

VH
 FR1 CDR1 FR2 CDR2
 EVQLQQSGTVLARPGASVKMSCKASGYTFT NYWMH WVKQRPVQGLEWIG AIYPGDSSDTSYNQKFKG

FR3 CDR3 FR4
 KAKLTAVTSTSTAFMELSSLTNEDSAVYYCTG LYYGYD WGQGTTLTVSS

VL
 FR1 CDR1 FR2 CDR2
 DVLMTQTPLTSLVTIGQPASISC KSSQSLIDSDGKTFLN WLLQRPQGSPKRLIY LVSKLDS

FR3 CDR3 FR4
 GVPDRFTGSGSGTDFTLKISRVEAEDLGLYYC WQGFHFPYT FGGGTKLEIK

FIG. 1A

VH FR1 CDR1 FR2 CDR2
 2A2 EVQLQQSGTVLARPGASVKMSCKASGYTFT NYWMH WVKQRPVQGLEWIG AIYPGDSSDTSYNQKFKG
 +VQL QSG + +PGASVK+SCKASGYTFT +Y+MH WV+Q P QGLEW+G I P TSY QKF+G
 1-46 QVQLVQSGAEVKKPGASVKVSCKASGYTFT SYMH WVRQAPGQGLEWMG IINPSGGSTSYAQKFQG

FR3 CDR3 FR4
 2A2 KAKLTAVTSTSTAFMELSSLTNEDSAVYYCTG LYYGYD WGQGTTLTVSS
 + +T TSTST +MELSSL +ED+AVYYC WGQGT+TVSS
 1-46 RVTMTRDTSTSTVYMELSSLRSEDTAVYYCAR WGQGTTVTVSS

VL FR1 CDR1 FR2 CDR2
 2A2 DVLMTQTPLTSLVTIGQPASISC KSSQSLIDSDGKTFLN WLLQRPQGSPKRLIY LVSKLDS
 DV+MTQ+PL+L VT+GQPASISC +SSQSL+ SDG T+LN W QRPQGSP+RLIY VS DS
 A1 DVVMTQSPLSLPVTLGQPASISC RSSQSLVYSDGNTYLN WFQRPQGSPRRLIY KVSNWDS

FR3 CDR3 FR4
 2A2 GVPDRFTGSGSGTDFTLKISRVEAEDLGLYYC WQGFHFPYT FGGGTKLEIKR
 GVPDRF+GSGSGTDFTLKISRVEAED+G+YYC QGFH+P T FG GTKLEIKR
 A1 GVPDRFSGSGSGTDFTLKISRVEAEDVGVYYC MQGFHWP T FGGTKLEIKR

FIG. 1B

Humanized 2A2 Heavy chain sequence

ATGGACTGGACCTGGAGGGTCTTCTGCTTGGCTGTAGCTCCAGGTGCTCACTCCAGGTGCAGCTTGTGCAGTCT
 GGGGCTGAGGTGAAAAAGCCTGGGGCTTCAGTGAAGGTGTCCTGCAAGGCTTCTGGCTACACCTTTACCAACTACTGG
 ATGCACTGGGTAAGACAGGCGCCTGGACAGGGTCTGGAATGGATGGGCGCTATTTATCCTGGAGATAGTGATACTAGC
 TACAACCAGAAGTTCAGGGCCGGGTCACAATGACTCGAGACACATCCACCAGCACTGTCTACATGGAGCTCAGCAGC
 CTGAGAAGTGAGGACACTGCGGTCTATTACTGTGCACGCCTTTACTACGGCTACGACTGGGGCCAAGGCACCACTGTCTC
 ACAGTCTCCTCAGCCAGCAAGAGGGGCCCATCGGTCTTCCCCCTGGCACCCTCCTCCAAGAGCACTCTGGGGGCACA
 GCGGCCCTGGGCTGCTTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCTGTGAACTCAGGGCCCTTGACCAGC
 GCGGTGCACACCTTCCCGGCTGTCTACAGTCTCAGGACTCTACTCCCTCAGCAGCGTGGTGAACGGTGGCCCTCCAGC
 AGCTTGGGCACCCAGACCTACATCTGCAACGTGAATCACAAGGCCAGCAACACCAAGGTGGTACAAGAAAGTTGAGCCC
 AAATCTTGTGACAAAACTCACACATGCCCCACCGTGGCCAGCACCTGAACTCCTGGGGGGACCGTCAGTCTTCTCTTC
 CCCCCAAAACCCAAGGACACCCTCATGATCTCCCGGACCCCTGAGGTACATGCGTGGTGGTGGACGTGAGCCACGAA
 GACCCTGAGGTCAAGTTCAACTGGTACGTGGACGGCGTGGAGGTGCATAATGCCAAGACAAAGCCGCGGGAGGAGCAG
 TACAACAGCACGTACCGTGTGGTCAAGCTCCTCACCCTCCTGCACCAGGACTGGCTGAATGGCAAGGAGTACAAGTGC
 AAGGTCTCCAACAAAGCCCTCCAGCCCCATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAACACAG
 GTGTACACCTGCCCCCATCCCGGATGAGCTGACCAAGAACCAGGTGAGCCTGACCTGCCTGGTCAAAGGCTTCTAT
 CCCAGCGACATCGCCGTGGAGTGGGAGAGCAATGGGCAGCCGGAGAACAACTACAAGACCACGCTTCCCGTGTGGAC
 TCCGACGGCTCCTTCTTCTCTACAGCAAGCTCACCGTGGACAAGAGCAGGTGGCAGCAGGGGAACGTCTTCTCATGC
 TCCGTGATGCATGAGGCTCTGCACAACCACTACACGCAGAAGAGCCTCTCCCTGTCCCCGGGTAAATGA

MDWTWRVFCLLAVAFGAHSQVQLVQSGAEVKKPGASVKVSCKASGYTFT**NYWMH**WVRQAPGQGLEWMG**AIYPGDS****DT**
YNQKFKGRVTMTRDTSTSTVYMEISSLRSEDTAVYYCAR**LYYGYD**WGQGTTVTVSSASTKGPSVFPLAPSSKSTSGGT
 AALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSGLYSLSSVTVTPSSSLGTQTYICNVNHKPSNTKVDKKVEP
 KSCDKTHFTCPPEAPELLGGPSVFLFPPKPKDTLMI SRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHNAKTKPREEQ
 YNSTYRVSVLTVLHQDLNGLKEYKCKVSNKALPAPIEKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFY
 PSDIAVEWESNGQPENNYKTTTPVLDSDGSFFLYSK
 LTVDKSRWQQGNVFCSSVMHEALHNHYTQKSLSLSPG

Red: leader sequence
 Black: variable heavy chain sequence
 Bold black: CDR sequence
 Green: CH1 sequence
 Magenta: hinge sequence
 Brown: CH2 and CH3 sequence

FIG. 2A

Humanized 2A2 light chain sequence

ATGAGGCTCCCTGCTCAGCTCCTGGGGCTGCTAATGCTCTGGGTCCCAGGATCCAGTGGGGATGTTGTGATGACCCAA
TCTCCACTCTCTTTGCCGGTTACCCTTGGACAACCAGCCTCCATCTCTTGCAAGTCAAGTCAGAGCCTCATAGATAGT
GATGGAAAGACATTTTTGAATTGGTTCCAACAGAGGCCAGGCCAGTCTCCAAGGCGCCTAATCTATCTGGTGTCTAAA
CTGGACTCTGGAGTCCCTGACAGGTTCTCTGGCAGTGGATCAGGGACAGATTTCACTCTGAAAATCAGCAGAGTGGAG
GCTGAGGATGTGGGAGTTTATTATTGCTGGCAAGGTACACATTTTCCGTACACGTTTCGGACAGGGGACCAAGCTGGAA
ATAAAAACGGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTGATGAGCAGTTGAAATCTGGAACCTGCCTCT
GTTGTGTGCTGCTGAATAACTTCTATCCCAGAGAGGCCAAAGTACAGTGGAGGTGGATAACGCCCTCCAATCGGGT
AACTCCCAGGAGAGTGTACAGAGCAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCTGACGCTGAGCAAAA
GCAGACTACGAGAAACACAAAGTCTACGCCTGCGAAGTCACCCATCAGGGCCTGAGTTGCCCCGTACAAAAGAGCTTC
AACAGGGGAGAGTGTAA

MRLPAQLLGLLMLWVPGSSGDVVMQTQSPLSLPVTLGQPASISCKSSQSLIDSDGKTFLNWFQQRPGQSPRRLIYLVSK
LDSGVPDRFSGSGGTDFTLKISRVEAEDVGVIY**CWQGT**HPYTFGQGTKLEIKTVAAPSVFIFPPSDEQLKSGTAS
VVCLLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDSTYLSSTLTLSKADYEKHKVYACEVTHQGLSSPVTKSF
NRGEC

Red: leader sequence

Black: variable light chain sequence

Bold black: CDR sequence

Blue: constant kappa light chain sequence

FIG. 2B

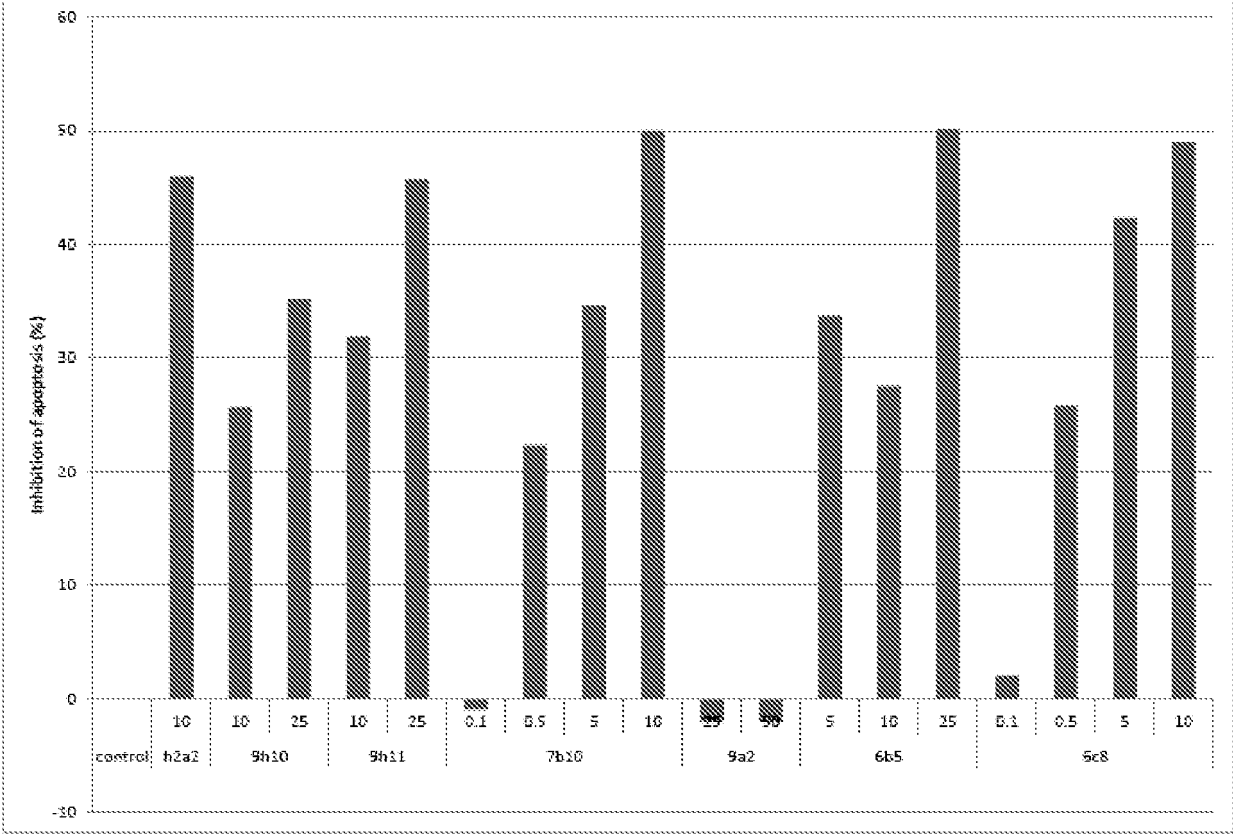
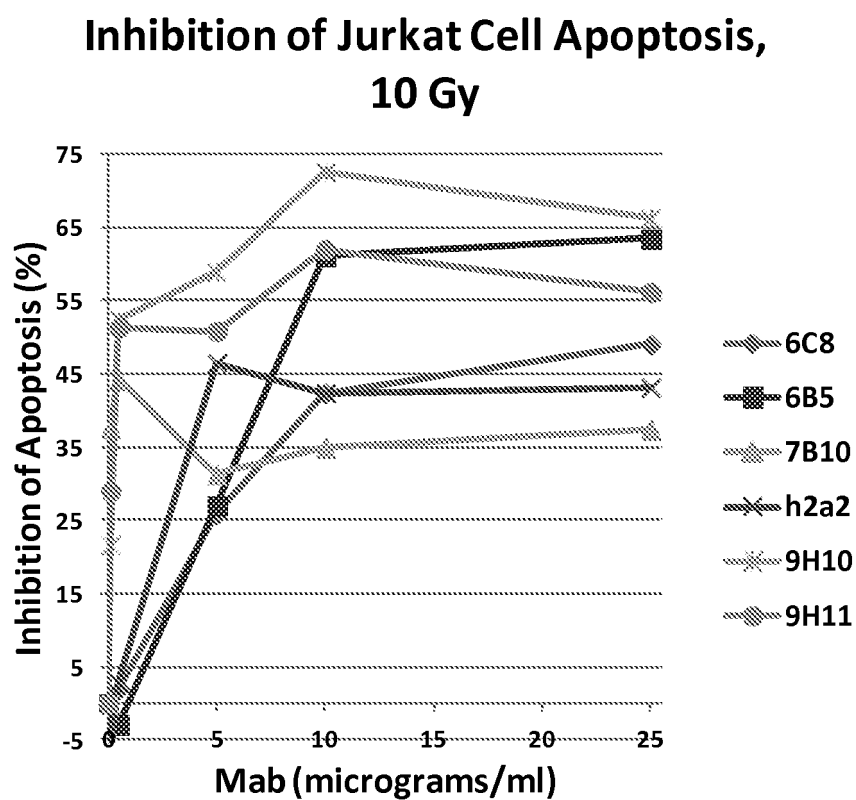
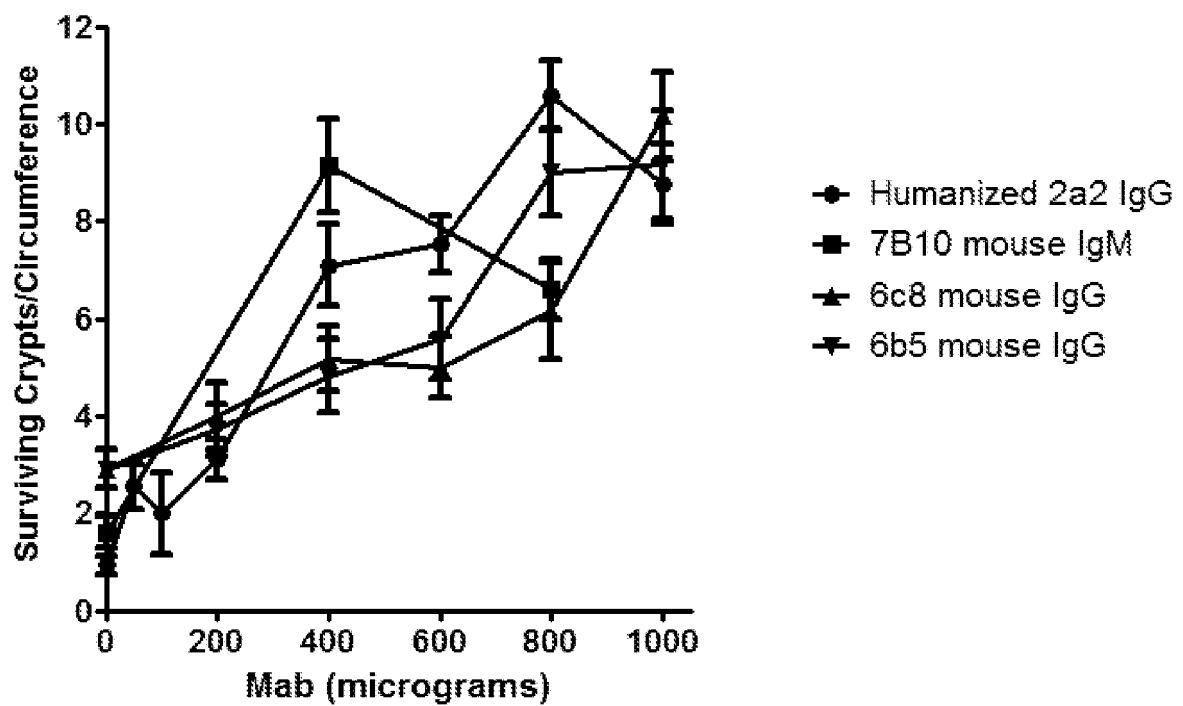
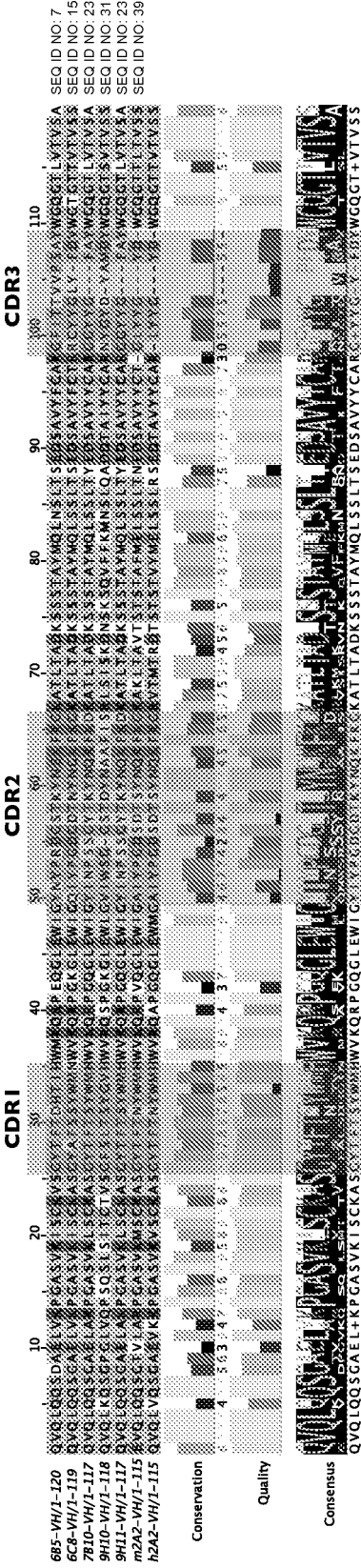


FIG. 3

**FIG. 4**

Microcolony Assay, Anti-ceramide Antibody**FIG. 5**

heavy chain



light chain

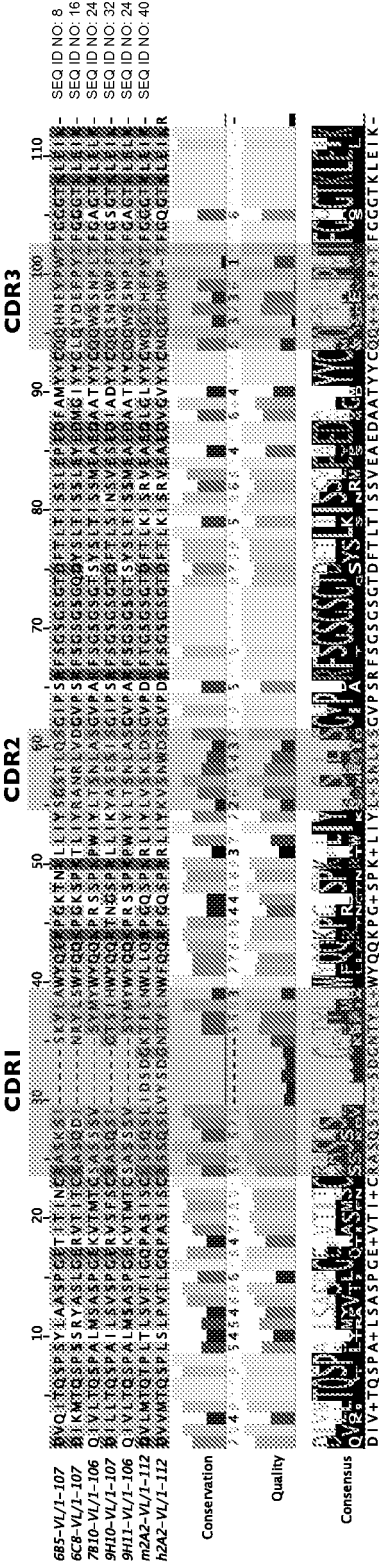
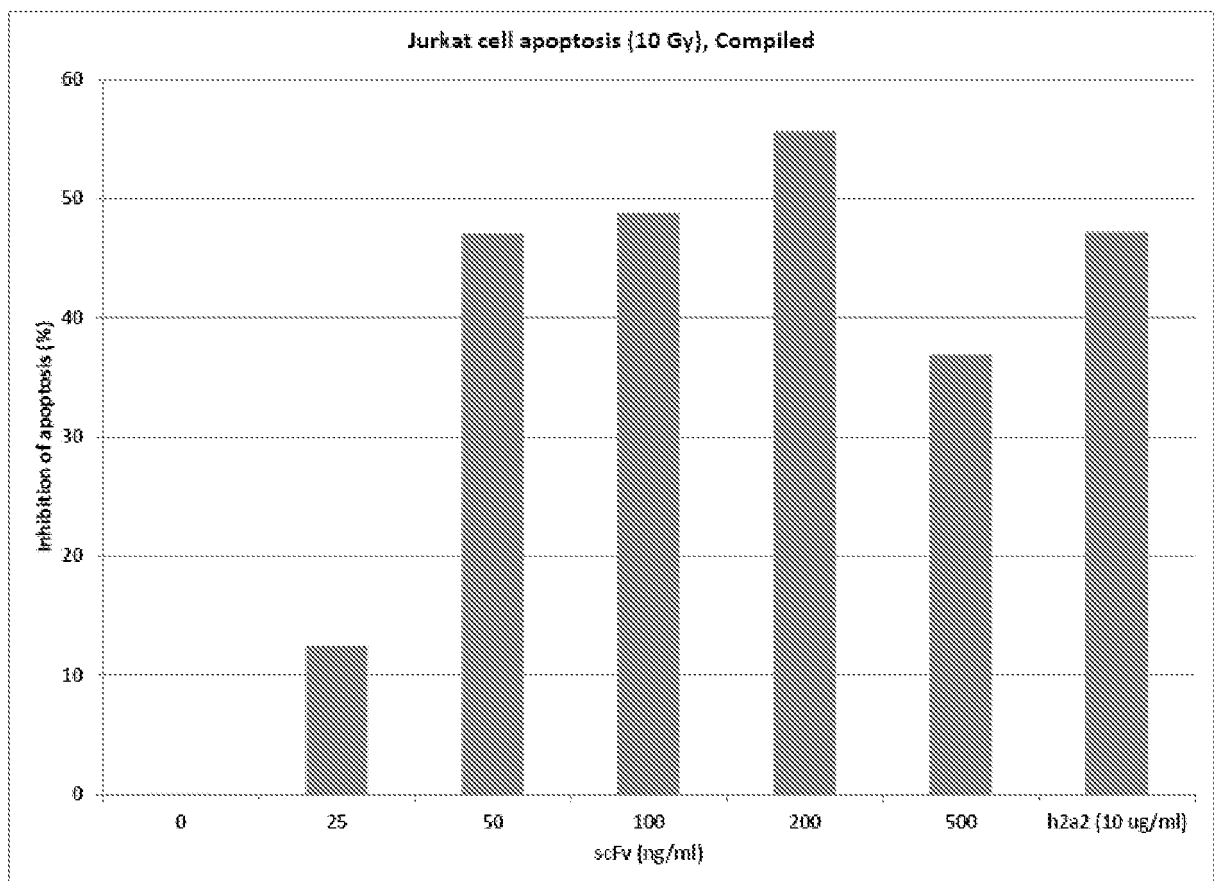
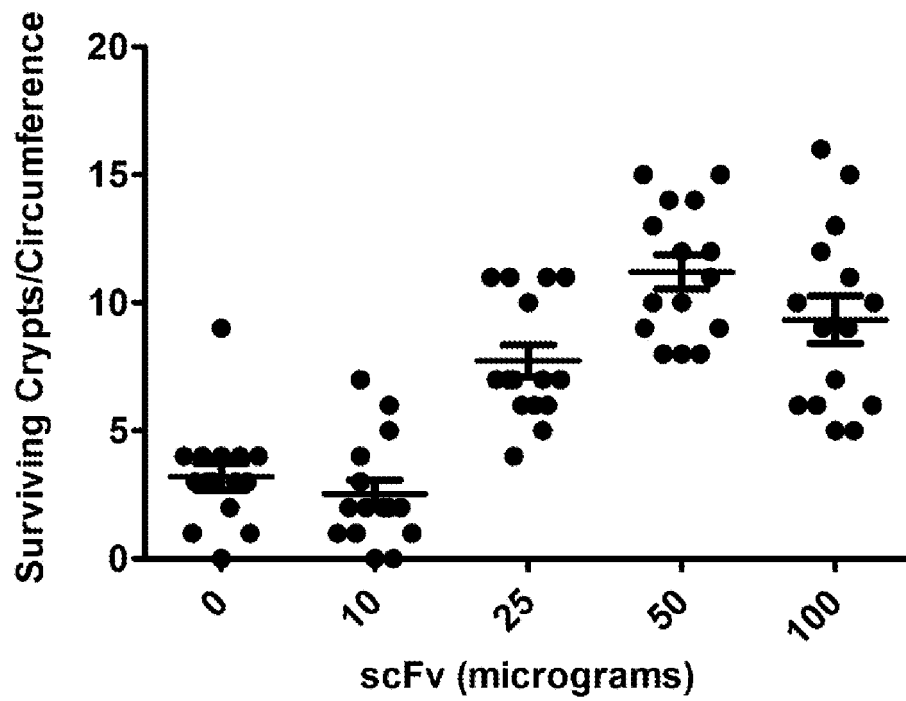


FIG. 6

**FIG. 7**

**FIG. 8**

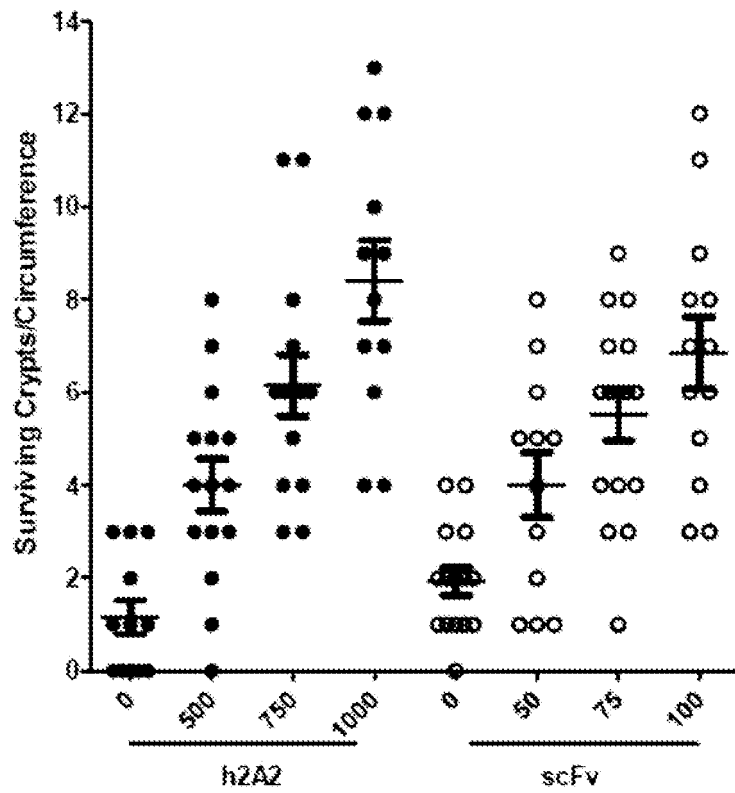


FIG. 10

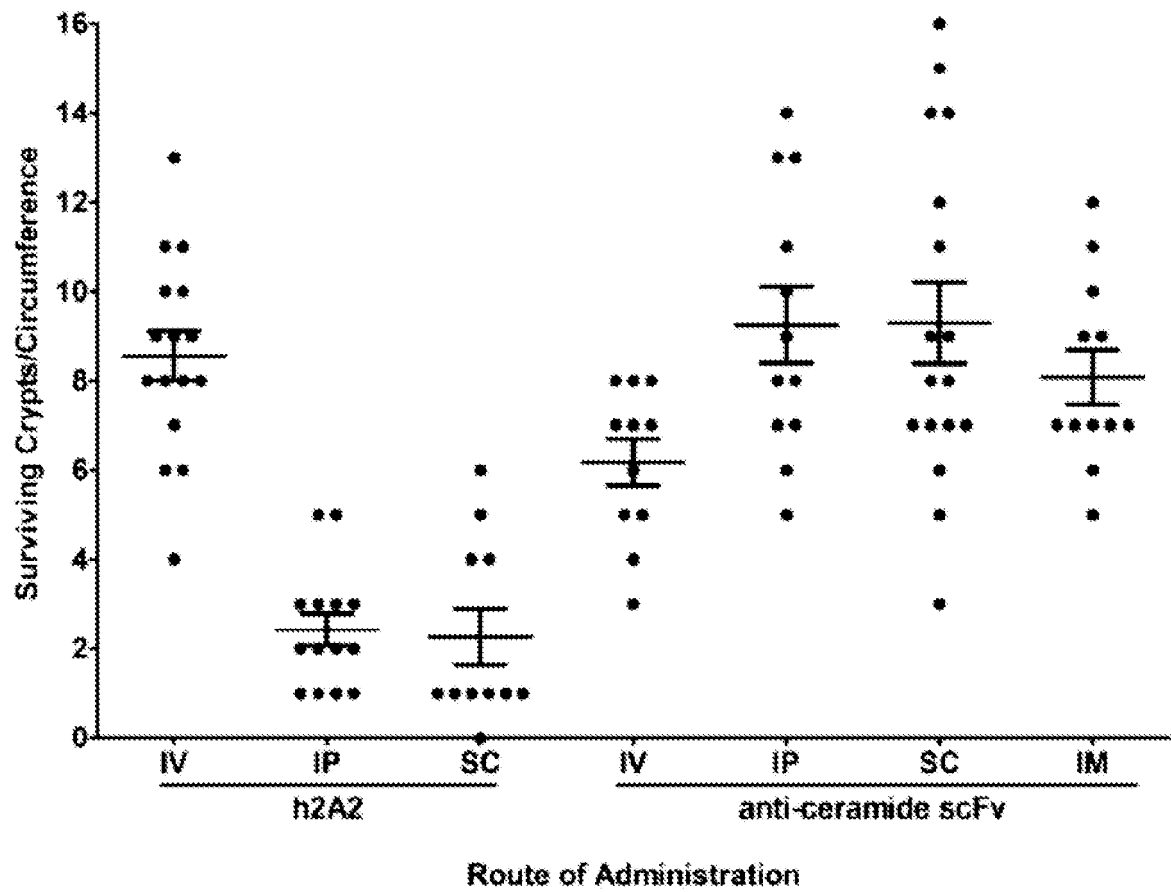


FIG. 11

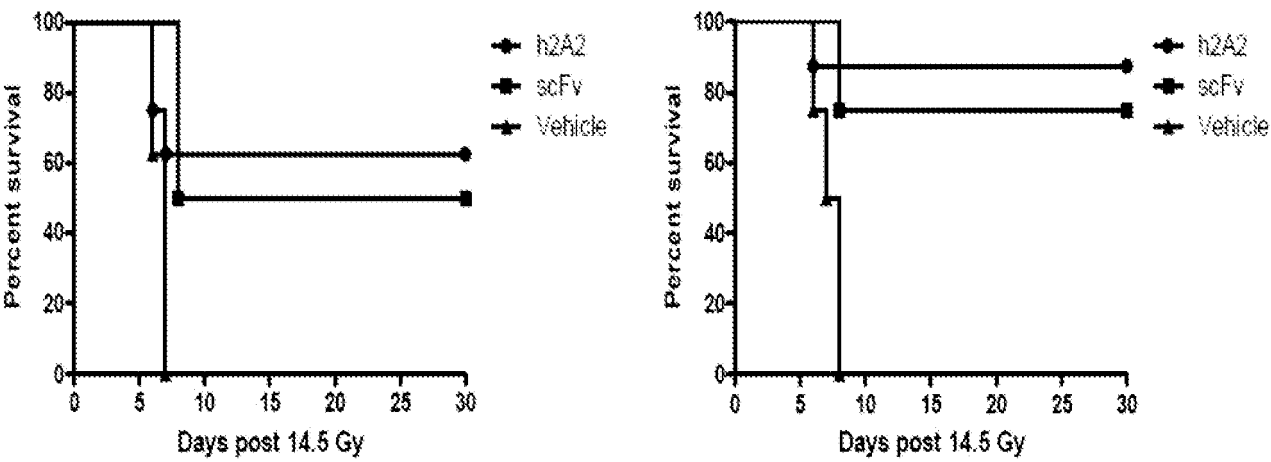


FIG. 12

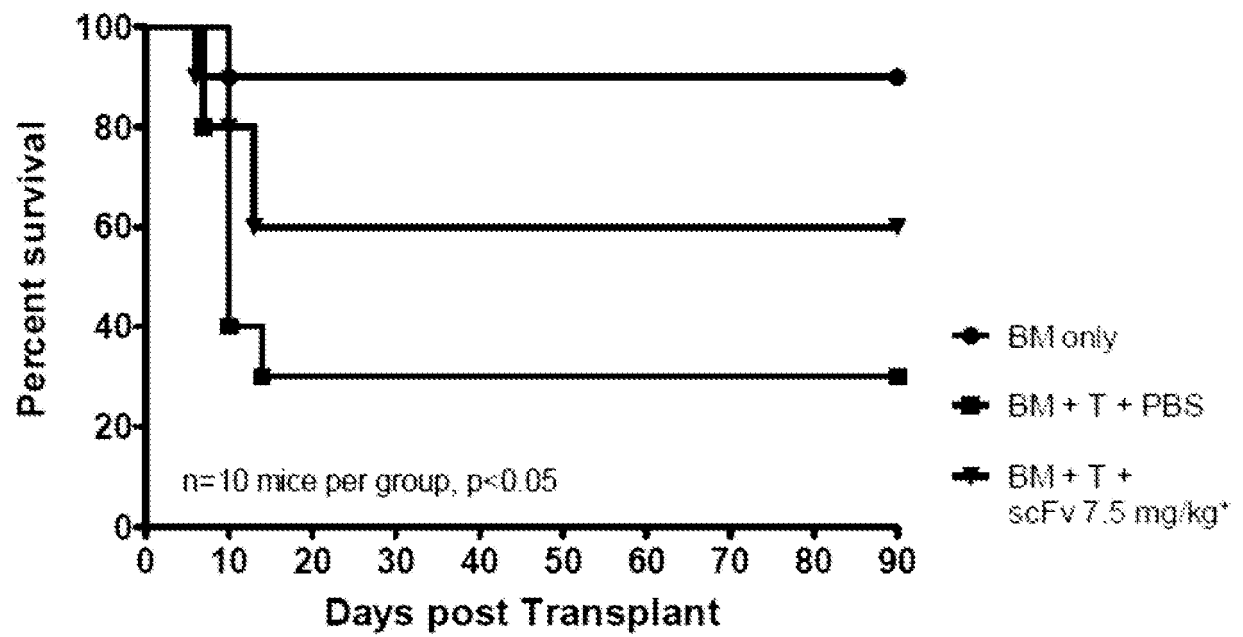


FIG. 13

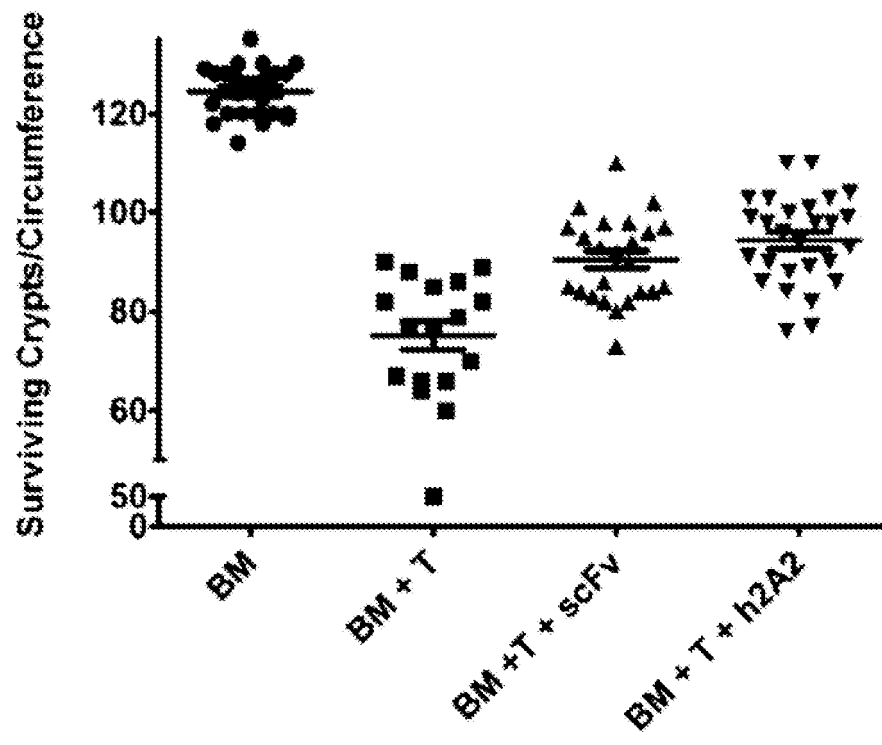


FIG. 14

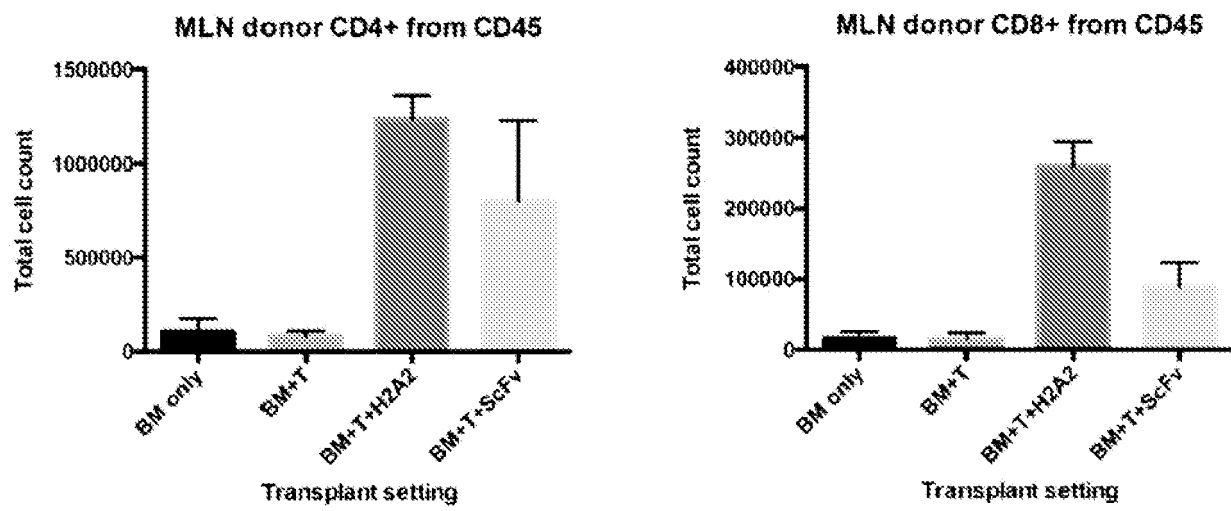


FIG. 15