| CLONE ID | MFI/bkgrd (H929 cell bind) | seq_aa_CDR1 | seq_aa_CDR2 | seq_aa_CDR3 |
|---|---|---|---|---|
| 308607 | 558.6 | GFTFSSYA (SEQ ID NO: 1) | ISGSGGST (SEQ ID NO: 5) | VKDWNTTMITE (SEQ ID NO: 19) |
| 308915 | 284.8 | GFTFTNYA (SEQ ID NO: 2) | ISGGGGST (SEQ ID NO: 5) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314189 | 123.5 | GFTFSSYA (SEQ ID NO: 1) | ITENGGST (SEQ ID NO: 6) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314196 | 133.6 | GFTFSSYA (SEQ ID NO: 1) | ITGDGGST (SEQ ID NO: 7) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314201 | 76.9 | GFTFSSYA (SEQ ID NO: 1) | IIGSGGST (SEQ ID NO: 8) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314202 | 193.1 | GFTFSSYA (SEQ ID NO: 1) | IIGSGGST (SEQ ID NO: 8) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314205 | 102.8 | GFTFSSYA (SEQ ID NO: 1) | ITGSGGTT (SEQ ID NO: 9) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314212 | 125.9 | GFTFSSYA (SEQ ID NO: 1) | LTGNGDST (SEQ ID NO: 10) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314213 | 135.2 | GFTFSSYA (SEQ ID NO: 1) | ITGSGGST (SEQ ID NO: 11) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314219 | 166.9 | GFTFSSYA (SEQ ID NO: 1) | IIGSGGST (SEQ ID NO: 8) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314224 | 175.8 | GFTFSSYA (SEQ ID NO: 1) | IIGSGGST (SEQ ID NO: 8) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314225 | 148.9 | GFTFSSYA (SEQ ID NO: 1) | ITGSGDST (SEQ ID NO: 12) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314228 | 99.1 | GFTFSSYA (SEQ ID NO: 1) | LTGSGDST (SEQ ID NO: 13) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314229 | 124.2 | GFTFSNYA (SEQ ID NO: 3) | ITGDGGST (SEQ ID NO: 7) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314231 | 157.3 | GFTFSRYA (SEQ ID NO: 4) | IVGSGGNT (SEQ ID NO: 14) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314232 | 79.0 | GFTFSSYA (SEQ ID NO: 1) | ITGSGGST (SEQ ID NO: 11) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314235 | 128.3 | GFTFSNYA (SEQ ID NO: 3) | LTGSGGST (SEQ ID NO: 15) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314501 | 251.1 | GFTFTNYA (SEQ ID NO: 2) | IIGSGGST (SEQ ID NO: 8) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314502 | 169.7 | GFTFSSYA (SEQ ID NO: 1) | IIGSGGST (SEQ ID NO: 8) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314503 | 183.3 | GFTFSNYA (SEQ ID NO: 3) | IIGSGGST (SEQ ID NO: 8) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314504 | 176.8 | GFTFSSYA (SEQ ID NO: 1) | IIGSGGST (SEQ ID NO: 8) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314506 | 243.1 | GFTFSNYA (SEQ ID NO: 3) | IIGSGGST (SEQ ID NO: 8) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314508 | 209.0 | GFTFSNYA (SEQ ID NO: 3) | IIGSGGST (SEQ ID NO: 8) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314509 | 241.5 | GFTFSNYA (SEQ ID NO: 3) | IIGSGATT (SEQ ID NO: 16) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314510 | 171.1 | GFTFSNYA (SEQ ID NO: 3) | IIGSGGST (SEQ ID NO: 8) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314512 | 213.8 | GFTFSSYA (SEQ ID NO: 1) | IIGSGGST (SEQ ID NO: 8) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314518 | 182.9 | GFTFSSYA (SEQ ID NO: 1) | IIGSGGST (SEQ ID NO: 8) | VKDWNTTMITE (SEQ ID NO:19) |
| 314521 | 234.8 | GFTFSNYA (SEQ ID NO: 3) | IVGGGGTS (SEQ ID NO: 17) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314523 | 195.1 | GFTFSNYA (SEQ ID NO: 3) | ITGDGGST (SEQ ID NO: 7) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314524 | 82.9 | GFTFSSYA (SEQ ID NO: 1) | IVGGGGTS (SEQ ID NO: 17) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314527 | 134.3 | GFTFSSYA (SEQ ID NO: 1) | IIGSGGTT (SEQ ID NO: 18) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314528 | 154.8 | GFTFSNYA (SEQ ID NO: 3) | ITGSGGST (SEQ ID NO: 11) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314530 | 222.3 | GFTFSSYA (SEQ ID NO: 1) | IVGGGGTS (SEQ ID NO: 17) | VKDWNTTMITE (SEQ ID NO: 19) |
| 314533 | 205.3 | GFTFSNYA (SEQ ID NO: 3) | IIGSGGST (SEQ ID NO: 8) | VKDWNTTMITE (SEQ ID NO: 19) |

FIG. 1

FIG. 2

| CLONE ID | seq_aa_FR1_FR4 |
|---|---|
| 308607 | EVQLLESGGGLAQPGGSLRLSCAASGFTFSSYAMNWIRQAPGKGLEWVSGISGSGGGSTYYADSVKGRFTISRDNSKNTVYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 20) |
| 308915 | EVQLLESGGGLVQPGRSLRLSCAASGFTFTNYAMNWVRQAPGKGLEWVSGISGGGGSTYYADSVKGRFTISRDNSKNTLYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 21) |
| 314189 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMTWVRQAPGKGLEWVSGITENGGSTYYADSVKGRFTISRDNSKNTLDLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 22) |
| 314196 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSGITGDGGSTFYADSVKGRFTISRDNSKNTLYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 23) |
| 314201 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSGIIGSGGSTYYADSVKGRFSISRDNSKNTLDLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 24) |
| 314202 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMNWVRQAPGKGLEWVSGITGSGGTTYYADSVKGRFTISRDNSKNTLYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 25) |
| 314205 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMNWVRQAPGKGLEWVSGITGSGGTTYYADSVKGRFTISRDNSKNTLYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 26) |
| 314212 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMNWVRQAPGKGLEWVSGLTGNGDSTYYADSVKGRFTISRDNSKNTVYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 27) |
| 314213 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMNWVRQAPGKGLEWVSGITGSGGSTYYADSVKGRFSISRDNSKNTLDLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 28) |
| 314219 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMNWVRQAPGKGLEWVSGIIGSGGSTYYADSVKGRFTISRDNSKNTLYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 29) |
| 314224 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMNWVRQAPGKGLEWVSGIIGSGGSTYYADSVKGRFTISRDNSKNTVYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 30) |
| 314225 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMNWVRQAPGKGLEWVSGITGSGDSTYYAASVKGRFSISRDNSQNTLDLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 31) |
| 314228 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSGLTGSGDSTYYADSVKGRFTISRDNSKNTVYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 32) |
| 314229 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSNYAMTWIRQAPGKGLEWVSGITGDGGSTFYADSVKGRFSISRDNSKNTLDLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 33) |
| 314231 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSRYAMNWIRQAPGKGLEWVSGIVGSGGNTYYADSVKGRFSISRDNSKNTLYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 34) |
| 314232 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSGITGSGGSTYYADSVKGRFSISRDNSKNTLDLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 5) |
| 314235 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSNYAMNWVRQAPGNGLEWVSGLTGSGGSTYYADSVKGRFTISRDNSKNTVYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 36) |

Fig 2 (CONT.)

| | |
|---|---|
| 314501 | EVQLLESGGGLVQPGGSLRLSCAASGFTFTNYAMNWVRQAPGKGLEWVSGIIGSGGSTYYADSVKGRFTISRDNSKNTLYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 37) |
| 314502 | EVQLLESGGGVVQPGRSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSGIIGSGGSTYYADSVKGRFTISRDNSKNTLYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 38) |
| 314503 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSNYAMSWVRQAPGKGLEWVSGIIGSGGSTYYADSVKGRFSISRDNSKNTLYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 39) |
| 314504 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSGIIGSGGSTYYADSVKGRFTISRDNSKNTLYLQMNSLRV EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 40) |
| 314506 | EVQLLESGGGVVQPGRSLRLSCAASGFTFSNYAMNWVRQAPGKGLEWVSGIIGSGGSTYYADSVKGRFTISRDNSKNTLYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 41) |
| 314508 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSNYAMNWVRQAPGKGLEWVSGIIGSGGSTYYADSVKGRFTISRDNSKNTLYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 42) |
| 314509 | EVQLLESGGGLVQPGGSLTLSCAASGFTFSNYAMNWVRQAPGKGLEWVSGIIGSGATTYYADSVKGRFTISRDNSKNTLNLQMNSLRA EDTAIYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 43) |
| 314510 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSNYAMSWVRQAPGKGLEWVSGIIGSGGSTYYADSVKGRFTISRDNSKNTLYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 44) |
| 314512 | EVQLLESGGGVVQPGRSLRLSCAASGFTFSSYAMNWVRQAPGKGLEWVSGIIGSGGSTYYADSVKGRFTISRDNSKNTLYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 45) |
| 314518 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSGIIGSGGSTFYADSVKGRFTISRDNSKNTLYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 46) |
| 314521 | EVQLLESGGGLVQPGESLRLSCAASGFTFSNYAMNWVRQAPGKGLEWVSGIVGGGGTSYYADSVKGRFTISRDNSKNTLYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 47) |
| 314523 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSNYAMTWIRQAPGKGLEWVSGITGDGGSTFYADSVKGRFTISRDNSKNTLYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 48) |
| 314524 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMTWIRQAPGKGLEWVSGIVGGGGTSYYADSVRGRFTISRDNSKNTLYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 49) |
| 314527 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMSWVRQAPGKGLEWVSGIIGSGGTTYYADSVKGRFTISRDNSKNTLNLQMNSLRA EDTAIYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 50) |
| 314528 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSNYAMNWVRQAPGKGLEWVSGITGSGGSTYYADSVKGRFTISRDNSKNTLYLQMNSLRV EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 51) |
| 314530 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSSYAMNWVRQAPGKGLEWVSGIVGGGGTSYYADSVRGRFTISRDNSKNTLYLQMNSLRA EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 52) |
| 314533 | EVQLLESGGGLVQPGGSLRLSCAASGFTFSNYAMNWVRQAPGKGLEWVSGIIGSGGSTYYADSVKGRFTISRDNSKNTLYLQMNSLRV EDTAVYYCVKDWNTTMITERGQGTLVTVSS (SEQ ID NO: 53) |

FIG. 3

| CLONE ID | MFI/bkgrd (H929 cell bind) | MFI/bkgrd (RPMI8226 cell bind) | % APRIL binding | ELISA hBCMA/bkgrd | ELISA (hG1)k/bkgrd | ELISA BVP score |
|---|---|---|---|---|---|---|
| 308607 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 308915 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 314189 | 123.5 | not measured | not measured | not measured | not measured | not measured |
| 314195 | 133.6 | not measured | not measured | not measured | not measured | not measured |
| 314201 | [illegible] | not measured | not measured | not measured | not measured | not measured |
| 314202 | [illegible] | not measured | not measured | not measured | not measured | not measured |
| 314205 | 102.8 | not measured | not measured | not measured | not measured | not measured |
| 314212 | 125.9 | not measured | not measured | not measured | not measured | not measured |
| 314213 | 135.2 | not measured | not measured | not measured | not measured | not measured |
| 314219 | [illegible] | not measured | not measured | not measured | not measured | not measured |
| 314224 | [illegible] | not measured | not measured | not measured | not measured | not measured |
| 314225 | 148.9 | not measured | not measured | not measured | not measured | not measured |
| 314228 | 98.1 | not measured | not measured | not measured | not measured | not measured |
| 314229 | 124.2 | not measured | not measured | not measured | not measured | not measured |
| 314231 | 157.3 | not measured | not measured | not measured | not measured | not measured |
| 314232 | [illegible] | not measured | not measured | not measured | not measured | not measured |
| 314235 | 128.3 | not measured | not measured | not measured | not measured | not measured |
| 314501 | [illegible] | not measured | not measured | not measured | not measured | not measured |
| 314502 | [illegible] | not measured | not measured | not measured | not measured | not measured |
| 314503 | [illegible] | not measured | not measured | not measured | not measured | not measured |
| 314504 | [illegible] | not measured | not measured | not measured | not measured | not measured |
| 314506 | [illegible] | not measured | not measured | not measured | not measured | not measured |
| 314508 | [illegible] | not measured | not measured | not measured | not measured | not measured |
| 314509 | [illegible] | not measured | not measured | not measured | not measured | not measured |
| 314510 | [illegible] | not measured | not measured | not measured | not measured | not measured |
| 314512 | [illegible] | not measured | not measured | not measured | not measured | not measured |
| 314518 | [illegible] | not measured | not measured | not measured | not measured | not measured |
| 314521 | [illegible] | not measured | not measured | not measured | not measured | not measured |
| 314523 | [illegible] | not measured | not measured | not measured | not measured | not measured |
| 314524 | [illegible] | not measured | not measured | not measured | not measured | not measured |
| 314527 | 134.3 | not measured | not measured | not measured | not measured | not measured |
| 314528 | 154.8 | not measured | not measured | not measured | not measured | not measured |
| 314530 | [illegible] | not measured | not measured | not measured | not measured | not measured |
| 314533 | [illegible] | not measured | not measured | not measured | not measured | not measured |

FIG. 4

**DAY 35 SERUM - ELISA TESTING (testing from 6/12 animals)**

Assayed 1:500 dilution of d35 serum

Signal/H.S.A, adjusted for each animal

| huBCMA-Fc | CyBCMA | huBCMA e coli frag | huBCMA full wht germ | hu IgG1kappa | H.S.A | Animal |
|---|---|---|---|---|---|---|
| 325 | 296 | 501 | 245 | 188 | | r12431 (HC27) |
| 281 | 226 | 417 | 247 | 207 | | r12455 (HC27) |
| 262 | 267 | 418 | 245 | 303 | | r12514 (HC27) |
| 314 | [illegible] | 519 | 444 | [illegible] | | r12271 (HC28) |
| 260 | 290 | 421 | 413 | 296 | | r12276 (HC28) |
| 594 | 476 | [illegible] | [illegible] | 176 | | r12278 (HC28) |
| [illegible] | [illegible] | [illegible] | 1194 | [illegible] | | r12516 (HC27) |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | | goat anti huBCMA |

FIG. 5

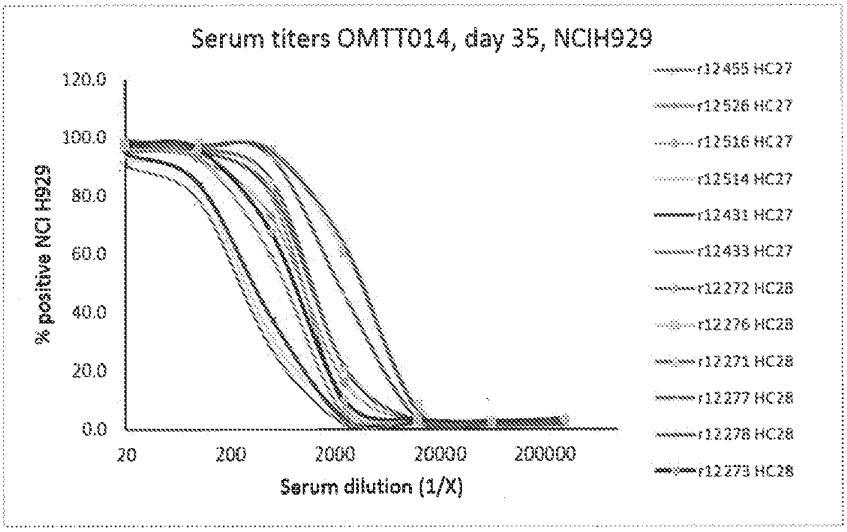
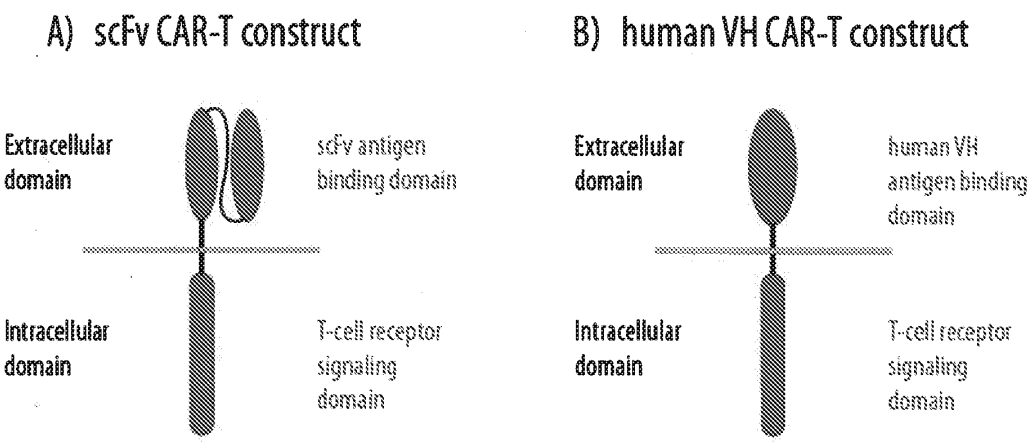

Serum titers OMTT014, day 35, NCIH929
% positive NCI H929
120.0
100.0
80.0
60.0
40.0
20.0
0.0
20
200
2000
20000
200000
Serum dilution (1/X)
r12455 HC27
r12526 HC27
r12516 HC27
r12514 HC27
r12431 HC27
r12433 HC27
r12272 HC28
r12276 HC28
r12271 HC28
r12277 HC28
r12278 HC28
r12273 HC28

FIG. 6


A) scFv CAR-T construct
Extracellular domain
scFv antigen binding domain
Intracellular domain
T-cell receptor signaling domain
B) human VH CAR-T construct
Extracellular domain
human VH antigen binding domain
Intracellular domain
T-cell receptor signaling domain