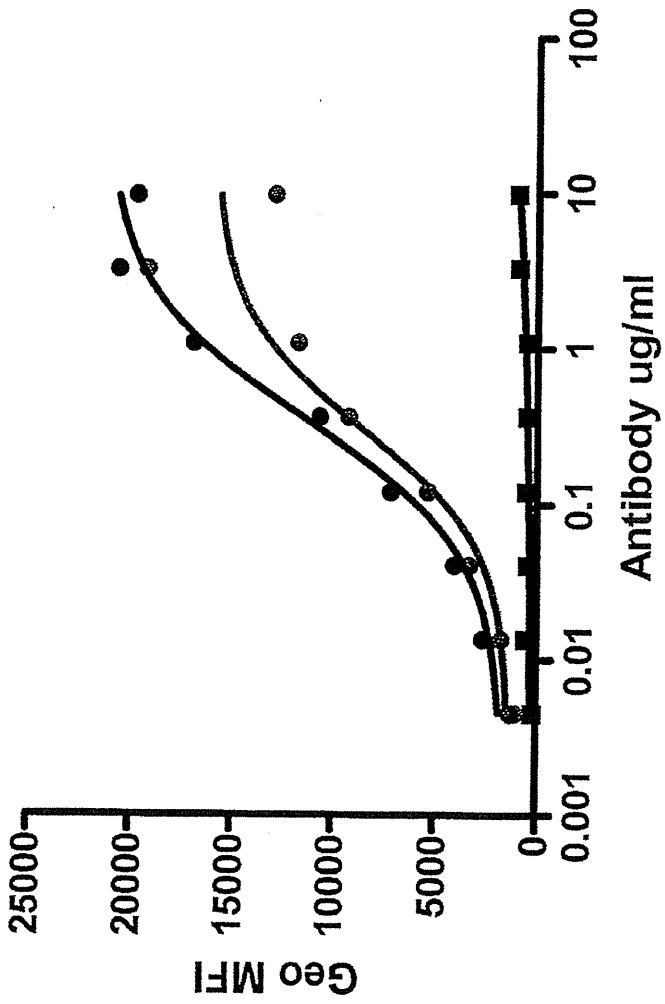
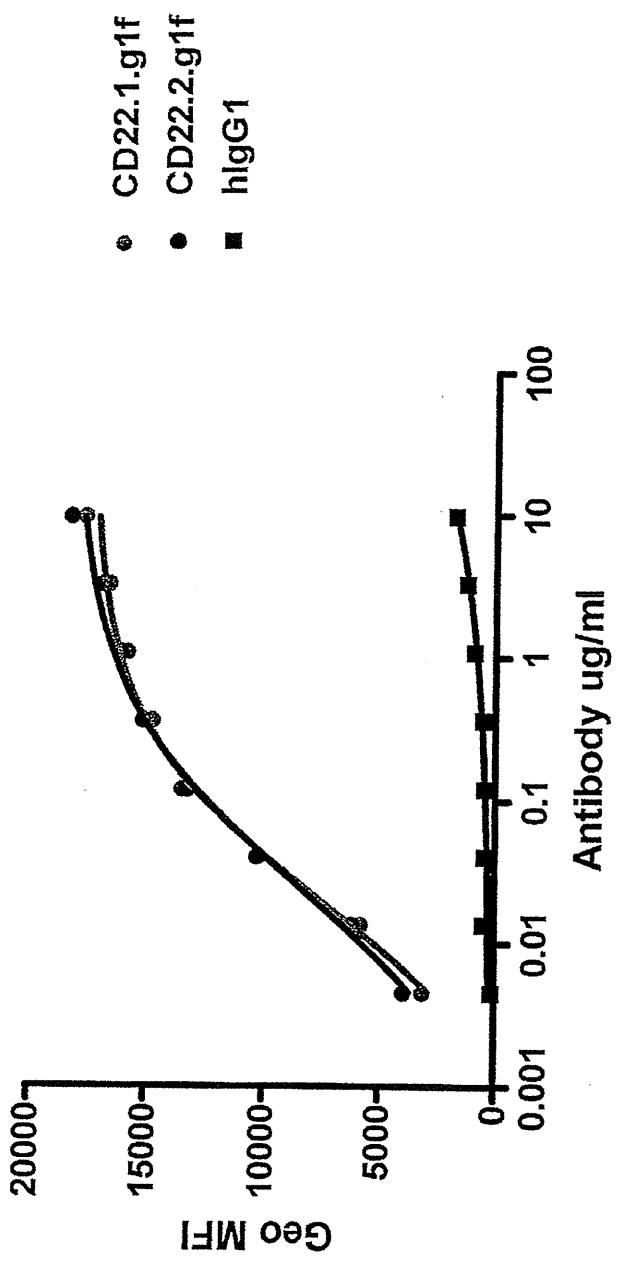

FACS Array: CHO-CD22 cells
CD22.1.g1f
CD22.2.g1f
HulgG1(1)
Geo MFI
25000
20000
15000
10000
5000
0
0.001
0.01
0.1
1
10
100
Antibody ug/ml

Figure 14


FACS Array: Raji cells
CD22.1.g1f
CD22.2.g1f
hIgG1
Geo MFI
20000
15000
10000
5000
0
0.001
0.01
0.1
1
10
100
Antibody ug/ml

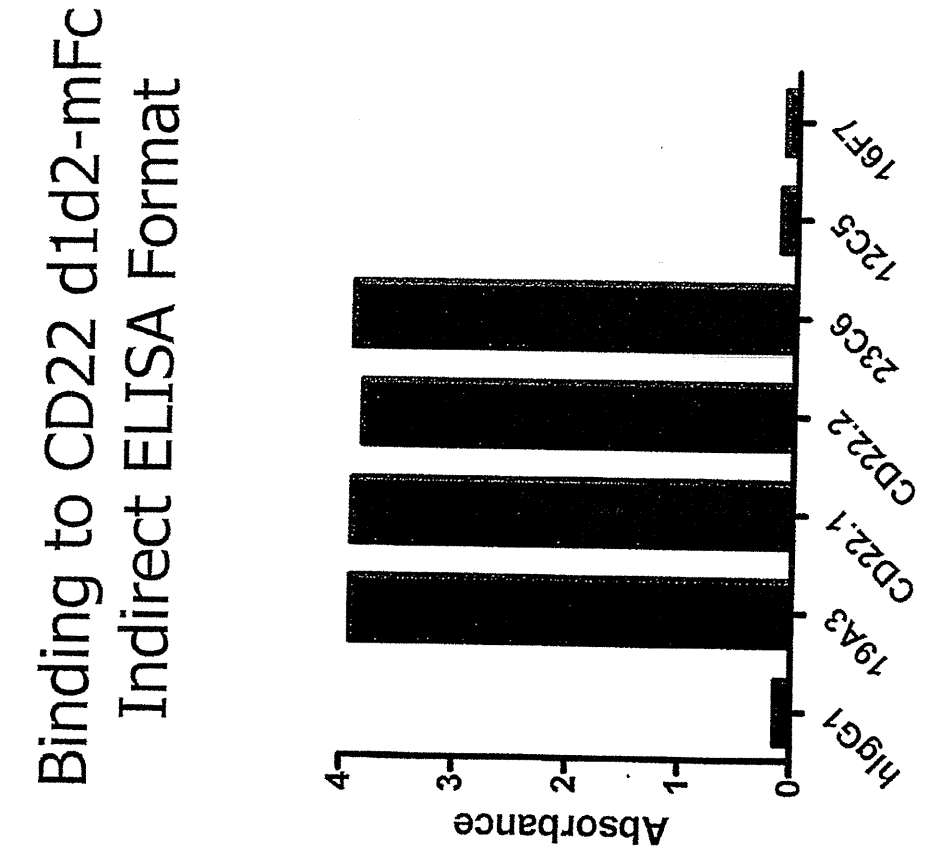
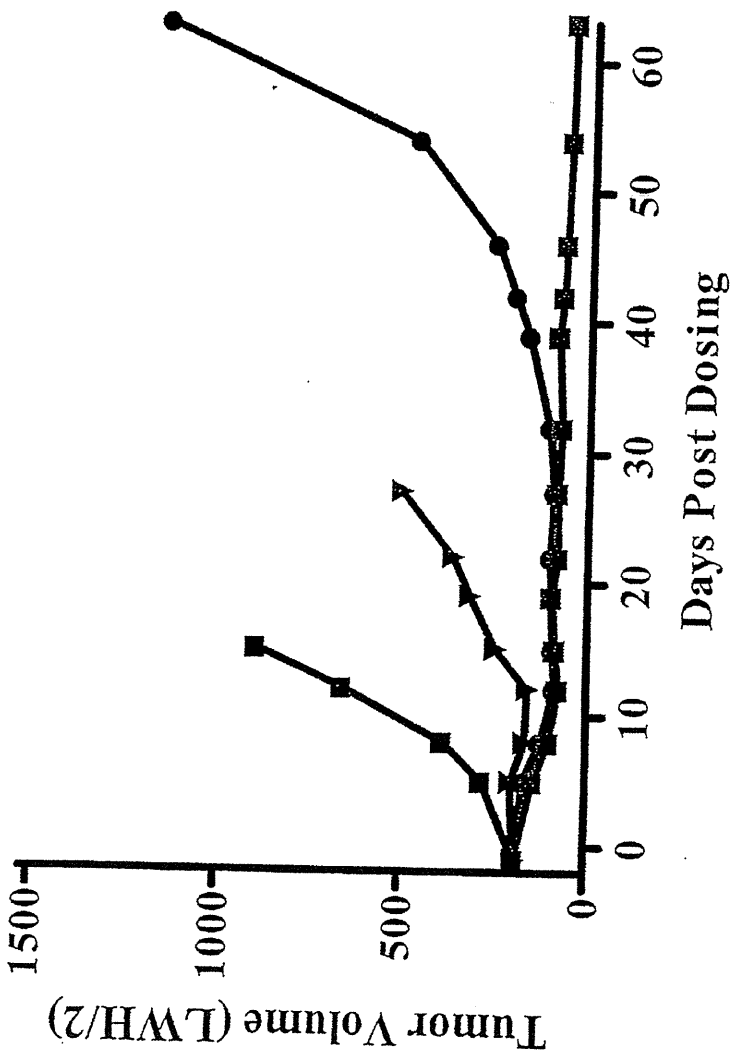

Binding to CD22 d1d2-mFc
Indirect ELISA Format
Absorbance
0
1
2
3
4
hIgG1
19A3
CD22.1
CD22.2
23C6
12C5
16F7

Figure 15

Figure 16


1416-001 Raji Median Tumor Volume
Vehicle
Control ab-Cytotoxin A 0.3
CD22.2-Cytotoxin A 0.3
CD22.1-Cytotoxin A 0.18
Tumor Volume (LWH/2)
1500
1000
500
0
0
10
20
30
40
50
60
Days Post Dosing

Anti-CD22 4G6 VH

V segment: 1-69
D segment: 7-27
J segment: JH4b

```
   Q  V  Q  L  V  Q  S  G  A  E  V  K  K  P  G  S  S  V
1  CAG GTC CAG TTG GTG CAG TCT GGG GCT GAG GTG AAG AAG CCT GGG TCC TCG GTG

                                                CDR1
                                               ~~~~~~~~~~~~~~~~~~
   K  V  S  C  K  P  S  G  D  T  F  S  N  Y  A  I  S  W
55 AAG GTC TCC TGC AAG CCT TCT GGA GAC ACC TTC AGC AAC TAT GCT ATC AGC TGG

                                                     CDR2
                                                    ~~~~~~~~~~~~~~~~~~
   V  R  Q  A  P  G  Q  G  L  E  W  M  G  R  I  I  P  I
109 GTG CGA CAG GCC CCT GGA CAA GGG CTT GAG TGG ATG GGA AGG ATC ATC CCT ATC

                    CDR2
    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   L  G  M  A  I  Y  A  P  K  F  Q  G  R  V  T  I  T  A
163 CTT GGT ATG GCT ATC TAC GCA CCG AAG TTC CAG GGC AGA GTT ACG ATT ACC GCG

   D  K  S  T  N  T  A  F  M  D  L  T  S  L  Y  F  E  D
217 GAC AAA TCC ACG AAC ACA GCC TTC ATG GAT CTT ACC AGC CTG TAT TTT GAG GAC

                                          CDR3
                                         ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   T  A  V  Y  Y  C  A  R  A  P  T  Y  W  G  S  K  D  Y
271 ACG GCC GTG TAT TAC TGT GCG AGA GCC CCA ACT TAC TGG GGA TCG AAG GAC TAC

    CDR3
    ~~~~~~~~~~~~
   F  D  Y  W  G  Q  G  T  L  V  T  V  S  S
325 TTT GAC TAC TGG GGC CAG GGA ACC CTG GTC ACC GTC TCC TCA
```

FIGURE 17A

Anti-CD22 4G6 VK1

V segment: L18
J segment: JK2

```
   A   I   Q   L   T   Q   S   P   S   S   L   S   A   S   V   G   D   R
1 GCC ATC CAG TTG ACC CAG TCT CCA TCC TCC CTG TCT GCA TCT GTA GGA GAC AGA

                                CDR1
                        ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   V   T   I   T   C   R   A   S   Q   D   I   S   S   G   L   A   W   Y
55 GTC ACC ATC ACT TGC CGG GCA AGT CAG GAC ATT AGC AGT GGT TTA GCC TGG TAT

                                                            CDR2
                                                        ~~~~~~~~~~~~~~~~~~
   Q   Q   K   P   G   T   A   P   K   L   L   I   Y   D   A   S   S   L
109 CAG CAG AAA CCA GGG ACA GCT CCT AAG CTC CTG ATC TAT GAT GCC TCC AGT TTG

    CDR2
    ~~~~~~~
   E   S   G   V   P   S   R   F   S   G   S   G   S   G   T   D   F   T
163 GAA AGT GGG GTC CCA TCA AGG TTC AGC GGC AGT GGA TCT GGG ACA GAT TTC ACT

                                                                CDR3
                                                            ~~~~~~~
   L   T   I   S   S   L   Q   P   D   D   F   A   T   Y   Y   C   Q   Q
217 CTC ACC ATC AGC AGC CTG CAG CCT GAC GAT TTT GCA ACT TAT TAC TGT CAA CAG

            CDR3
    ~~~~~~~~~~~~~~~~~~~~~~~~~~~
   F   N   S   F   P   Y   T   F   G   Q   G   T   K   L   E   I   K
271 TTT AAT AGT TTC CCG TAC ACT TTT GGC CAG GGG ACC AAG CTG GAG ATC AAA
```

FIGURE 17B

Anti-CD22 4G6 VK2

V segment: A27
J segment: JK4

```
   E   I   V   L   T   Q   S   P   G   T   L   S   L   S   P   G   E   R
1 GAA ATT GTG TTG ACG CAG TCT CCA GGC ACC CTG TCT TTG TCT CCA GGG GAA AGA

                                CDR1
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   A   T   L   S   C   R   A   S   Q   S   V   S   S   S   Y   L   A   W
55 GCC ACC CTC TCC TGC AGG GCC AGT CAG AGT GTT AGC AGC AGC TAC TTA GCC TGG

                                                            CDR2
                                                        ~~~~~~~~~~~~~~~~
   Y   Q   Q   K   P   G   Q   A   P   R   L   L   I   Y   G   A   S   S
109 TAC CAG CAG AAA CCT GGC CAG GCT CCC AGG CTC CTC ATC TAT GGT GCA TCC AGC

     CDR2
    ~~~~~~~~~~~
   R   A   T   G   I   P   D   R   F   S   G   S   G   S   G   T   D   F
163 AGG GCC ACT GGC ATC CCA GAC AGG TTC AGT GGC AGT GGG TCT GGG ACA GAC TTC

                                                                CDR3
                                                                ~~~~
   T   L   T   I   S   R   L   E   P   E   D   F   A   V   Y   Y   C   Q
217 ACT CTC ACC ATC AGC AGA CTG GAG CCT GAA GAT TTT GCA GTG TAT TAC TGT CAG

           CDR3
    ~~~~~~~~~~~~~~~~~~~~~~~~~~~
   Q   Y   G   S   S   P   T   F   G   G   G   T   K   V   E   I   K
271 CAG TAT GGT AGC TCA CCC ACT TTC GGC GGA GGG ACC AAG GTG GAG ATC AAA
```

FIGURE 17C

Anti-CD22 21F6 VH1

V segment: 4-34
D segment: 3-9
J segment: JH4b

```
   Q  V  Q  L  Q  Q  W  G  A  G  L  L  K  P  S  E  T  L
1  CAG GTG CAG CTA CAG CAG TGG GGC GCA GGA CTG TTG AAG CCT TCG GAG ACC CTG

                                                CDR1
                                                ~~~~~~~~~~~~~~~~~~
   S  L  T  C  A  V  Y  G  G  S  F  S  G  H  Y  W  S  W
55 TCC CTC ACC TGC GCT GTC TAT GGT GGG TCC TTC AGT GGT CAC TAC TGG AGC TGG

                                                   CDR2
                                                   ~~~~~~~~~~~~~~~~~~
   I  R  Q  S  P  G  K  G  L  E  W  I  G  E  T  D  H  S
109 ATC CGC CAG TCC CCA GGG AAG GGG CTG GAG TGG ATT GGG GAA ACC GAT CAT AGT

                CDR2
   ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   G  S  T  N  Y  N  P  S  L  K  S  R  V  T  I  S  I  D
163 GGA AGC ACC AAC TAC AAT CCG TCC CTC AAG AGT CGA GTC ACC ATA TCA ATA GAC

   T  S  K  N  Q  F  S  L  K  L  S  S  V  T  A  A  D  T
217 ACG TCC AAG AAT CAG TTC TCC CTG AAG CTG AGC TCT GTG ACC GCC GCG GAC ACG

                                    CDR3
                                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   A  V  Y  Y  C  A  R  T  Y  Y  D  I  L  T  D  Y  Y  P
271 GCT GTG TAT TAC TGT GCG AGG ACG TAT TAC GAT ATT TTG ACT GAT TAT TAC CCC

    CDR3
   ~~~~~~~~~~~
   F  D  S  W  G  Q  G  T  L  V  T  V  S  S
325 TTT GAC TCC TGG GGC CAG GGA ACC CTG GTC ACC GTC TCC TCA
```

FIGURE 18A

Anti-CD22 21F6 VH2

V segment: 4-34
D segment: 3-9
J segment: JH4b

```
   Q  V  Q  L  Q  Q  W  G  A  G  L  L  K  P  S  E  T  L
 1 CAG GTG CAG CTA CAG CAG TGG GGC GCA GGA CTG TTG AAG CCT TCG GAG ACC CTG

                                                CDR1
                                                ~~~~~~~~~~~~~~~~~~
   S  L  T  C  A  V  Y  G  G  S  F  S  G  H  Y  W  S  W
55 TCC CTC ACC TGC GCT GTC TAT GGT GGG TCC TTC AGT GGT CAC TAC TGG AGC TGG

                                                   CDR2
                                                   ~~~~~~~~~~~~~~~~~~
   I  R  Q  S  P  G  K  G  L  E  W  I  G  E  I  D  H  S
109 ATC CGC CAG TCC CCA GGG AAG GGA CTG GAG TGG ATT GGG GAA ATC GAT CAT AGT

                CDR2
   ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   G  S  T  N  Y  N  P  S  L  K  S  R  V  T  I  S  V  D
163 GGA AGC ACC AAC TAC AAT CCG TCC CTC AAG AGT CGA GTC ACC ATA TCA GTA GAC

   T  S  K  N  Q  F  S  L  K  L  S  S  V  T  A  A  D  T
217 ACG TCC AAG AAC CAG TTC TCC CTG AAG CTG AGC TCT GTG ACC GCC GCG GAC ACG

                                  CDR3
                                  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   A  M  Y  Y  C  A  R  T  Y  Y  D  I  L  T  D  Y  Y  P
271 GCT ATG TAT TAC TGT GCG AGG ACG TAT TAC GAT ATT TTG ACT GAT TAT TAC CCC

    CDR3
   ~~~~~~~~~~~
   F  D  S  W  G  Q  G  T  L  V  T  V  S  S
325 TTT GAC TCC TGG GGC CAG GGA ACC CTG GTC ACC GTC TCC TCA
```

FIGURE 18B

Anti-CD22 21F6 VK

V segment: L6
J segment: JK4

```
   E   I   V   L   T   Q   S   P   A   T   L   S   L   S   P   G   E   R
1 GAA ATT GTG TTG ACA CAG TCT CCA GCC ACC CTG TCT TTG TCT CCA GGG GAA AGA

                                CDR1
                    ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
   A   T   L   S   C   R   A   S   Q   S   V   S   G   Y   L   A   W   Y
55 GCC ACC CTC TCC TGC AGG GCC AGT CAG AGT GTT AGC GGC TAC TTA GCC TGG TAC

                                                            CDR2
                                                    ~~~~~~~~~~~~~~~~~~~~
   Q   Q   K   P   G   Q   A   P   R   L   L   I   Y   D   V   S   Y   R
109 CAA CAG AAA CCT GGC CAG GCT CCC AGG CTC CTC ATC TAT GAT GTA TCC TAC AGG

    CDR2
    ~~~~~~~
   A   T   G   I   L   V   R   F   S   G   S   G   S   G   T   D   F   T
163 GCC ACT GGC ATC CTA GTC AGG TTC AGT GGC AGT GGG TCT GGG ACA GAC TTC ACT

                                                                CDR3
                                                                ~~~~~~~
   L   T   I   S   S   L   E   P   E   D   F   A   V   Y   Y   C   Q   Q
217 CTC ACC ATC AGC AGC CTA GAG CCT GAA GAT TTT GCA GTT TAT TAC TGT CAG CAG

            CDR3
    ~~~~~~~~~~~~~~~~~~~~~~~~~~~
   R   S   N   W   P   I   T   F   G   G   G   T   K   V   E   I   K
271 CGT AGC AAC TGG CCC ATC ACT TTC GGC GGA GGG ACC AAG GTG GAG ATC AAA
```

FIGURE 18C

Anti-CD22 4G6 VH

V segment: 1-69
D segment: 7-27
J segment: JH4b

```
1-69 germline   Q V Q L V Q S G A E V K K P G S S V K V S C K A S G G T F S S Y A I S W
                                          CDR1
4G6 VH          - - - - - - - - - - - - - - - - - - - - P - - D - - - N - - - - -

1-69 germline   V R Q A P G Q G L E W M G R I I P I L G I A N Y A Q K F Q G R V T I T A
                                    CDR2
4G6 VH          - - - - - - - - - - - - - - - - - - - M - I - - P - - - - - - - - -

1-69 germline   D K S T S T A Y M E L S S L R S E D T A V Y Y C A R
                                                                  CDR3
JH4b germline
4G6 VH          - - - - N - - F - D - T - - Y F - - - - - - - - - - A P T Y W G S K D - Y

JH4b germline   F D Y W G Q G T L V T V S S
4G6 VH          - - - - - - - - - - - - - -
```

FIGURE 19A

Anti-CD22 4G6 VK1

V segment: L18
J segment: JK2

```
                                                                  CDR1
L18 germline   A I Q L T Q S P S S L S A S V G D R V T I T C R A S Q G I S S A L A W Y Q Q K
4G6 VK1        - - - - - - - - - - - - - - - - - - - - - - - - D - - - G - - - - - - - -

                                    CDR2
L18 germline   P G K A P K L L I Y D A S S L E S G V P S R F S G S G S G T D F T L T I S S L
4G6 VK1        - - T - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

                                    CDR3
L18 germline   Q P E D F A T Y Y C Q Q F N S
JK2 germline                               Y T F G Q G T K L E I K
4G6 VK1        - - D - - - - - - - - - - - F P - - - - - - - - - - -
```

FIGURE 19B

Anti-CD22 4G6 VK2

V segment: A27
J segment: JK4

```
A27 germline     E I V L T Q S P G T L S L S P G E R
4G6 VK2          - - - - - - - - - - - - - - - - -

                          CDR1
A27 germline     A T L S C R A S Q S V S S S Y L A W
4G6 VK2          - - - - - - - - - - - - - - - - -

                                                CDR2
A27 germline     Y Q Q K P G Q A P R L L I Y G A S S
4G6 VK2          - - - - - - - - - - - - - - - - -

                 _____
A27 germline     R A T G I P D R F S G S G S G T D F
4G6 VK2          - - - - - - - - - - - - - - - - -

A27 germline     T L T I S R L E P E D F A V Y Y C Q
4G6 VK2          - - - - - - - - - - - - - - - - -

                 CDR3
A27 germline     Q Y G S S P
JK4 germline               T F G G G T K V E I K
4G6 VK2          - - - - - - - - - - - - - - - - -
```

FIGURE 19C

Anti-CD22 21F6 VH1

```
4-34 germline    Q V Q L Q Q W G A G L L K P S E T L
21F6 VH1         - - - - - - - - - - - - - - - - - -

                                        _CDR1____
4-34 germline    S L T C A V Y G G S F S G Y Y W S W
21F6 VH1         - - - - - - - - - - - - H - - - -

                                            _CDR2____
4-34 germline    I R Q P P G K G L E W I G E I N H S
21F6 VH1         - - - S - - - - - - - - - T D - -

                 _CDR2_____________
4-34 germline    G S T N Y N P S L K S R V T I S V D
21F6 VH1         - - - - - - - - - - - - - - - I -

4-34 germline    T S K N Q F S L K L S S V T A A D T
21F6 VH1         - - - - - - - - - - - - - - - - -

                                 _CDR3_____________
4-34 germline    A V Y Y C A R
21F6 VH1         - - - - - - - T Y Y D I L T D Y Y P

                 _____
JH4b germline    F D Y W G Q G T L V T V S S
21F6 VH1         - - S - - - - - - - - - -
```

FIGURE 20A

Anti-CD22 21F6 VH2

```
4-34 germline     Q V Q L Q Q W G A G L L K P S E T L
21F6 VH2          - - - - - - - - - - - - - - - - - -

                                          _CDR1____
4-34 germline     S L T C A V Y G G S F S G Y Y W S W
21F6 VH2          - - - - - - - - - - - - H - - - -

                                          _CDR2____
4-34 germline     I R Q P P G K G L E W I G E I N H S
21F6 VH2          - - - S - - - - - - - - - - D - -

                  __CDR2_____________
4-34 germline     G S T N Y N P S L K S R V T I S V D
21F6 VH2          - - - - - - - - - - - - - - - - - -

4-34 germline     T S K N Q F S L K L S S V T A A D T
21F6 VH2          - - - - - - - - - - - - - - - - - -

                                _CDR3_____________
4-34 germline     A V Y Y C A R
21F6 VH2          - M - - - - - T Y Y D I L T D Y Y P

                  _____
JH4b germline     F D Y W G Q G T L V T V S S
21F6 VH2          - - S - - - - - - - - - - -
```

FIGURE 20B

Anti-CD22 21F6 VK

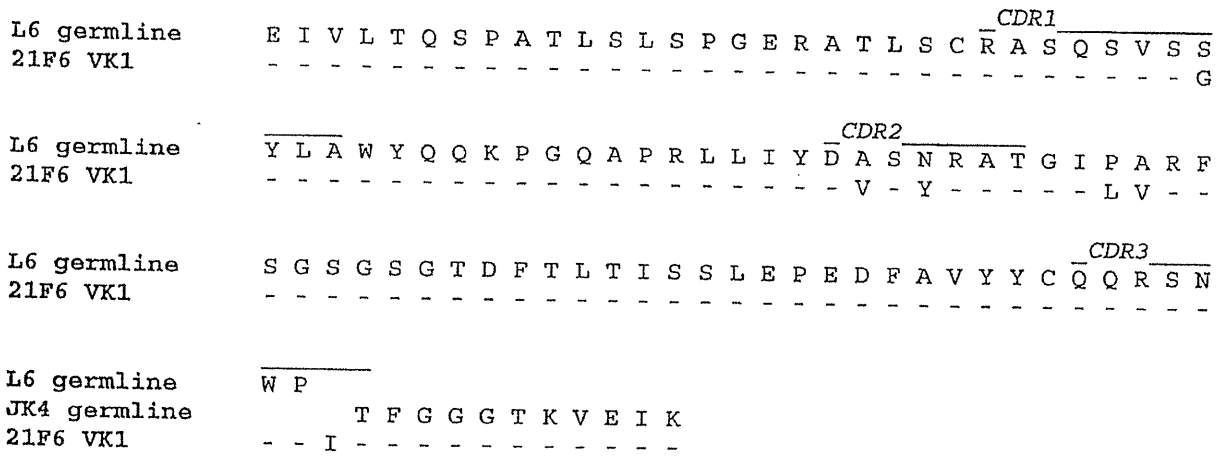


FIGURE 20C

Figure 21

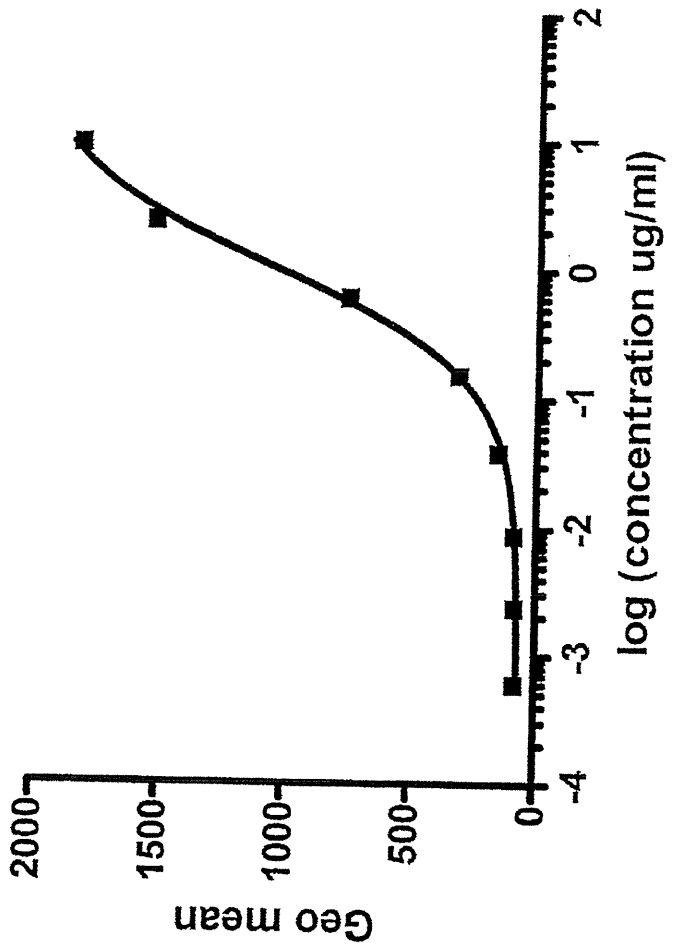

Geo mean
2000
1500
1000
500
0
-4
-3
-2
-1
0
1
2
log (concentration ug/ml)

Figure 22

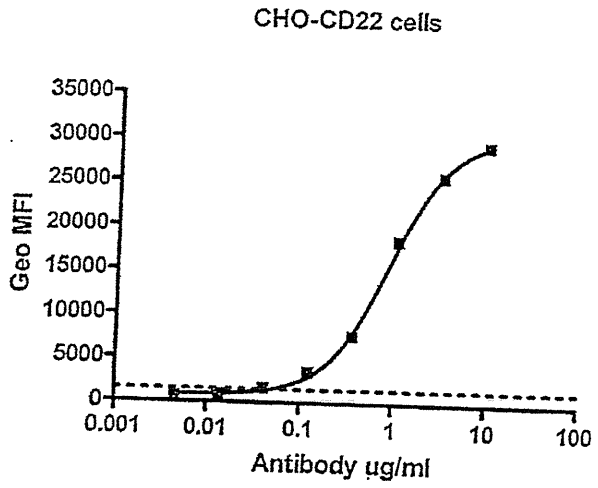
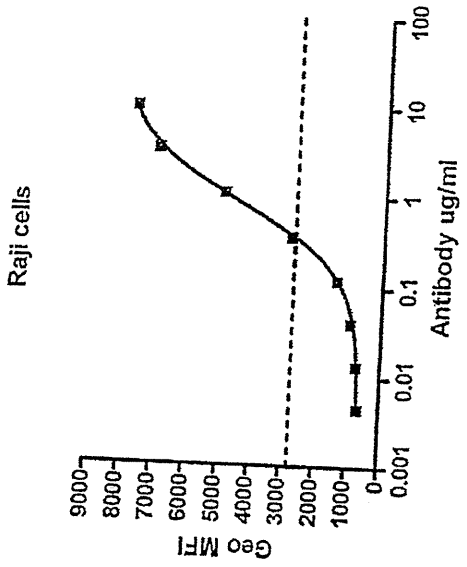

CHO-CD22 cells
Geo MFI
35000
30000
25000
20000
15000
10000
5000
0
0.001
0.01
0.1
1
10
100
Antibody ug/ml

Figure 23


Raji cells
Geo MFI
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
0.001
0.01
0.1
1
10
100
Antibody ug/ml