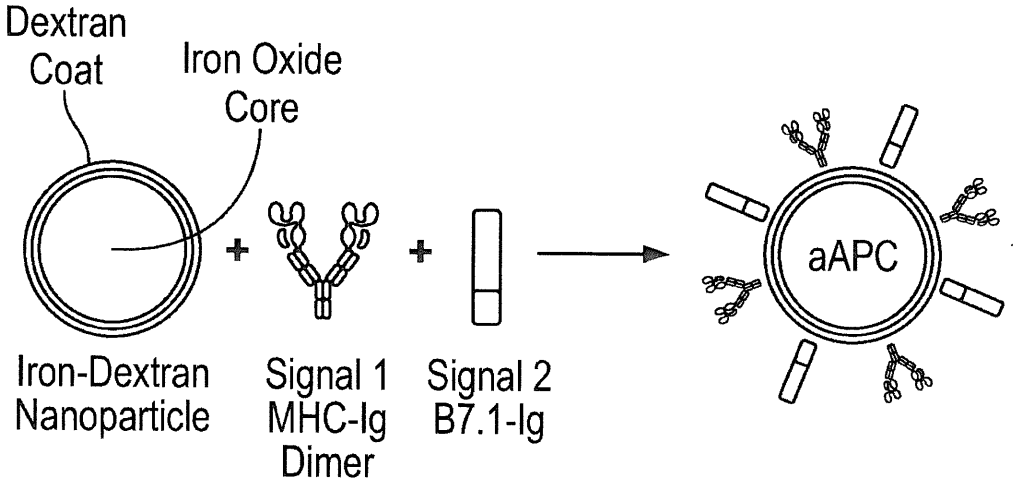


FIG. 1A

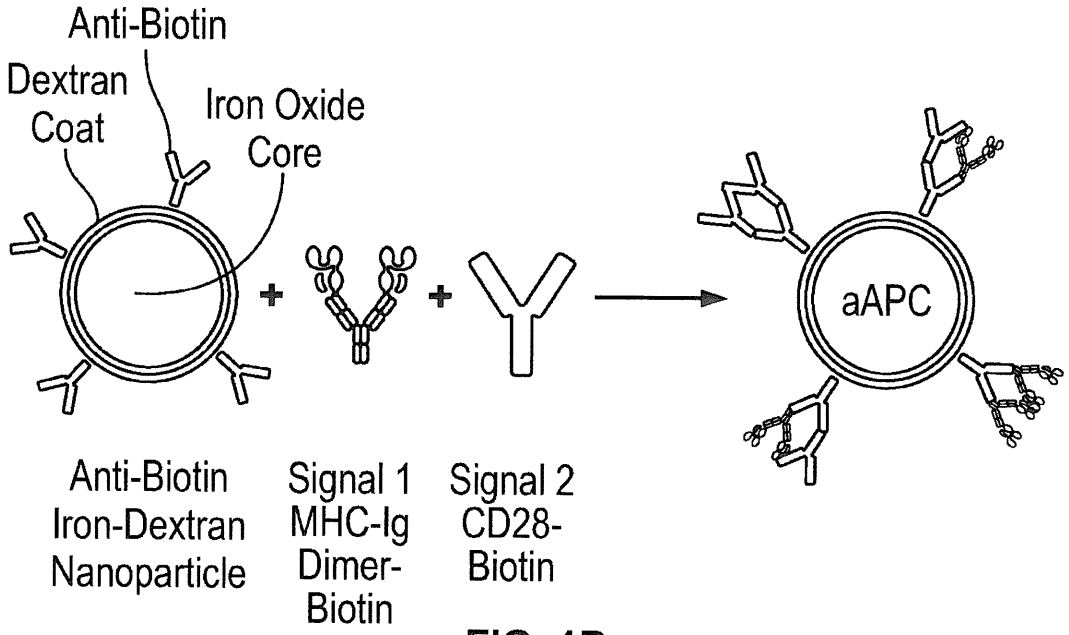


FIG. 1B

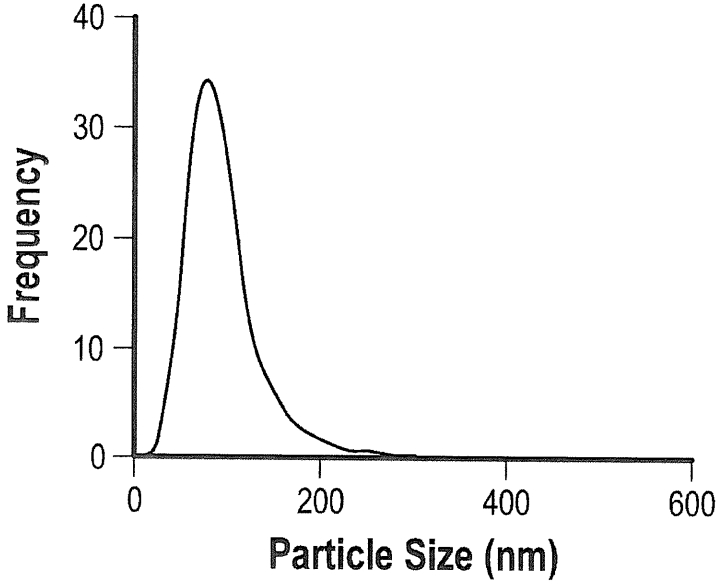


FIG. 1C

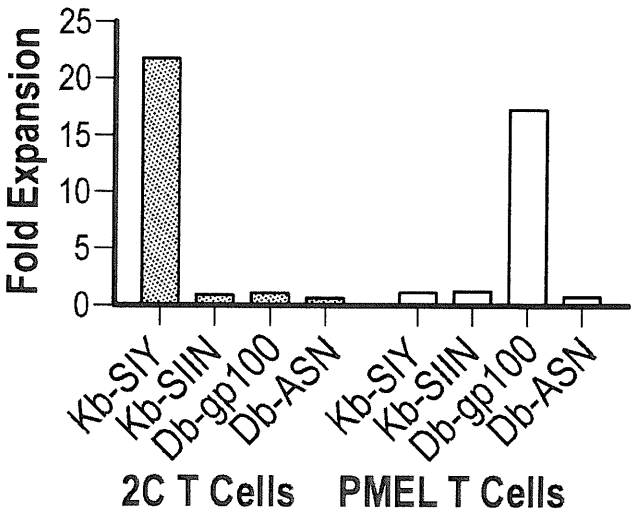


FIG. 2A

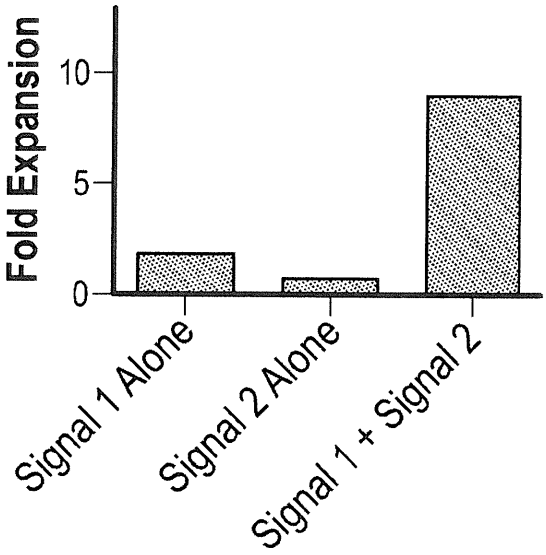


FIG. 2B

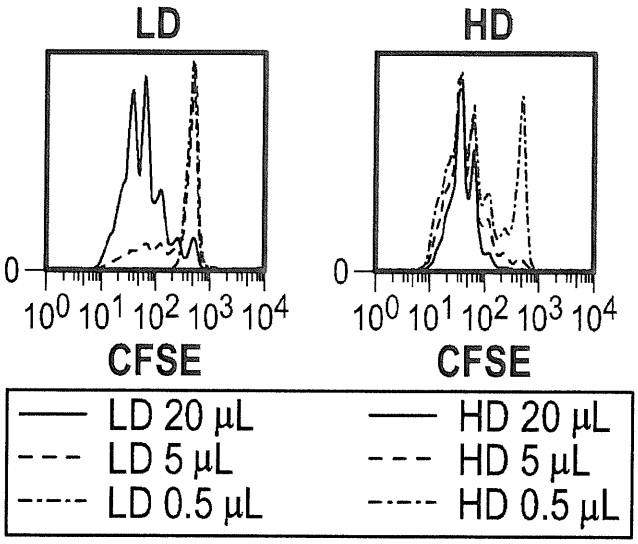


FIG. 2C

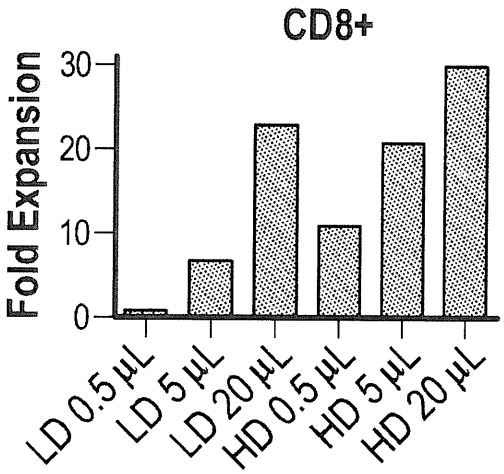


FIG. 2D

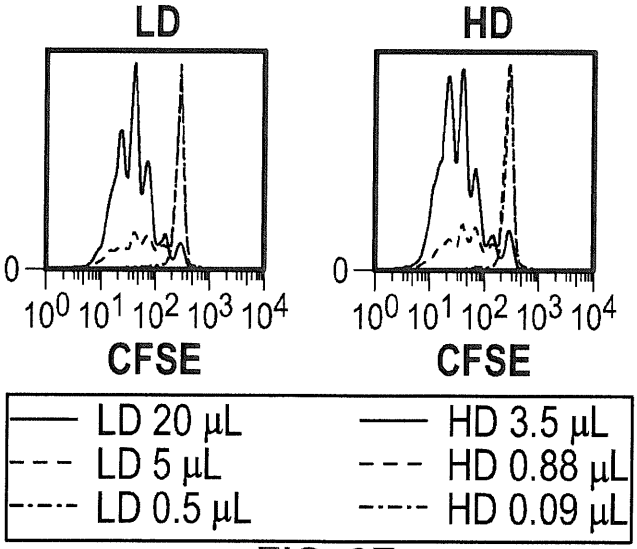


FIG. 2E

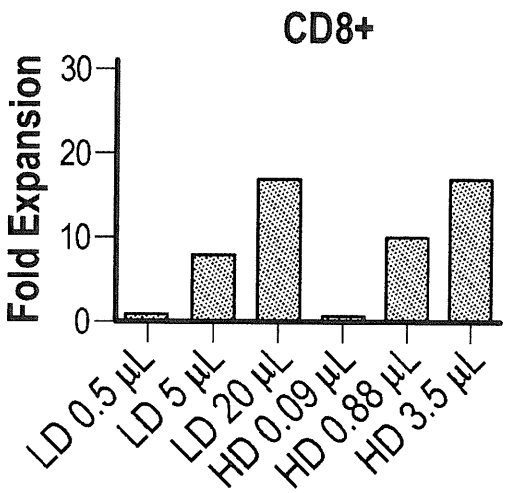


FIG. 2F

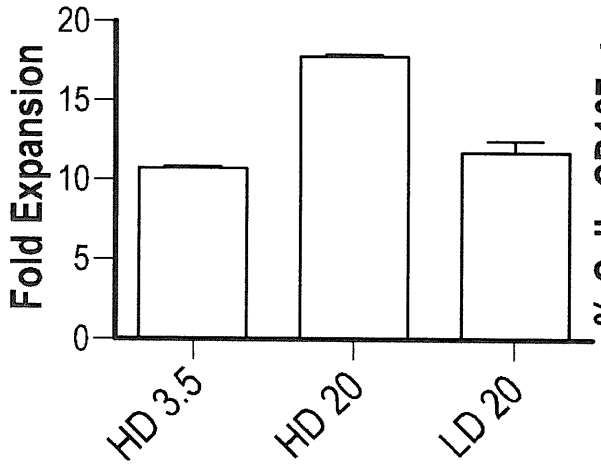


FIG. 3A

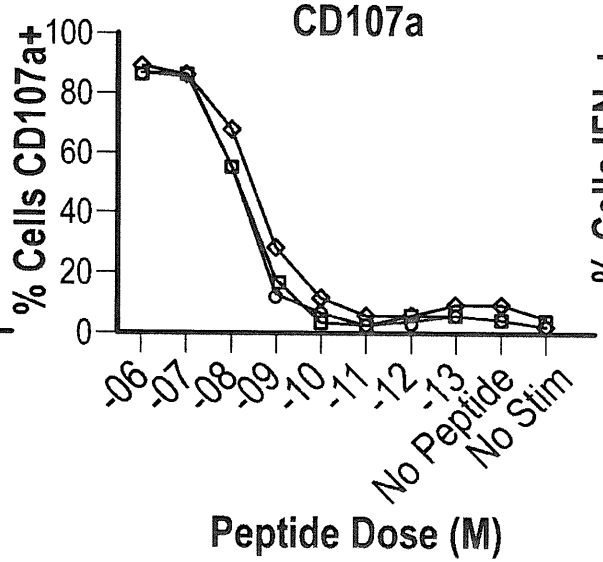


FIG. 3B

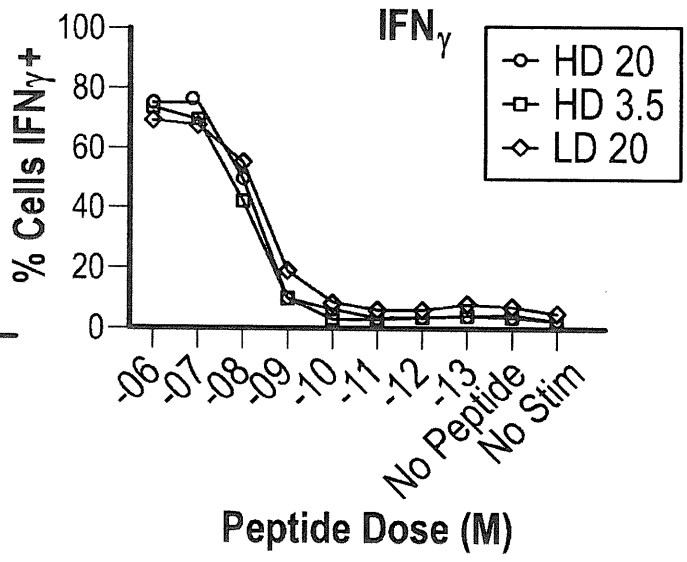


FIG. 3C

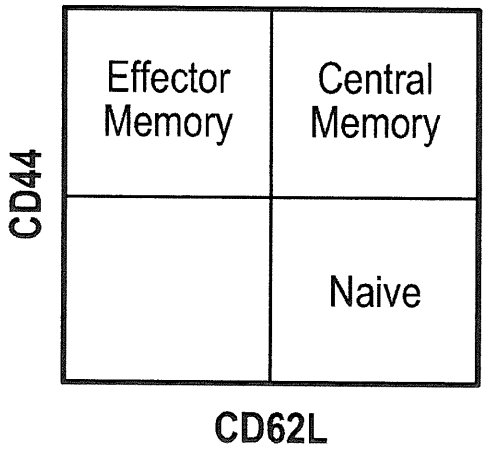


FIG. 3D

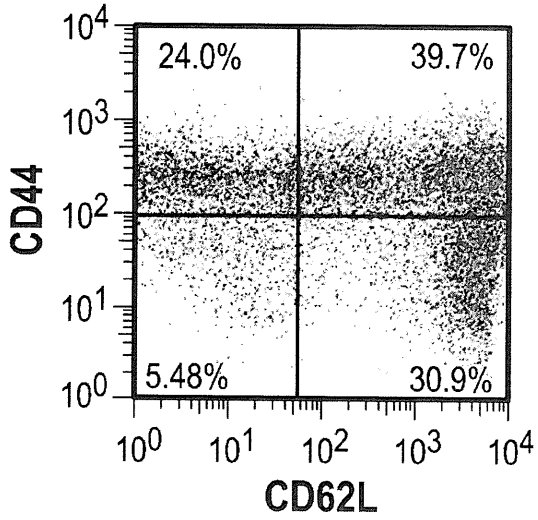


FIG. 3E

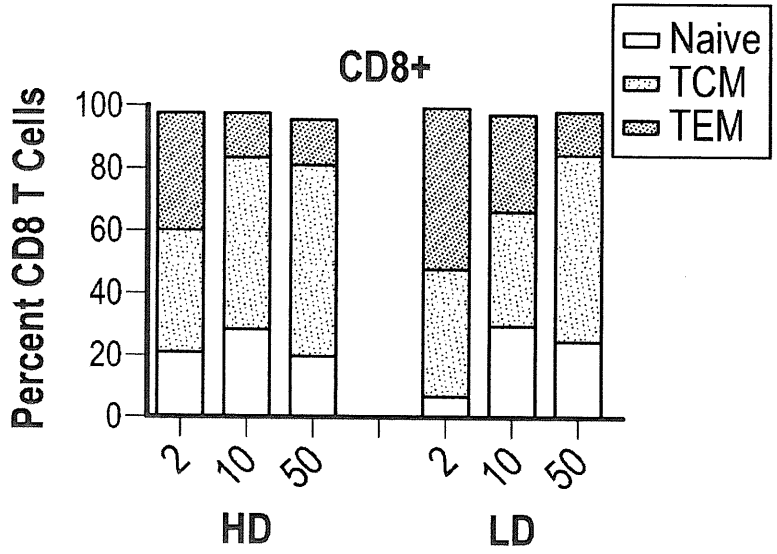


FIG. 3F

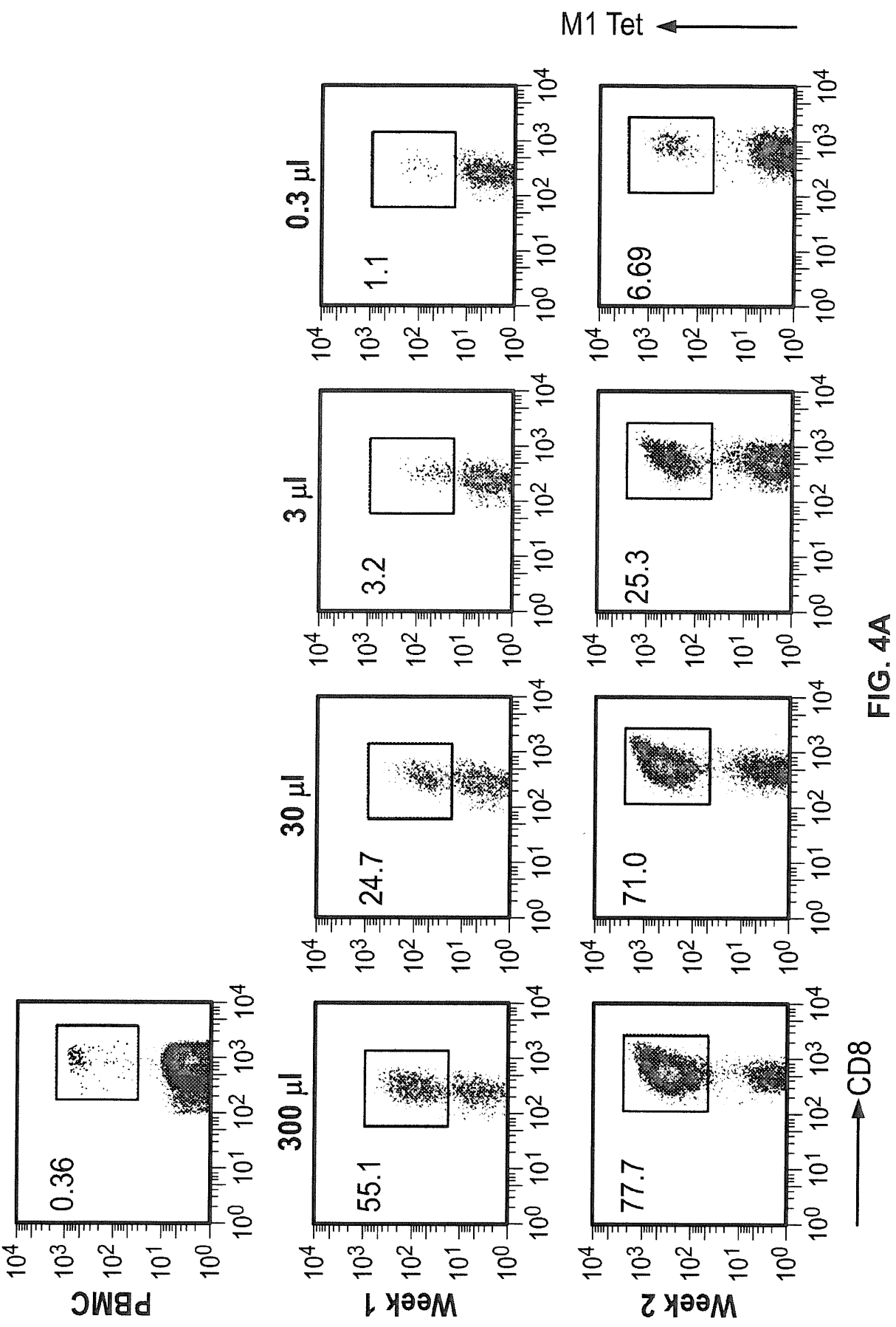

M1 Tet
CD8
PBMC
Week 1
Week 2
300 µl
30 µl
3 µl
0.3 µl
0.36
55.1
24.7
3.2
1.1
77.7
71.0
25.3
6.69

FIG. 4A

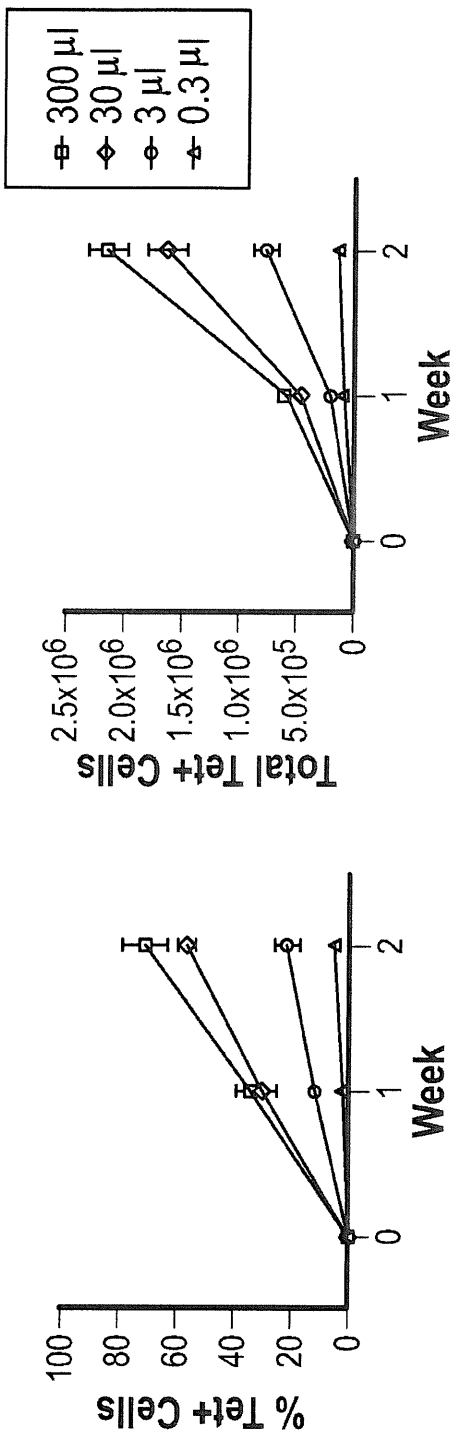

300 µl
30 µl
3 µl
0.3 µl
Total Tet+ Cells
2.5x10^6
2.0x10^6
1.5x10^6
1.0x10^6
5.0x10^5
0
0
1
2
Week
% Tet+ Cells
100
80
60
40
20
0
0
1
2
Week

FIG. 4B

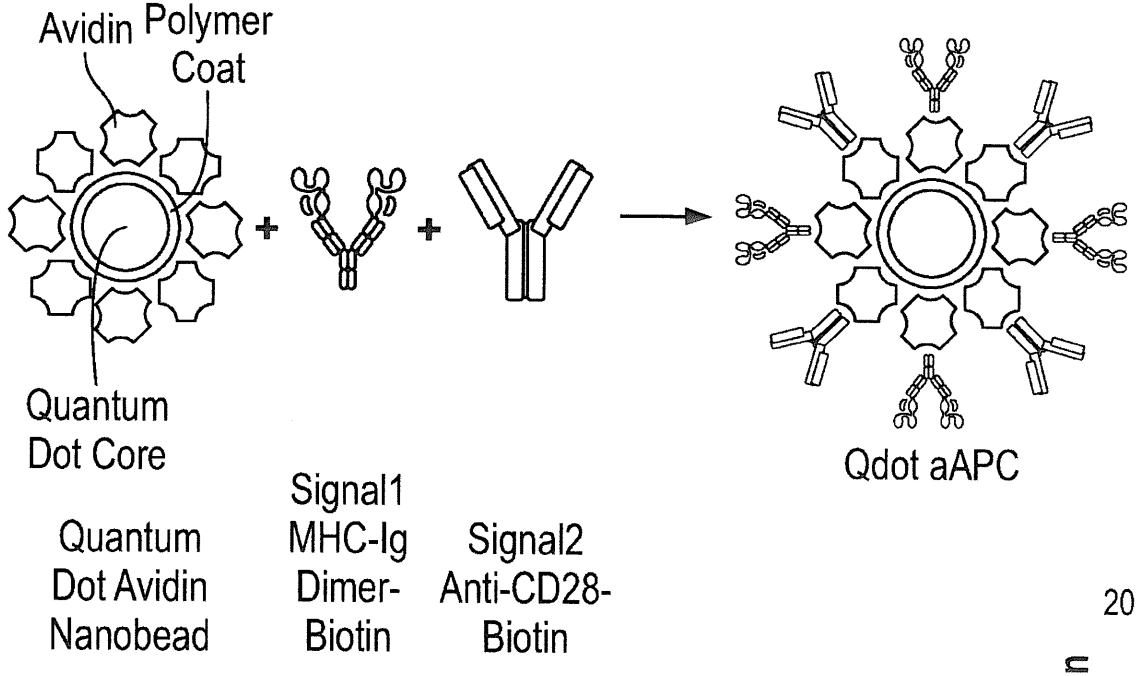

Avidin
Polymer Coat
Quantum Dot Core
Quantum Dot Avidin Nanobead
Signal1 MHC-Ig Dimer-Biotin
Signal2 Anti-CD28-Biotin
Qdot aAPC

FIG. 5A

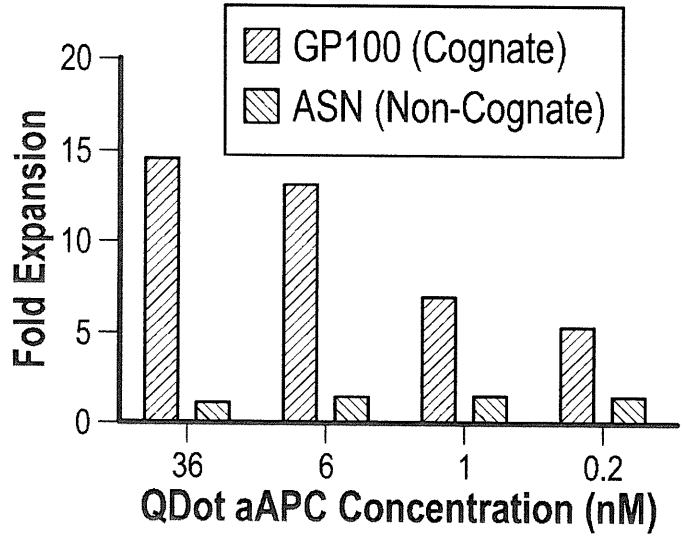

GP100 (Cognate)
ASN (Non-Cognate)
Fold Expansion
20
15
10
5
0
36
6
1
0.2
QDot aAPC Concentration (nM)

FIG. 5B

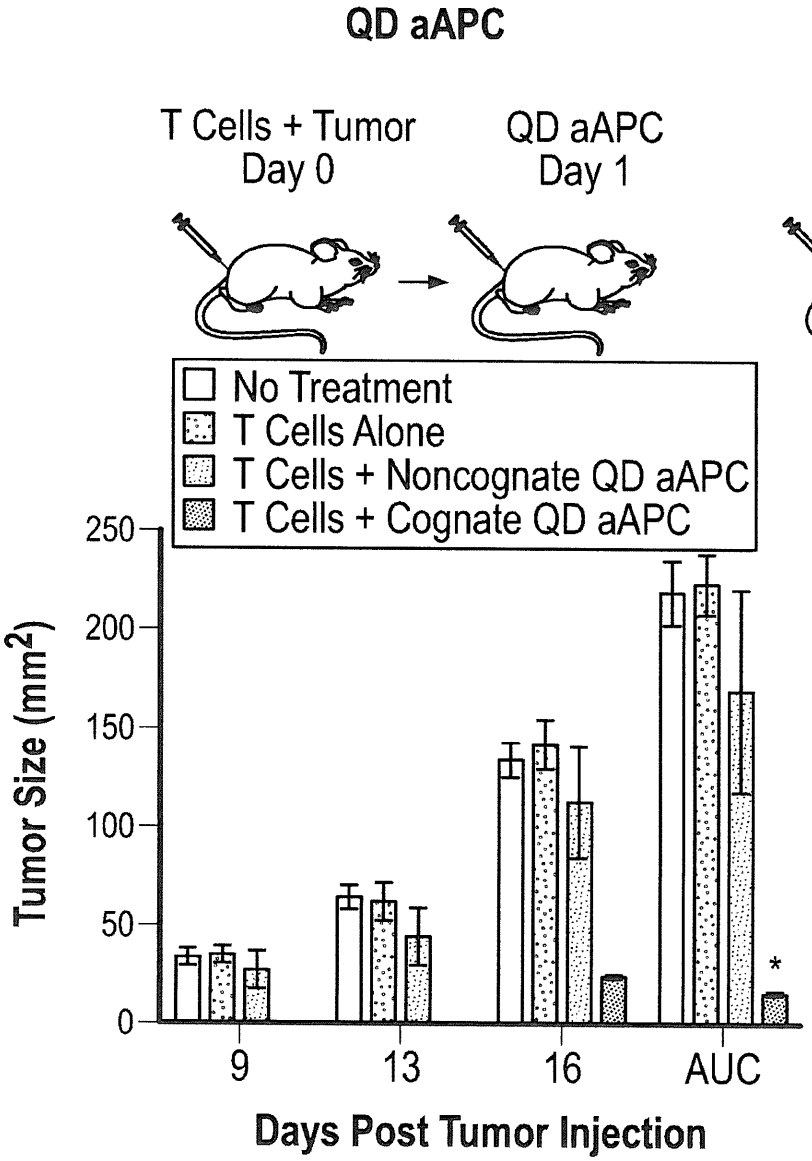

QD aAPC
T Cells + Tumor
Day 0
QD aAPC
Day 1
No Treatment
T Cells Alone
T Cells + Noncognate QD aAPC
T Cells + Cognate QD aAPC
Tumor Size (mm2)
250
200
150
100
50
0
9
13
16
AUC
*
Days Post Tumor Injection

FIG. 6A

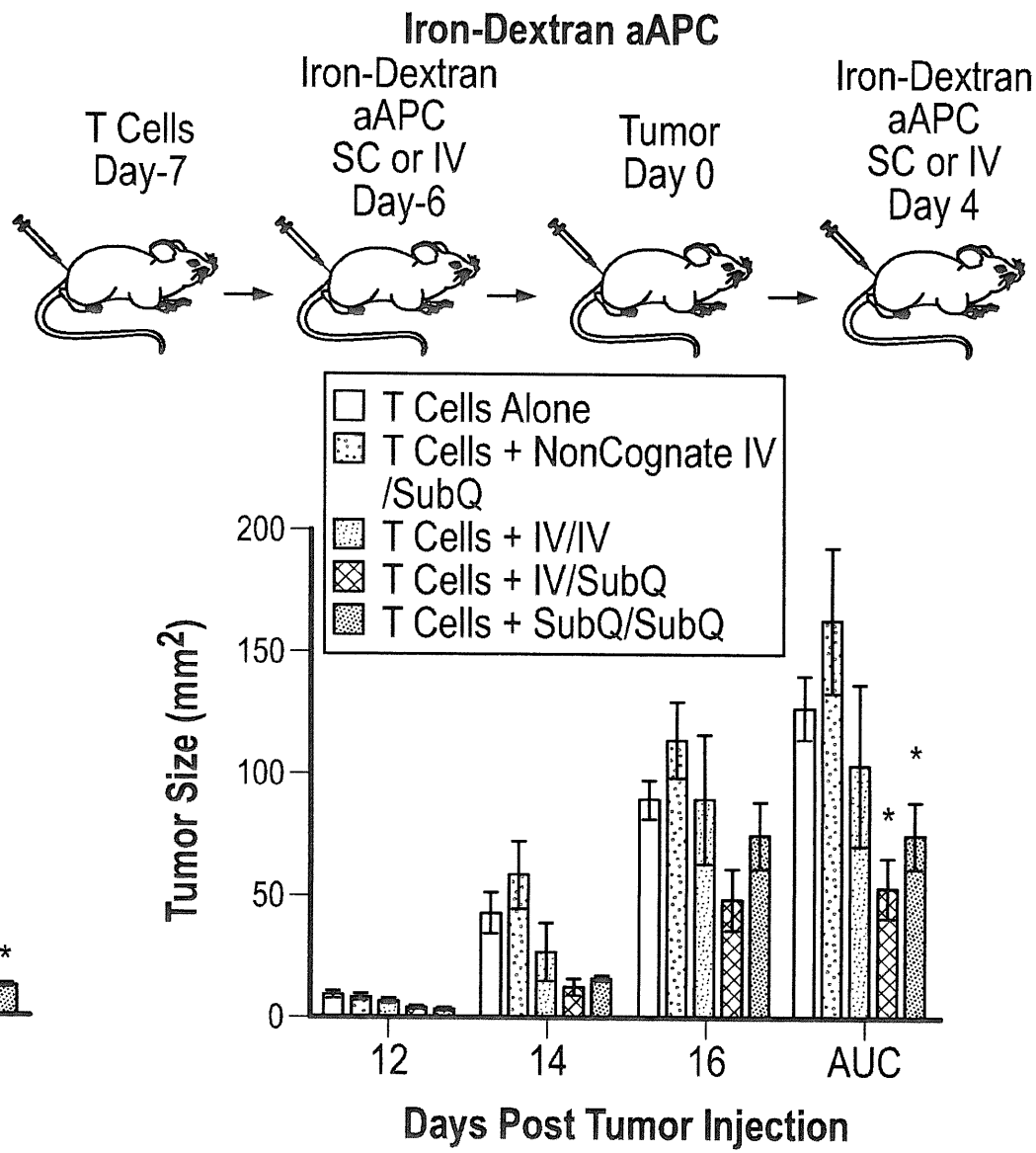

Iron-Dextran aAPC
T Cells
Day-7
Iron-Dextran
aAPC
SC or IV
Day-6
Tumor
Day 0
Iron-Dextran
aAPC
SC or IV
Day 4
T Cells Alone
T Cells + NonCognate IV
/SubQ
T Cells + IV/IV
T Cells + IV/SubQ
T Cells + SubQ/SubQ
Tumor Size (mm2)
200
150
100
50
0
12
14
16
AUC
*
*
Days Post Tumor Injection

FIG. 6B

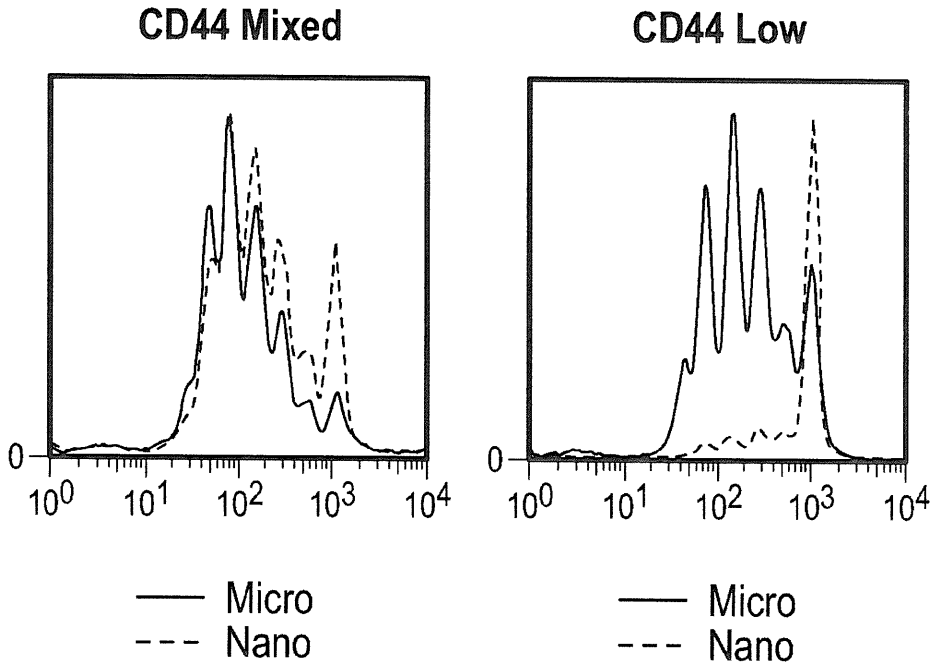

CD44 Mixed
CD44 Low
0
10^0 10^1 10^2 10^3 10^4
Micro
Nano

FIG. 7A

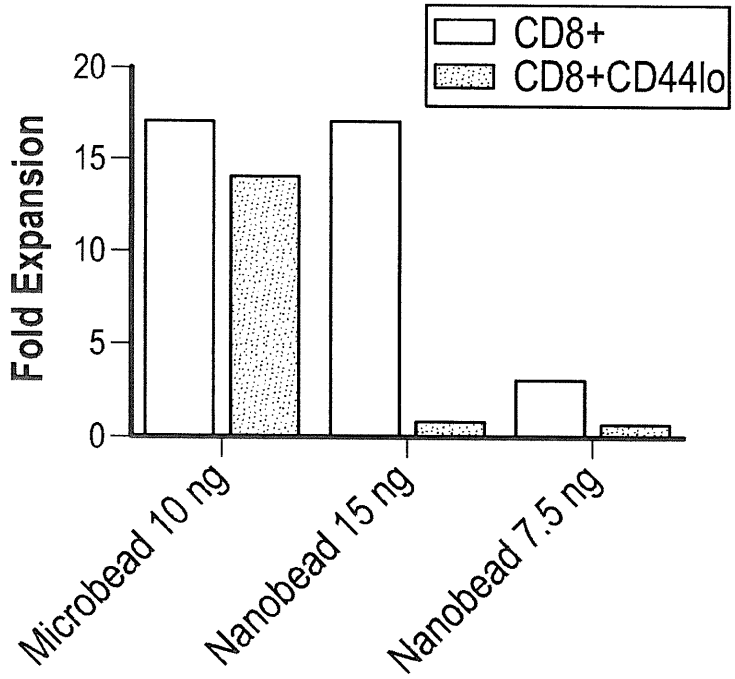

CD8+
CD8+CD44lo
Fold Expansion
20
15
10
5
0
Microbead 10 ng
Nanobead 15 ng
Nanobead 7.5 ng

FIG. 7B

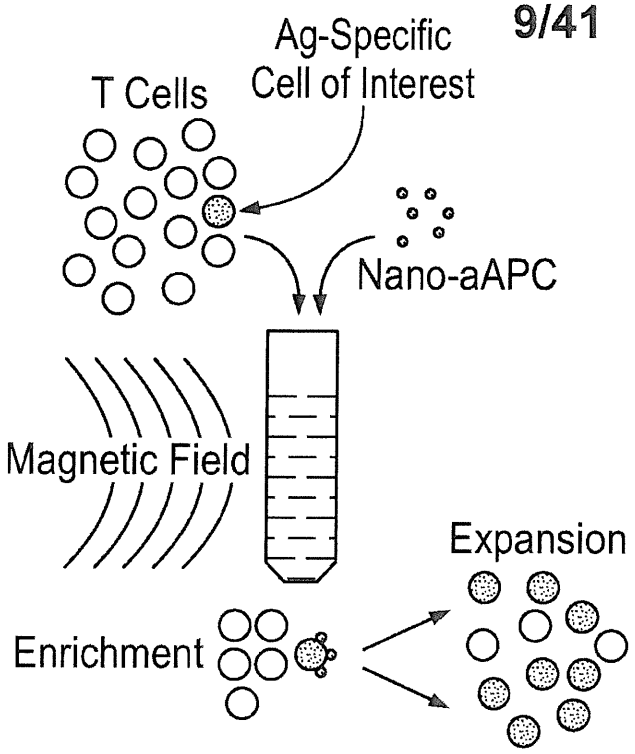


FIG. 8A

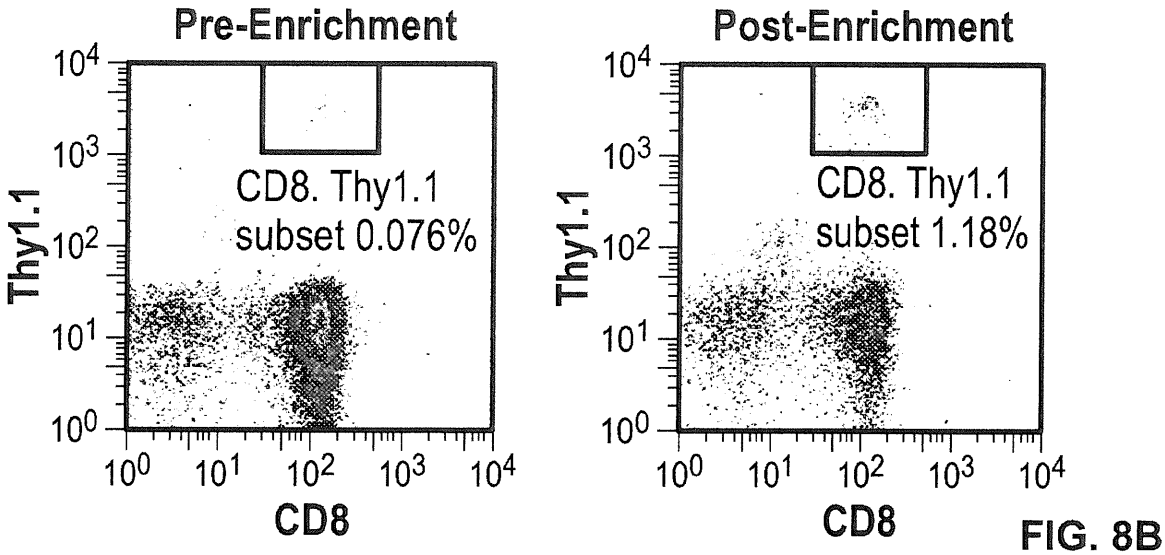


FIG. 8B

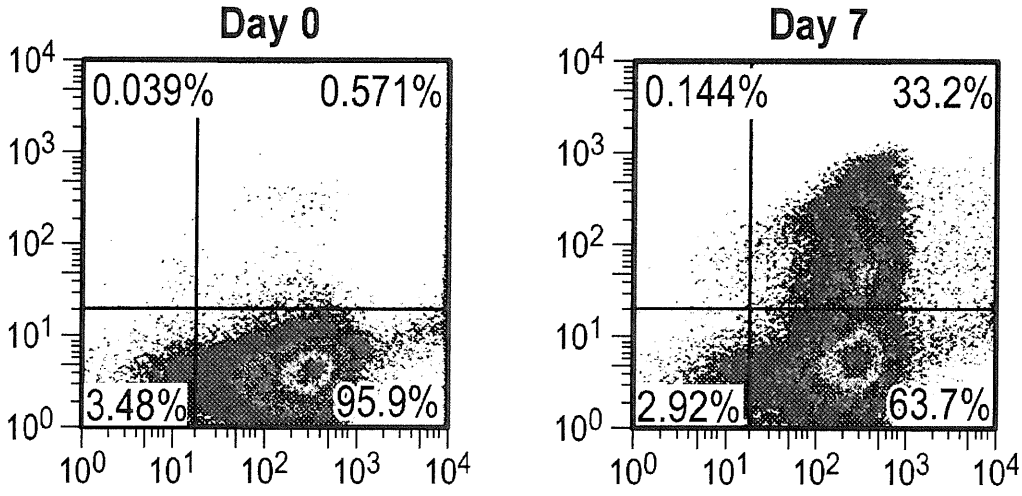


FIG. 8C

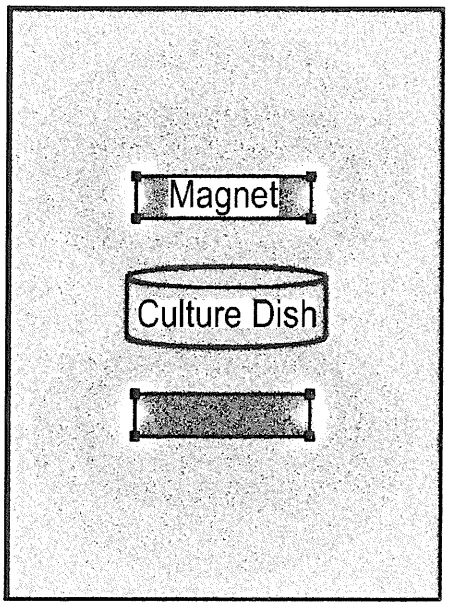


FIG. 8D

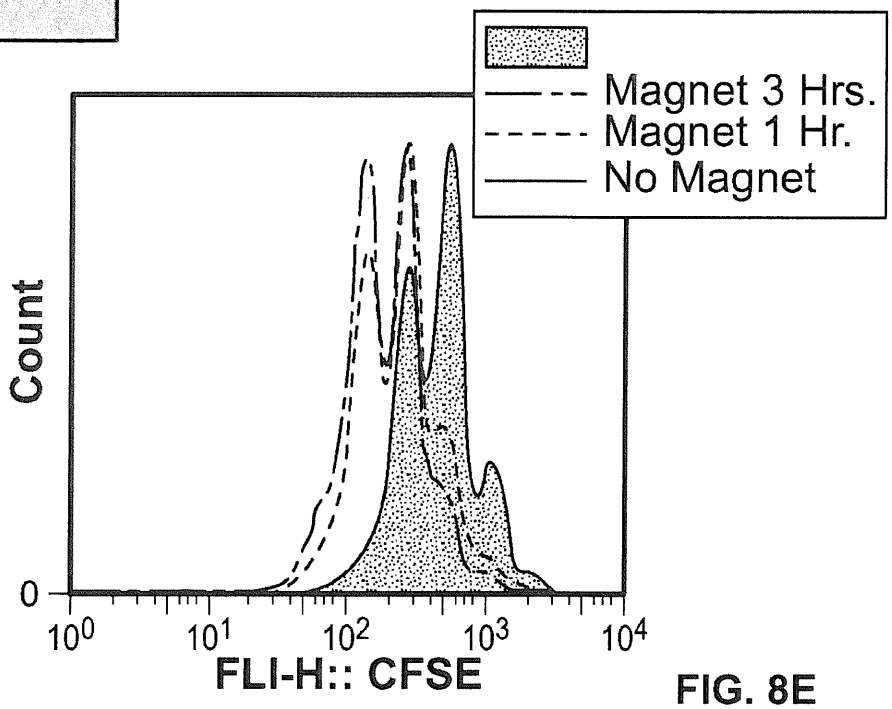


FIG. 8E

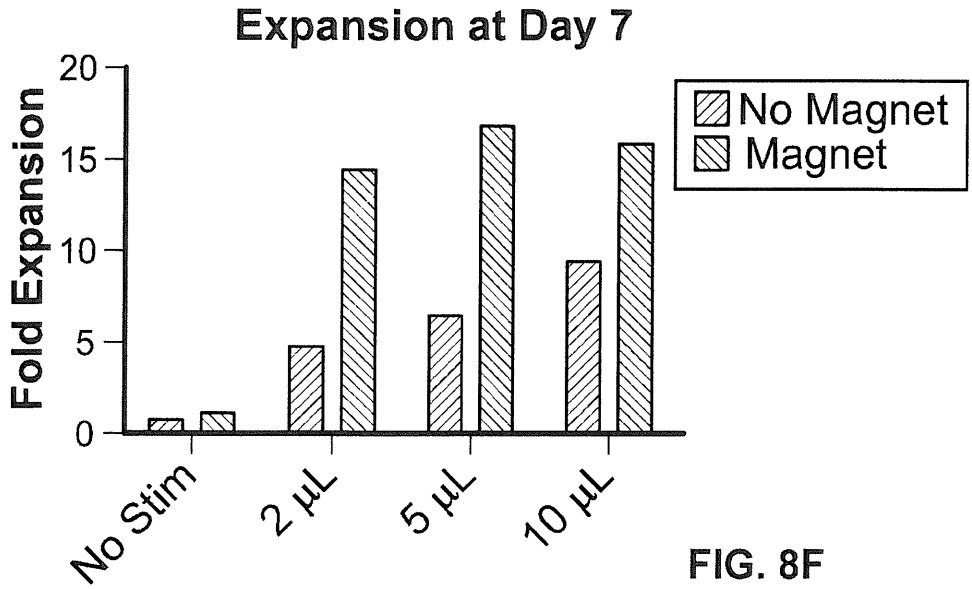


FIG. 8F

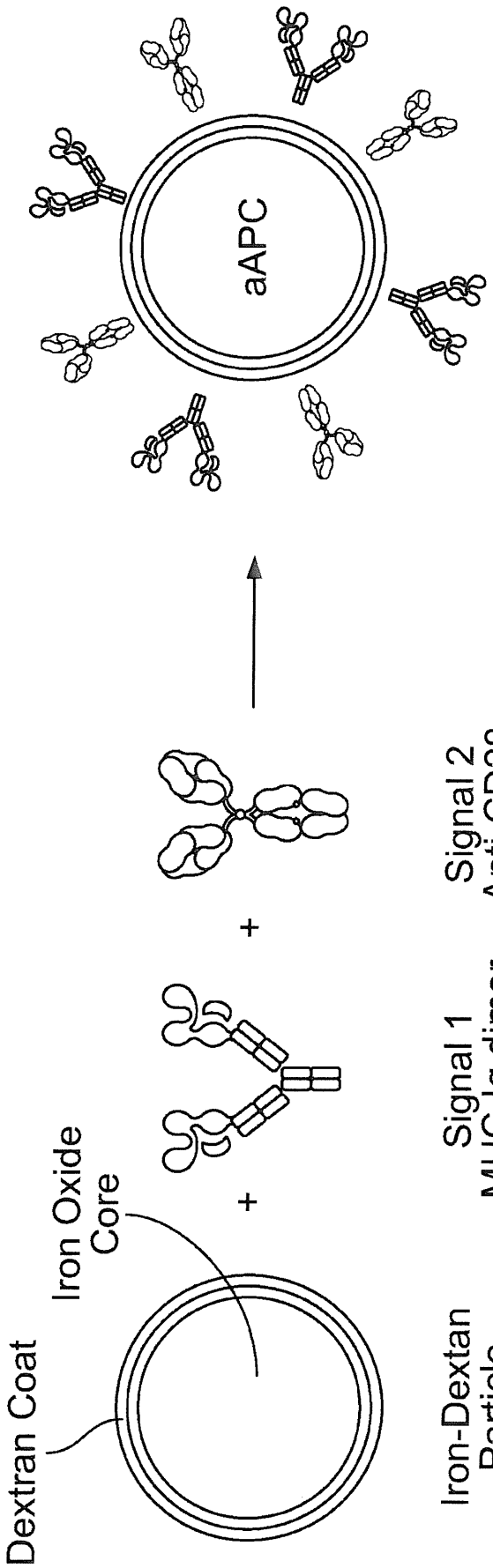

aAPC
Dextran Coat
Iron Oxide Core
Iron-Dextan Particle
Signal 1 MHC-Ig dimer
Signal 2 Anti-CD28

FIG. 9A

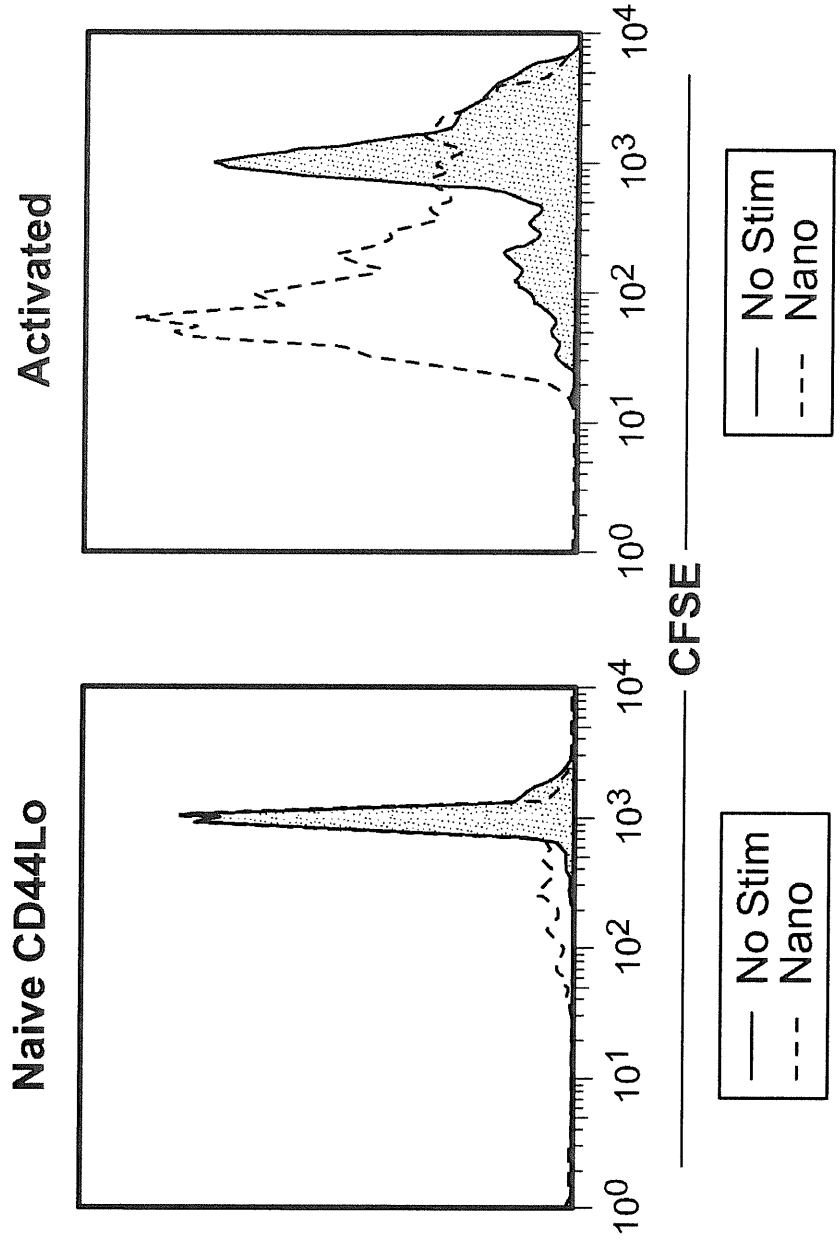


FIG. 9B

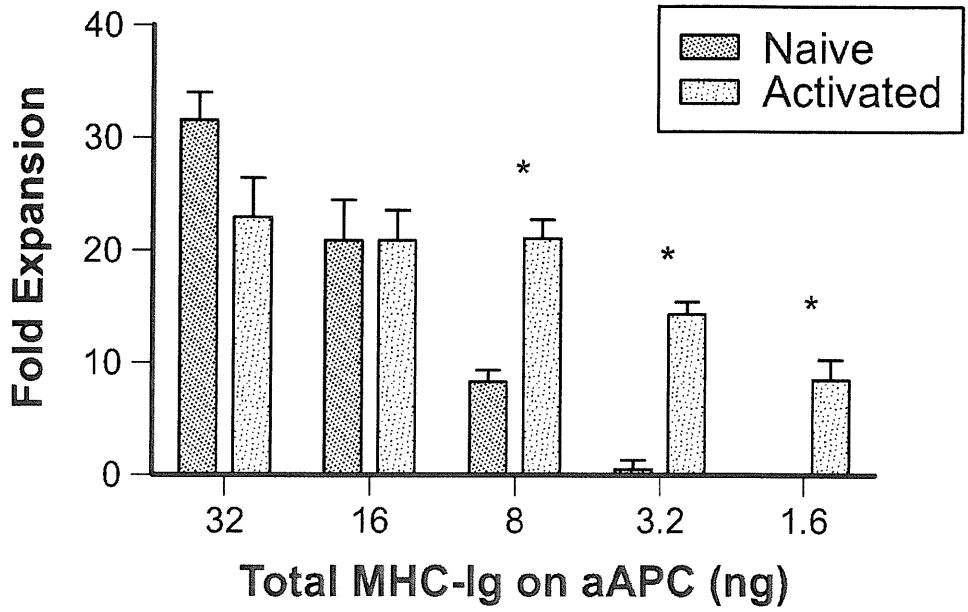

Naive
Activated
Fold Expansion
40
30
20
10
0
*
*
*
32
16
8
3.2
1.6
Total MHC-Ig on aAPC (ng)

FIG. 9C

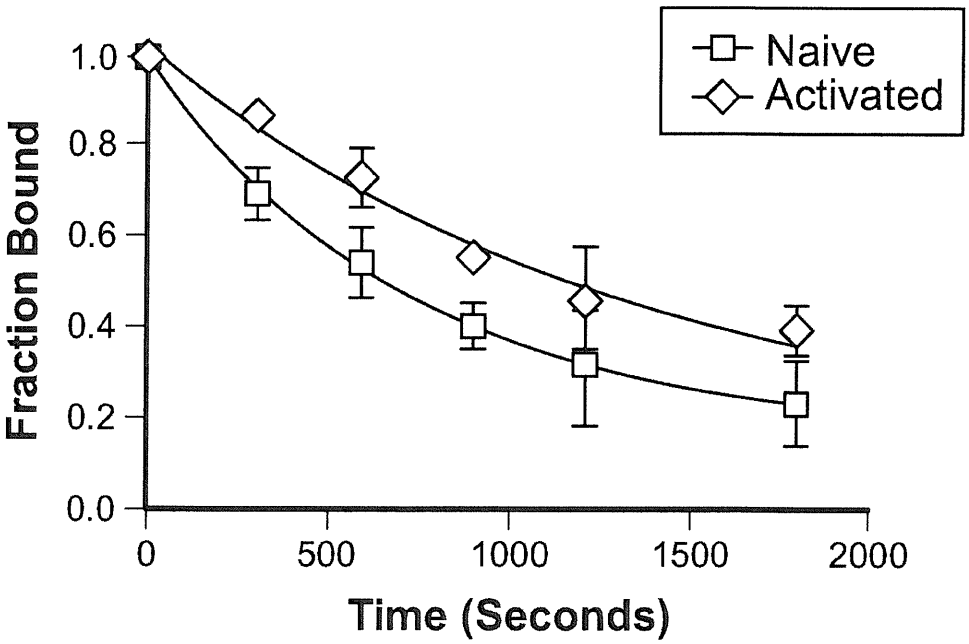

Naive
Activated
Fraction Bound
1.0
0.8
0.6
0.4
0.2
0.0
0
500
1000
1500
2000
Time (Seconds)

FIG. 9D

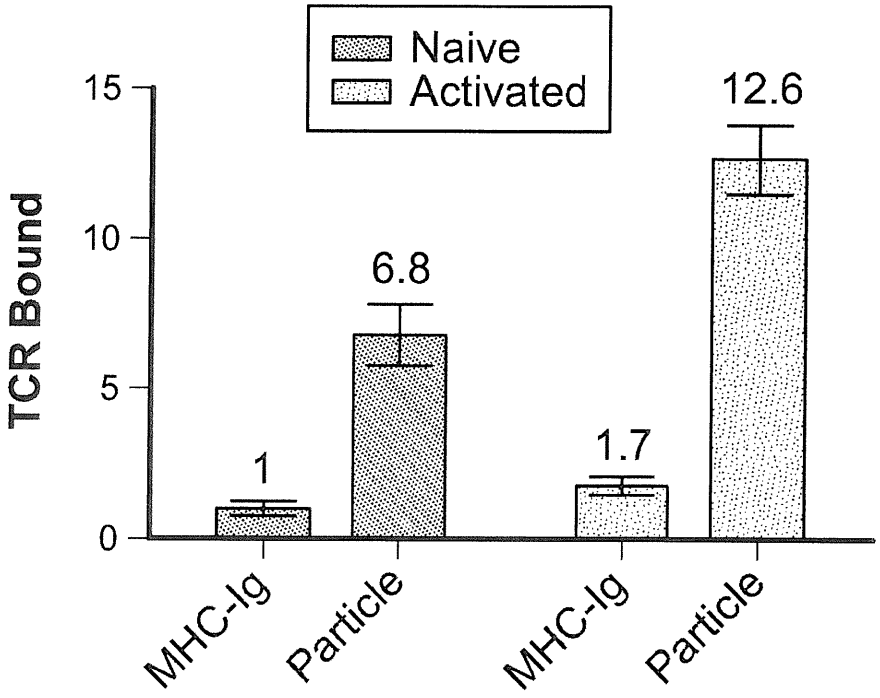

Naive
Activated
TCR Bound
15
10
5
0
1
6.8
1.7
12.6
MHC-Ig
Particle
MHC-Ig
Particle

FIG. 9E

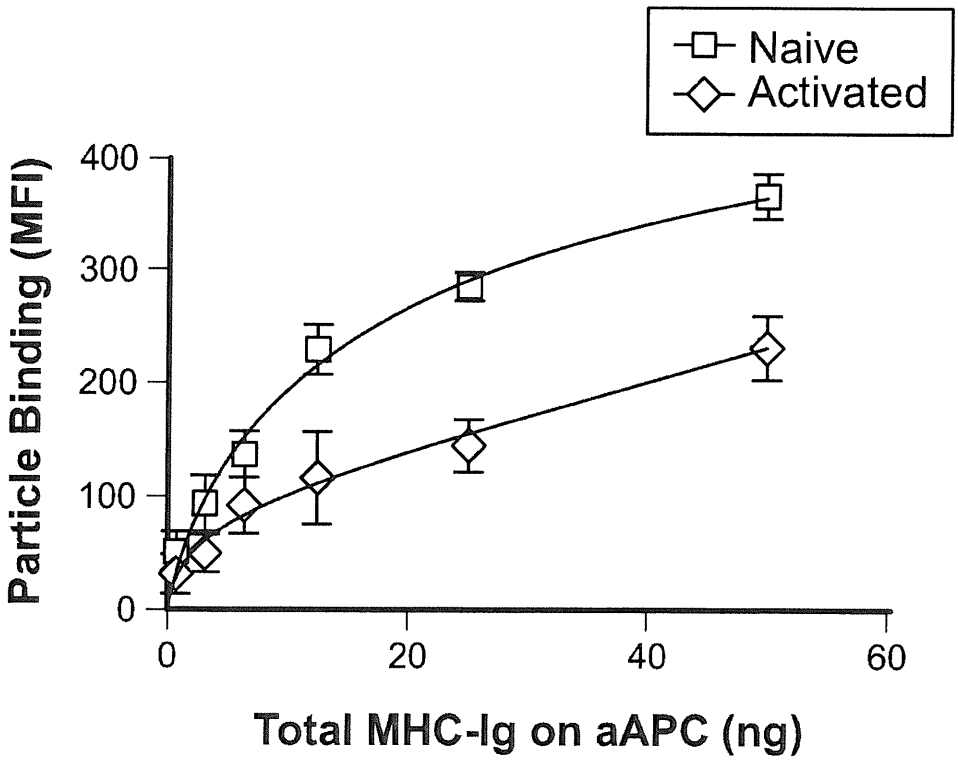

Naive
Activated
Particle Binding (MFI)
400
300
200
100
0
0
20
40
60
Total MHC-Ig on aAPC (ng)

FIG. 9F

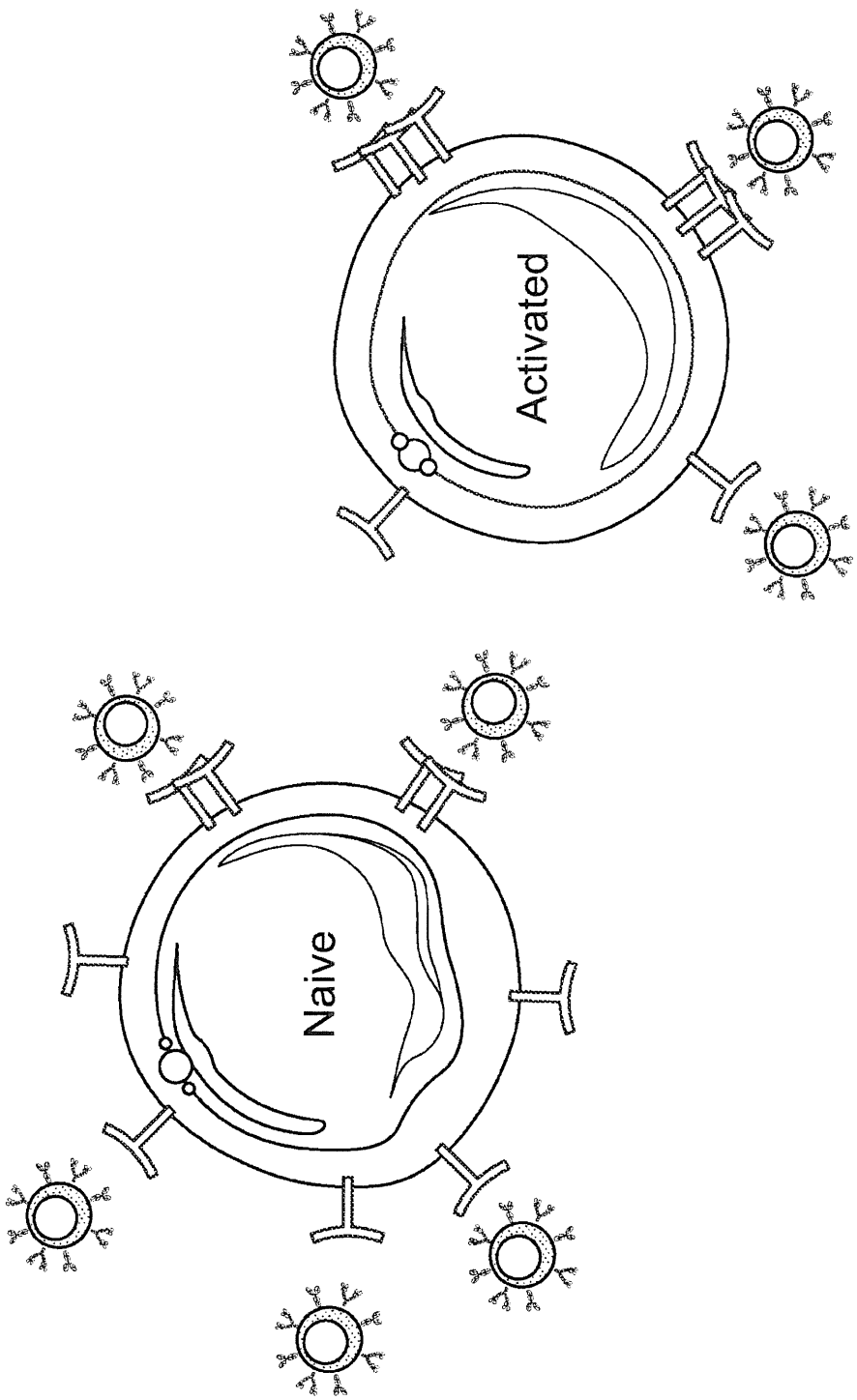


FIG. 9G

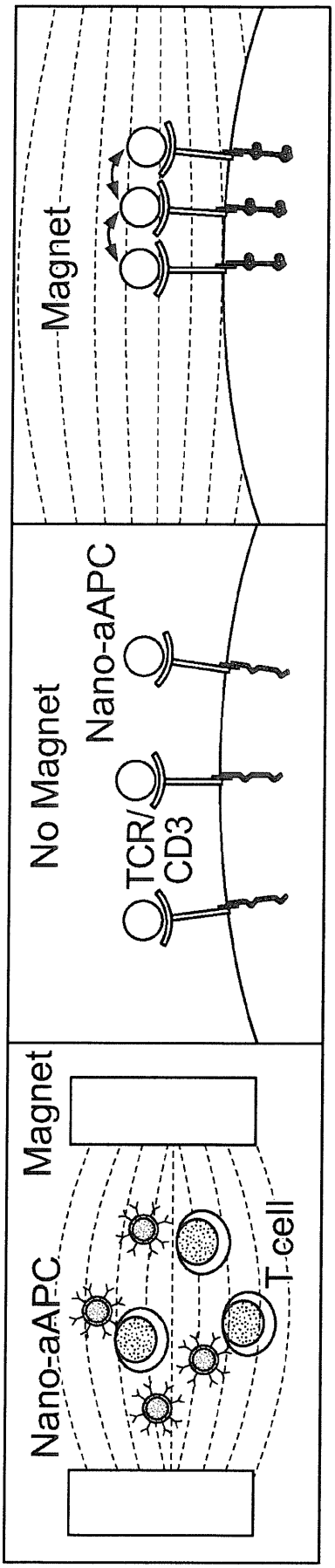


FIG. 10A

FIG. 10B

FIG. 10C

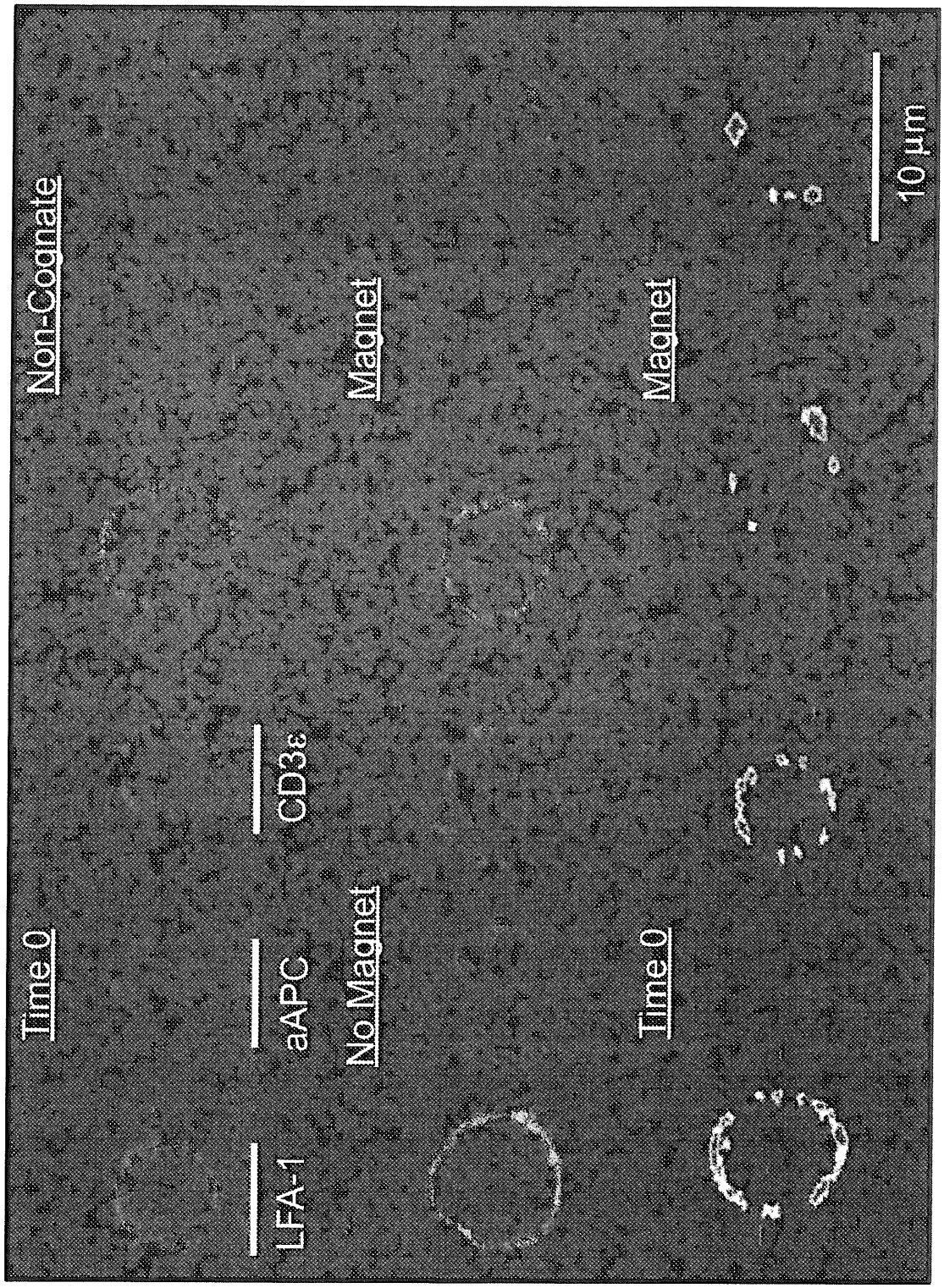


FIG. 10D

FIG. 10E

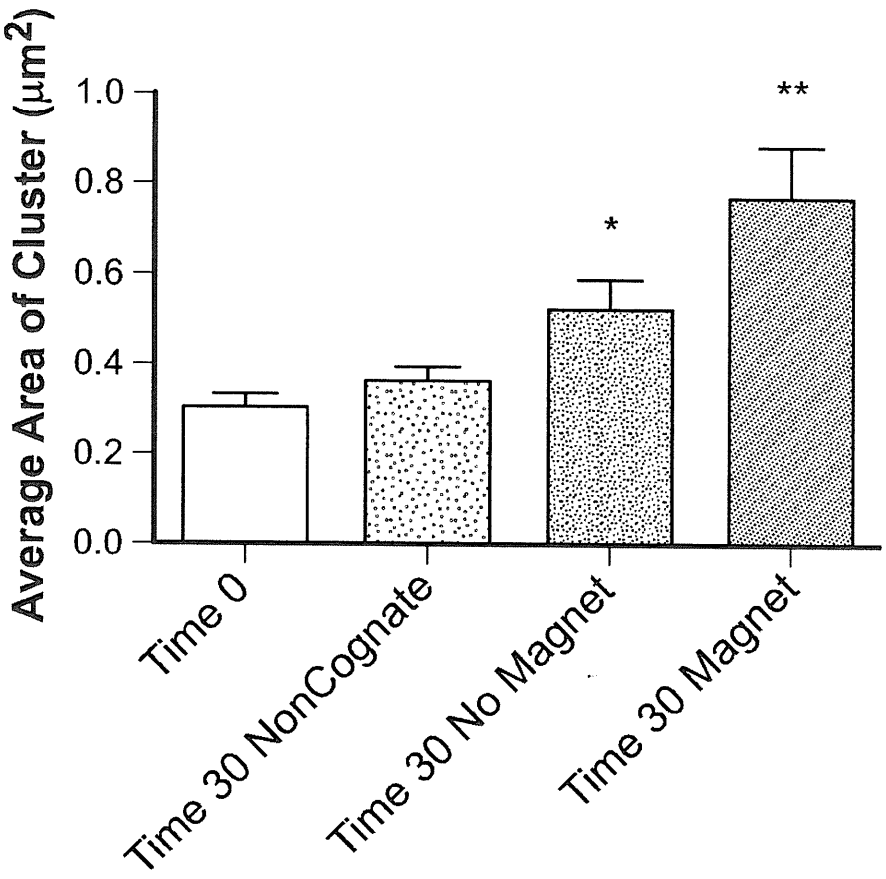


FIG. 10F

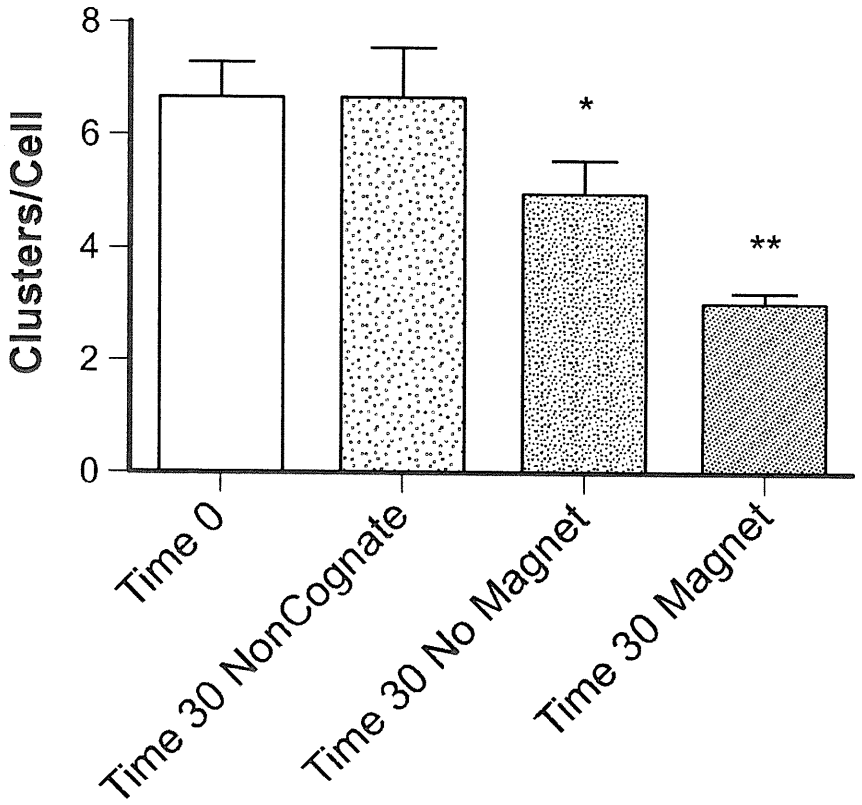


FIG. 10G

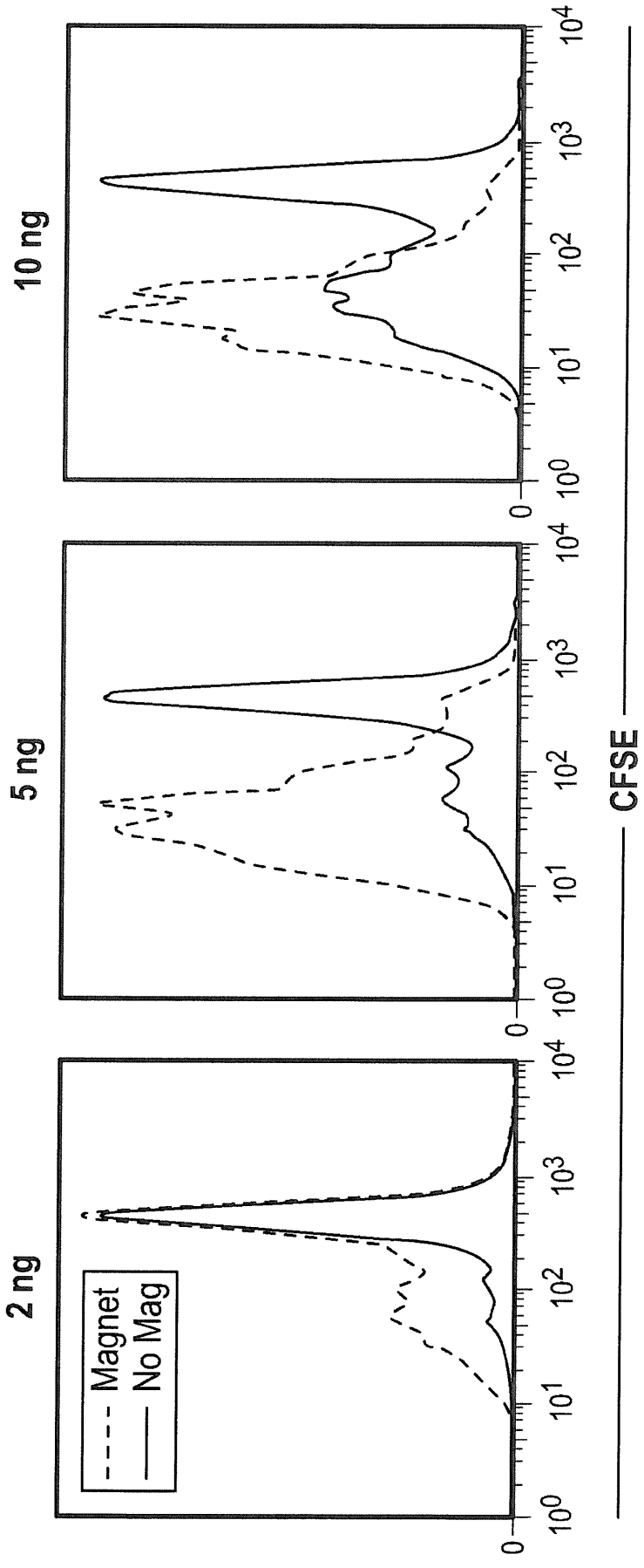


FIG. 11A

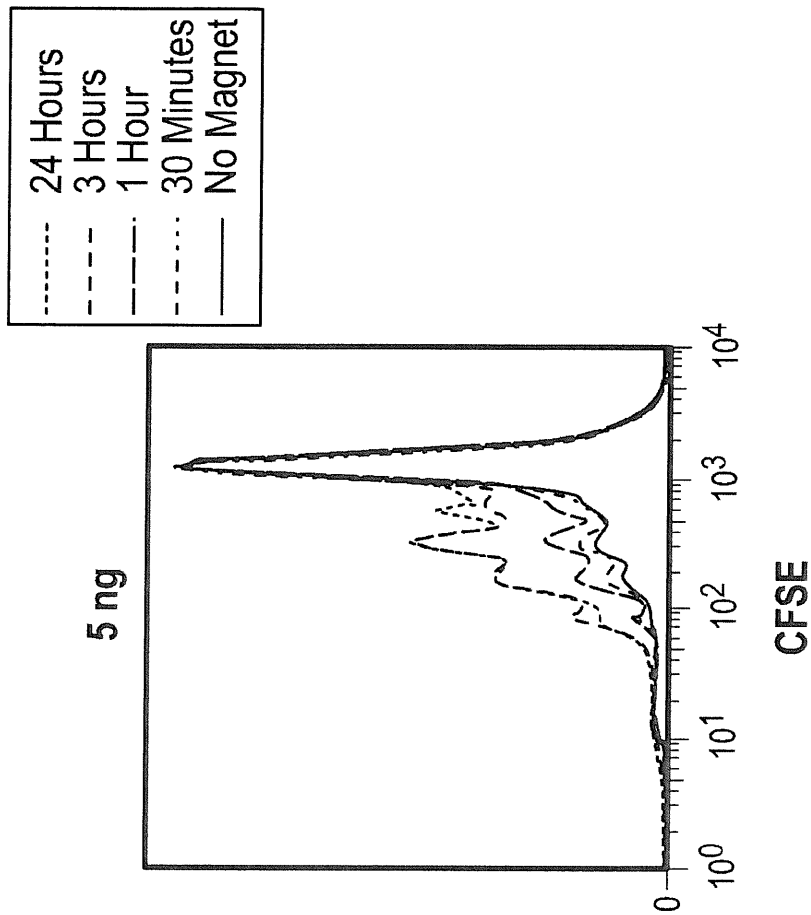


FIG. 11C

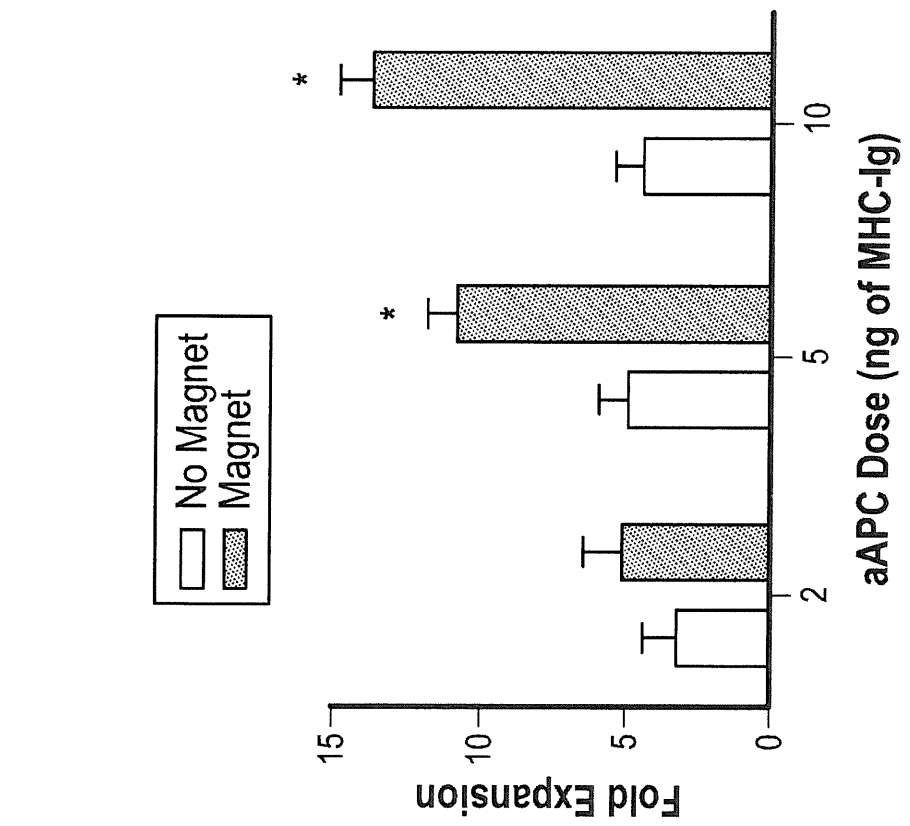


FIG. 11B

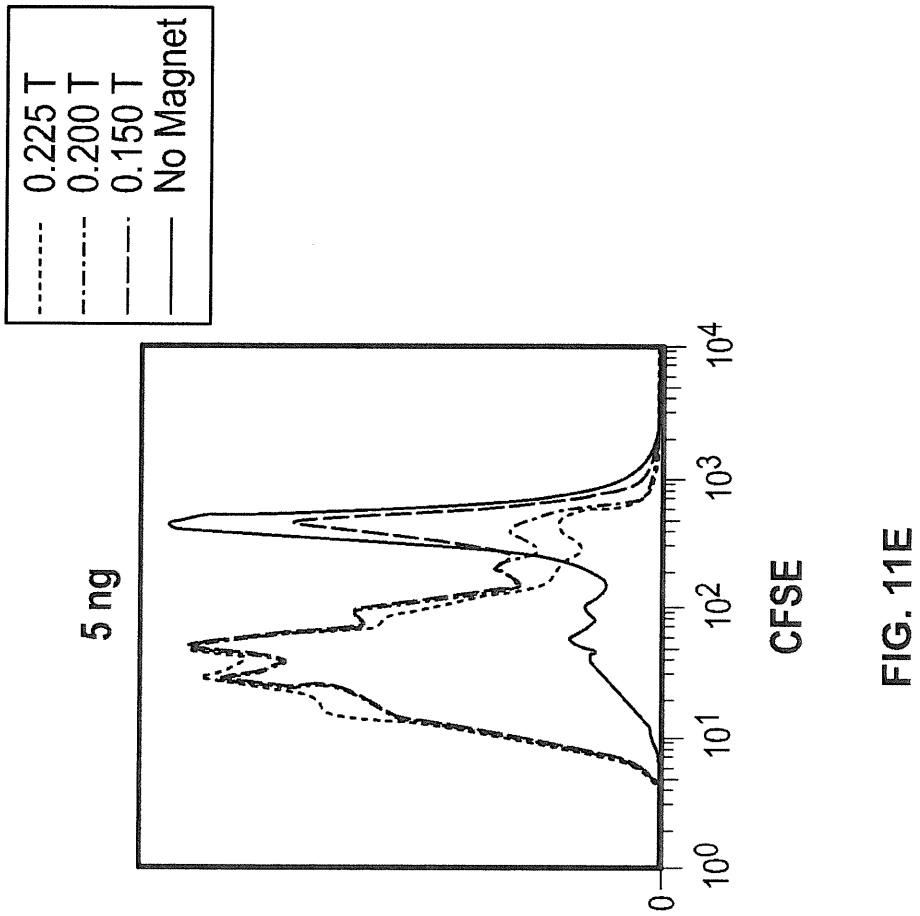


FIG. 11E

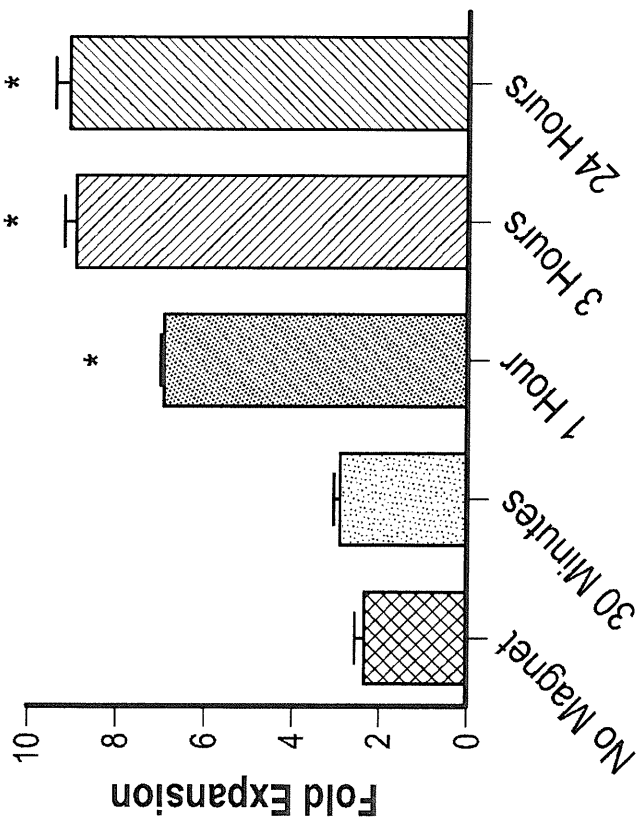


FIG. 11D

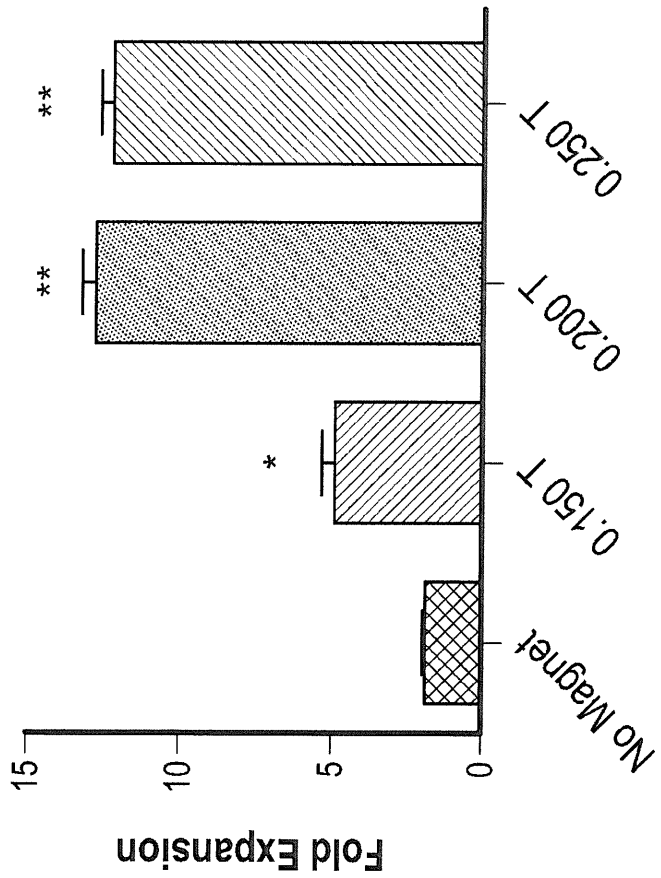

Fold Expansion
15
10
5
0
No Magnet
0.150 T
0.200 T
0.250 T
*
**
**
Magnet Strength (Tesla)

FIG. 11F

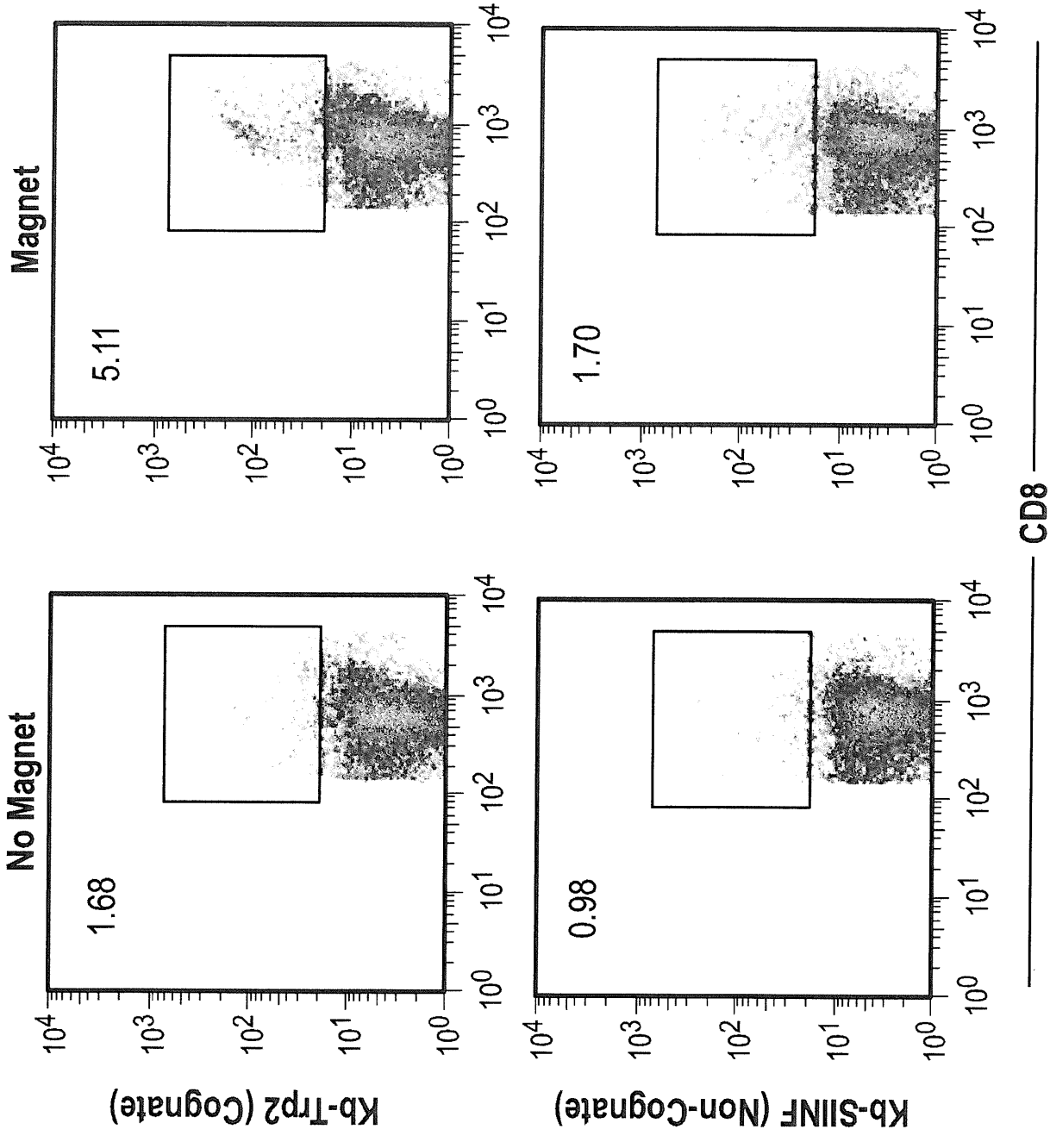

No Magnet
Magnet
1.68
5.11
0.98
1.70
Kb-Trp2 (Cognate)
Kb-SIINF (Non-Cognate)
CD8

FIG. 11G

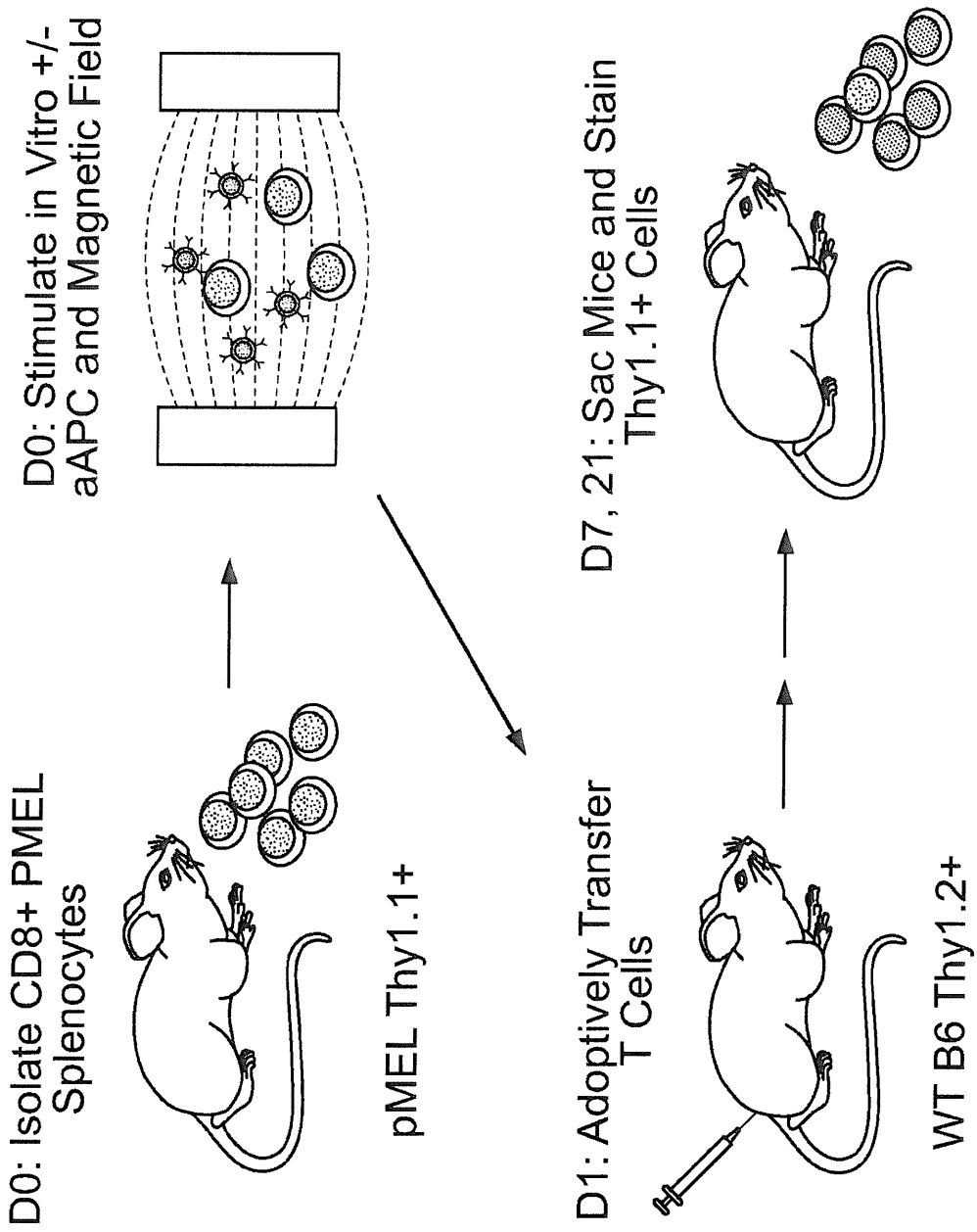

D0: Isolate CD8+ PMEL Splenocytes
pMEL Thy1.1+
D0: Stimulate in Vitro +/- aAPC and Magnetic Field
D1: Adoptively Transfer T Cells
WT B6 Thy1.2+
D7, 21: Sac Mice and Stain Thy1.1+ Cells

FIG. 12A

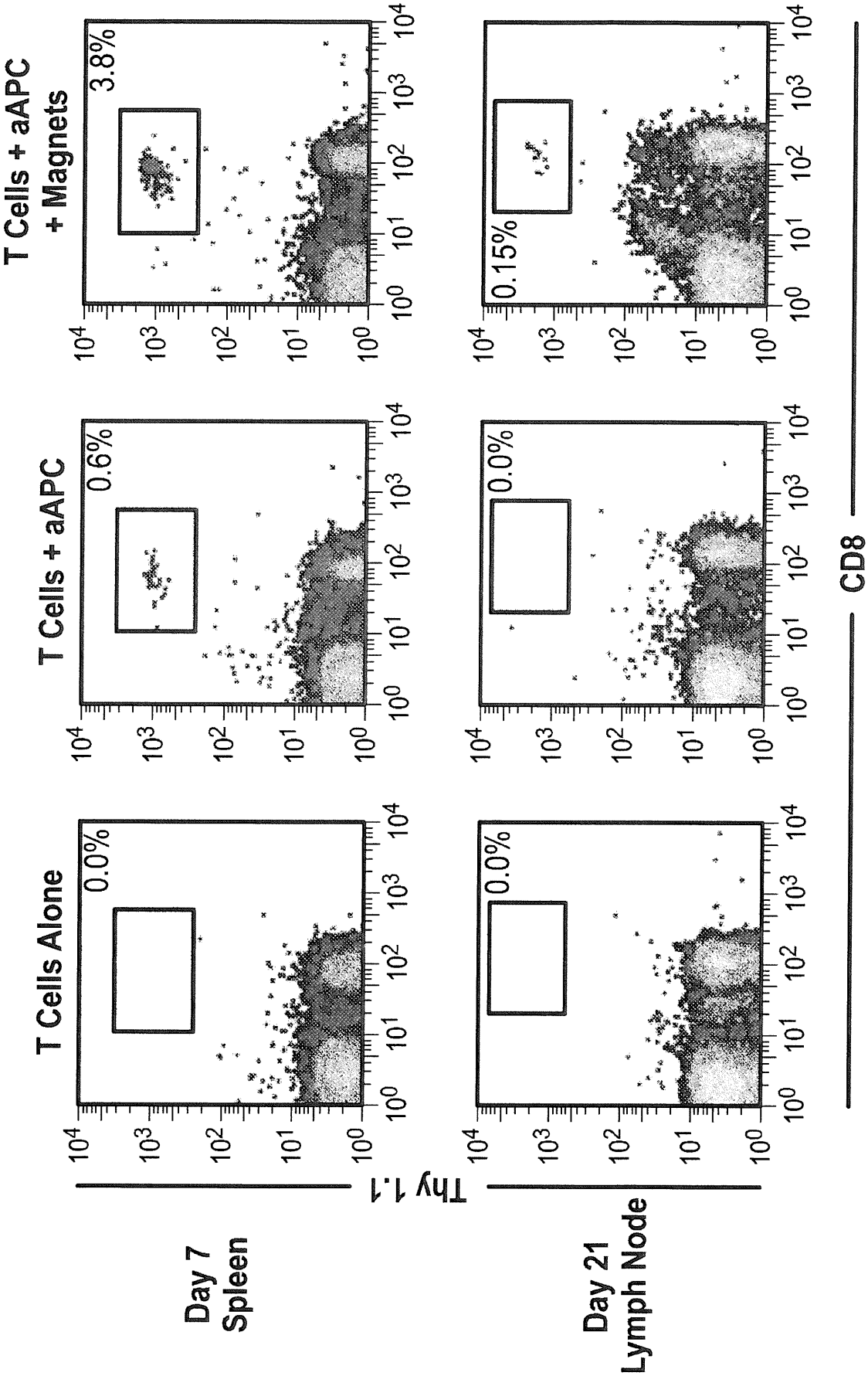

T Cells Alone
T Cells + aAPC
T Cells + aAPC + Magnets
Day 7 Spleen
Day 21 Lymph Node
Thy 1.1
CD8
0.0%
0.6%
3.8%
0.0%
0.0%
0.15%

FIG. 12B

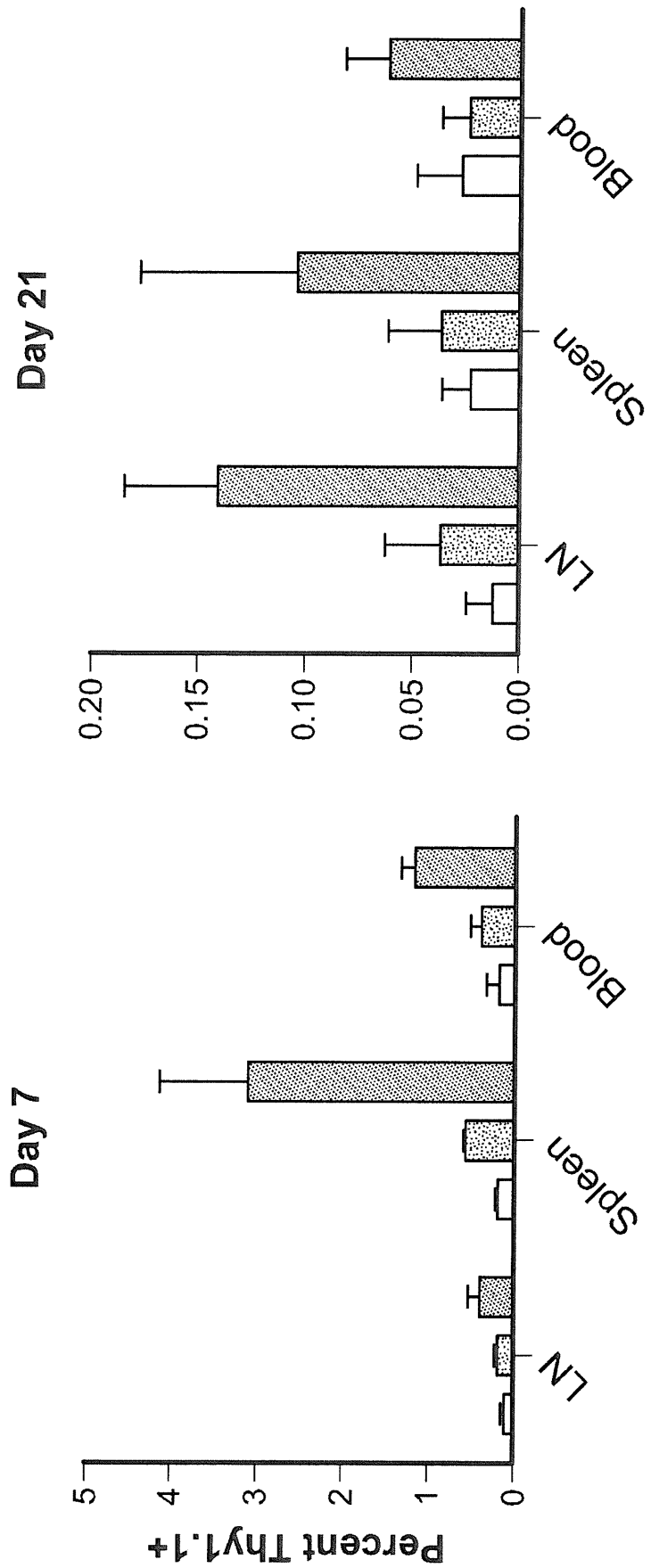

Day 7
Day 21
Percent Thy1.1+
0
1
2
3
4
5
0.00
0.05
0.10
0.15
0.20
LN
Spleen
Blood
LN
Spleen
Blood

FIG. 12C

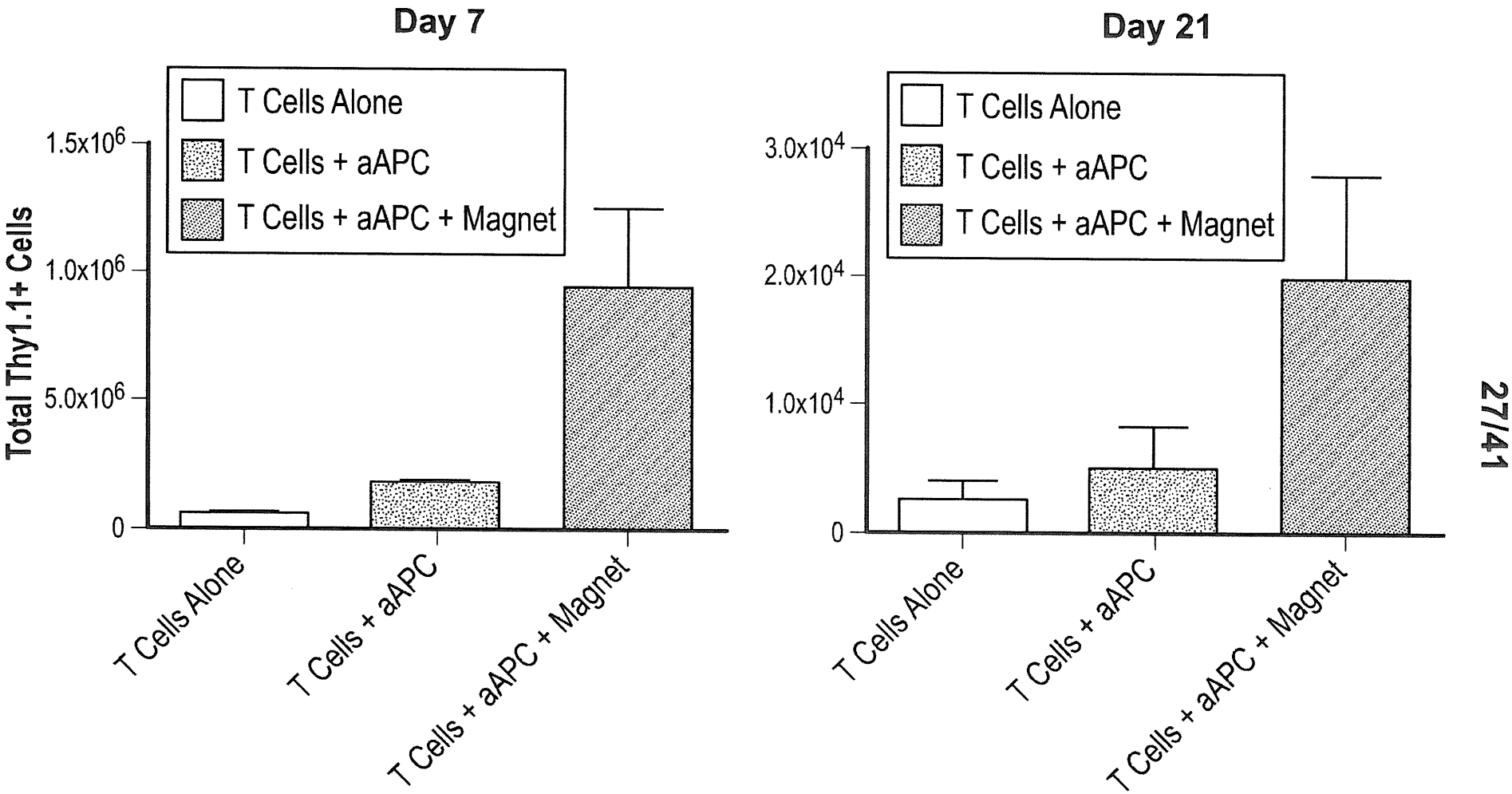

Day 7
Day 21
T Cells Alone
T Cells + aAPC
T Cells + aAPC + Magnet
Total Thy1.1+ Cells
1.5x10^6
1.0x10^6
5.0x10^6
0
3.0x10^4
2.0x10^4
1.0x10^4
0
T Cells Alone
T Cells + aAPC
T Cells + aAPC + Magnet

FIG. 12D

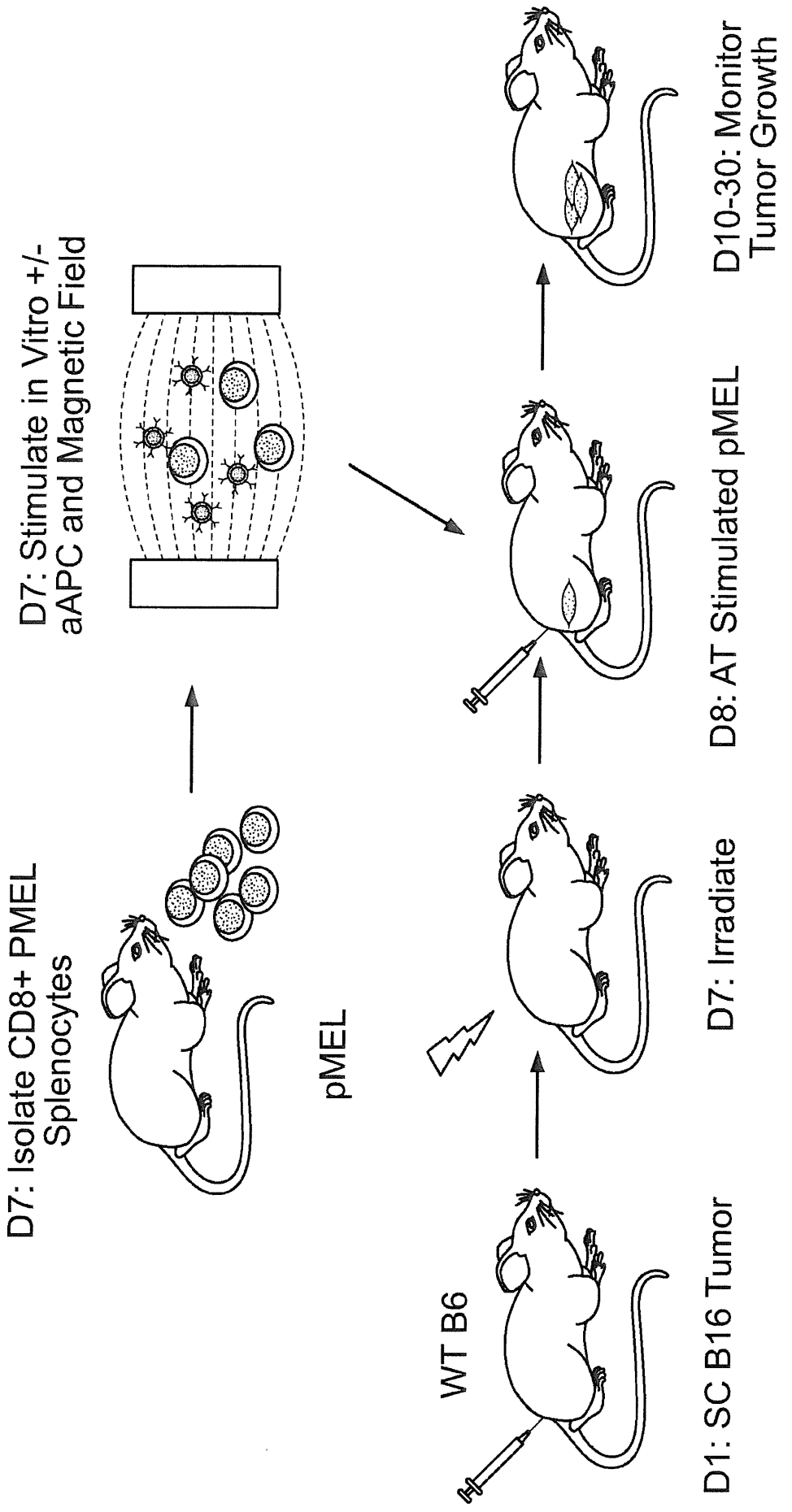

D7: Isolate CD8+ PMEL Splenocytes
D7: Stimulate in Vitro +/- aAPC and Magnetic Field
pMEL
WT B6
D1: SC B16 Tumor
D7: Irradiate
D8: AT Stimulated pMEL
D10-30: Monitor Tumor Growth

FIG. 12E

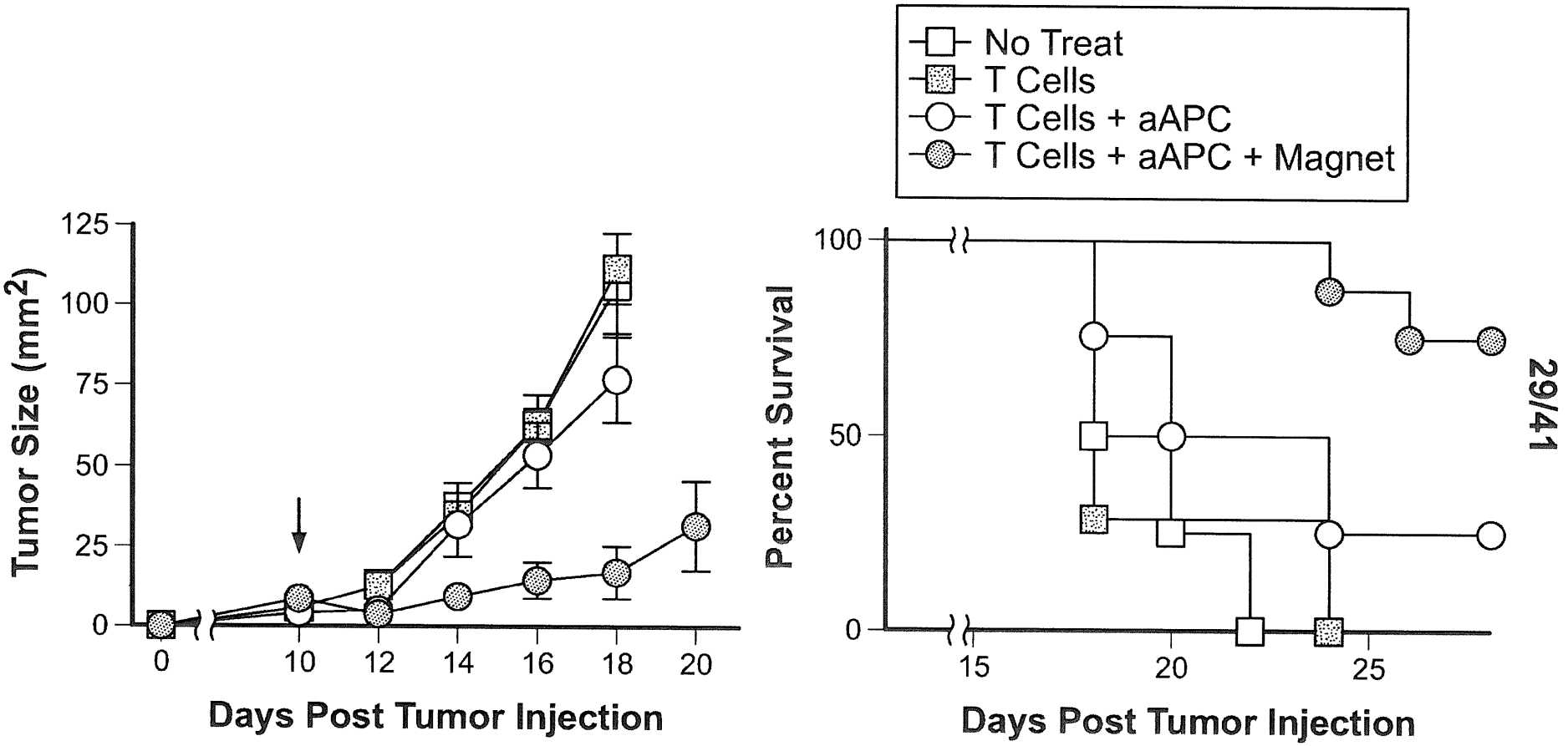

No Treat
T Cells
T Cells + aAPC
T Cells + aAPC + Magnet
Tumor Size (mm2)
125
100
75
50
25
0
0
10
12
14
16
18
20
Days Post Tumor Injection
Percent Survival
100
50
0
15
20
25
Days Post Tumor Injection
29/41

FIG. 12F

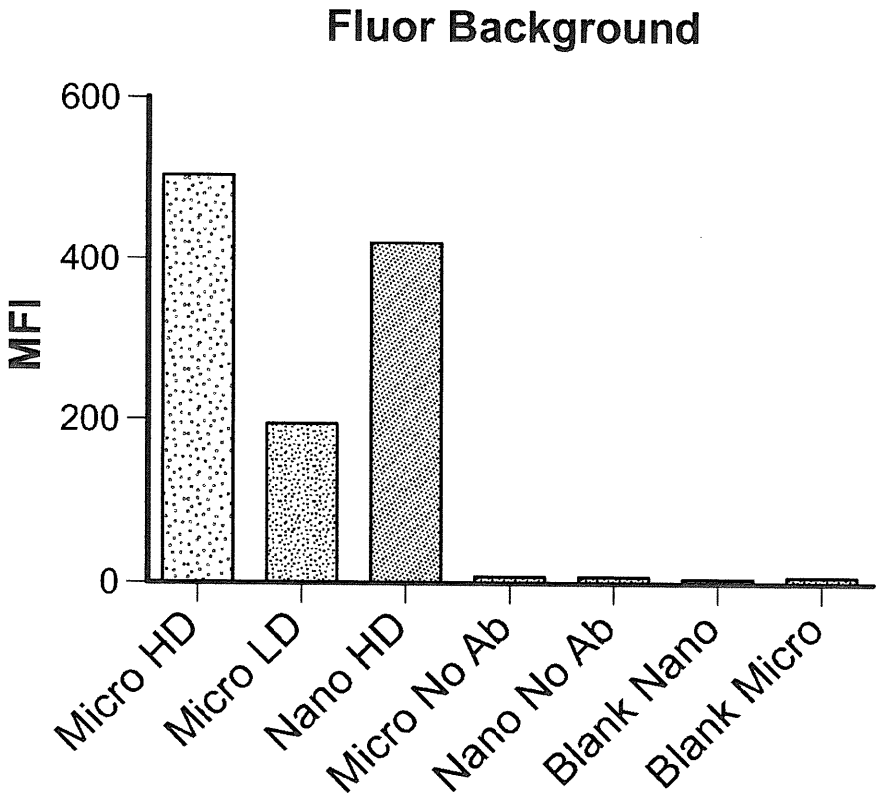


FIG. 13A

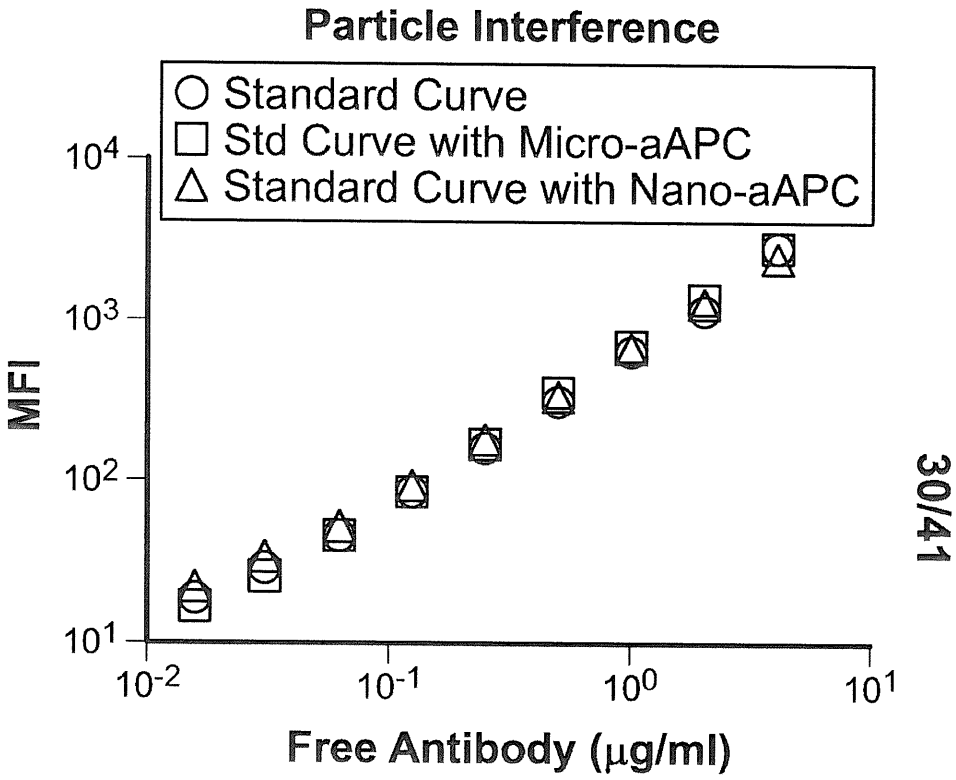


FIG. 13B

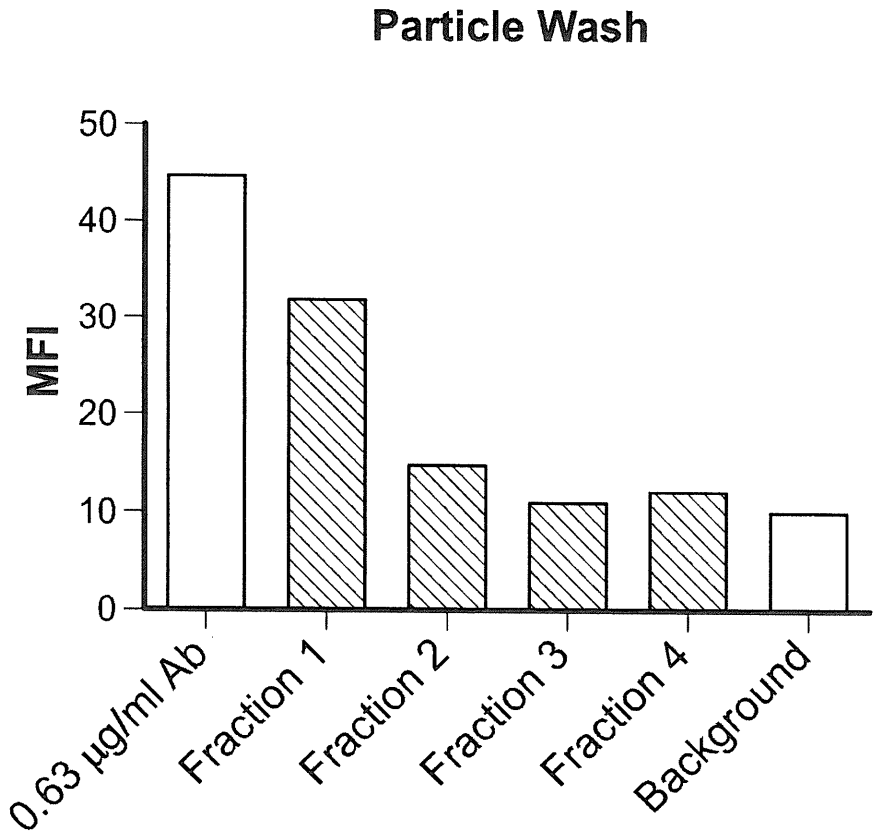


FIG. 13C

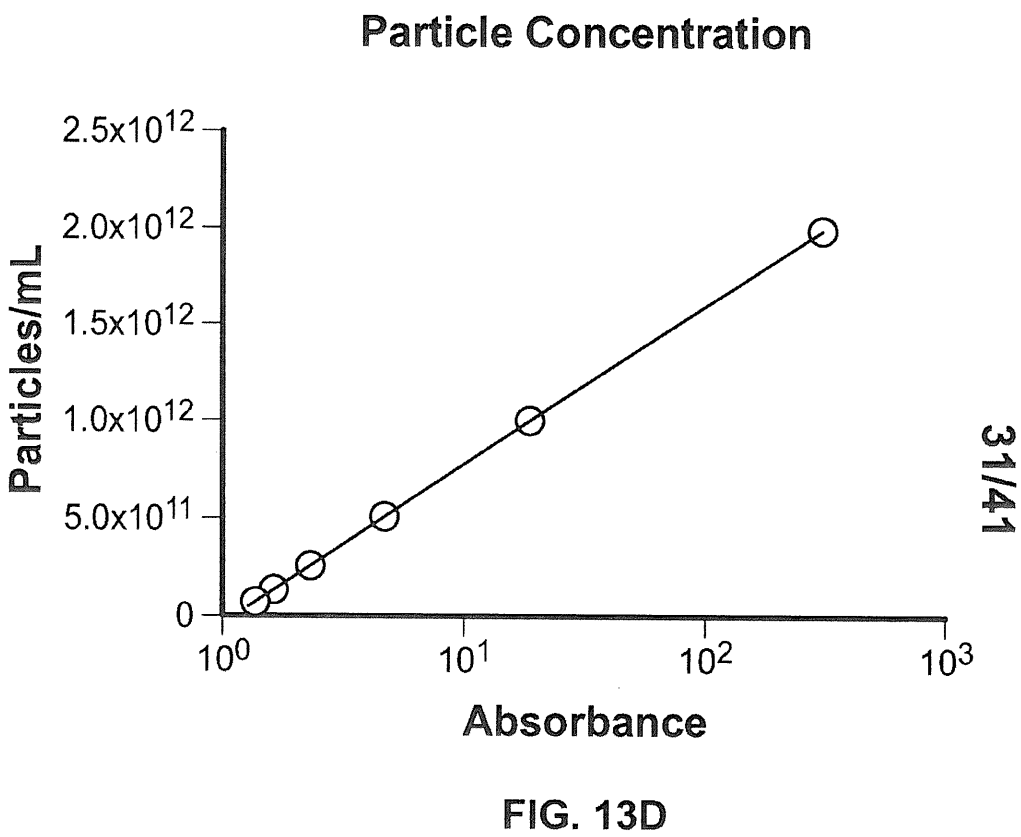


FIG. 13D

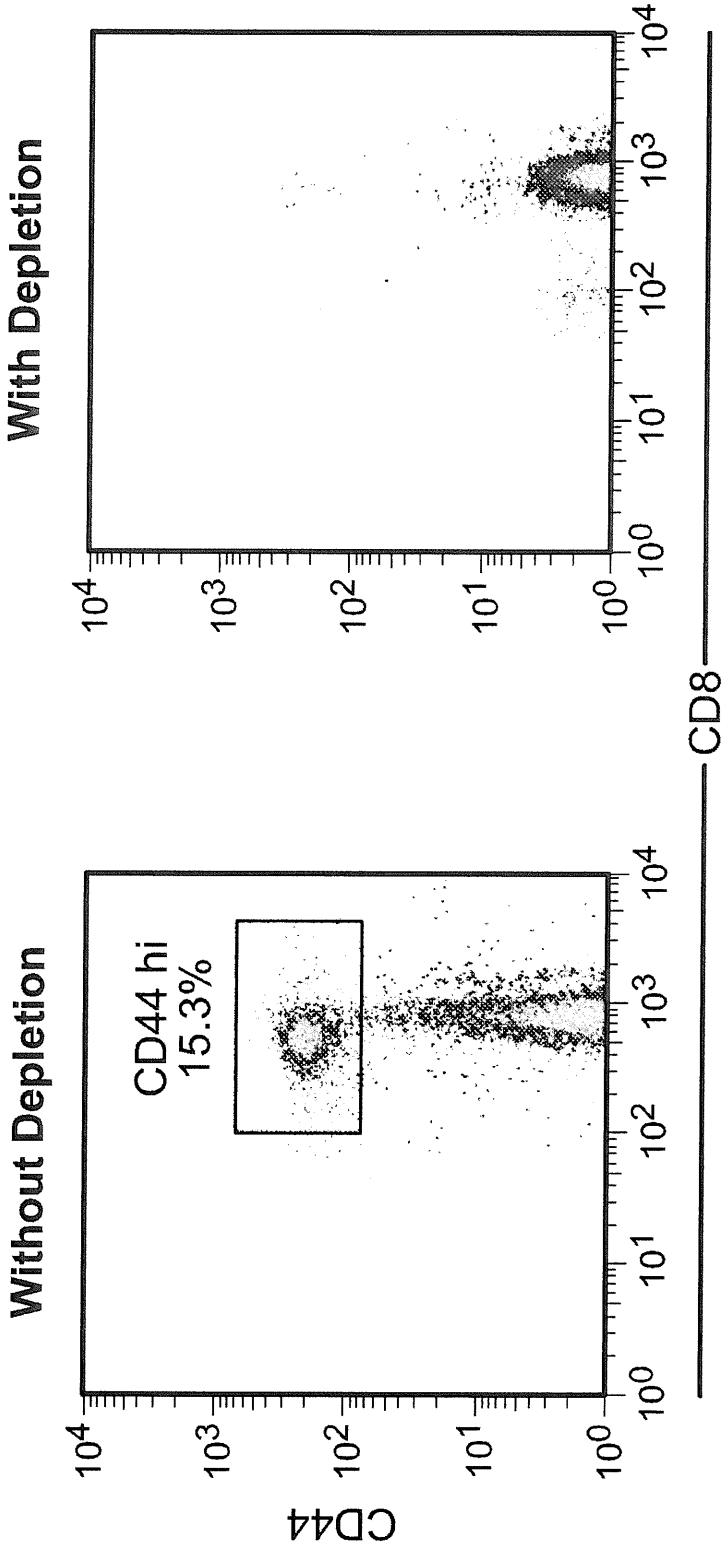

Without Depletion
With Depletion
CD44 hi
15.3%
CD44
CD8
10^0
10^1
10^2
10^3
10^4

FIG. 14A

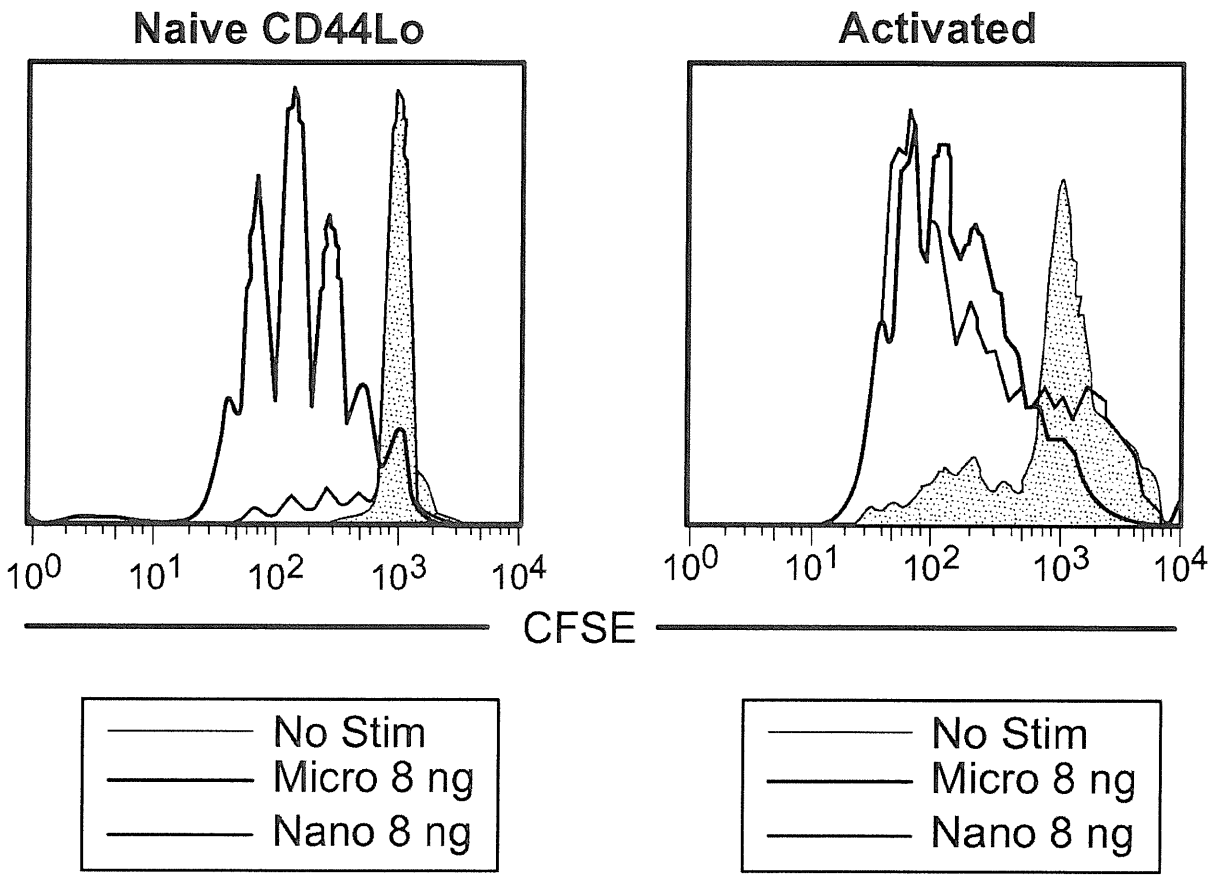


FIG. 14B

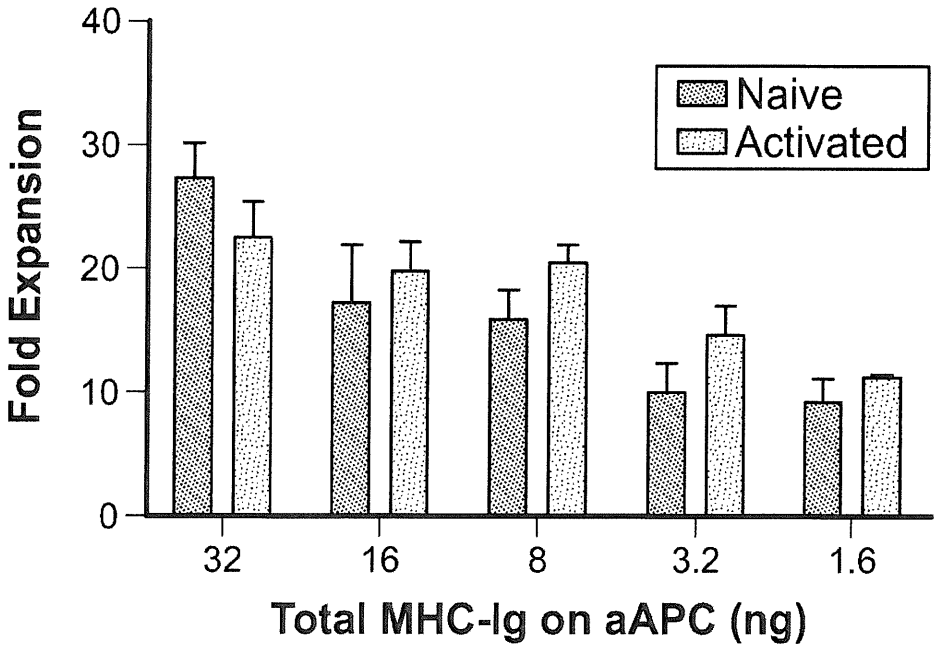


FIG. 14C

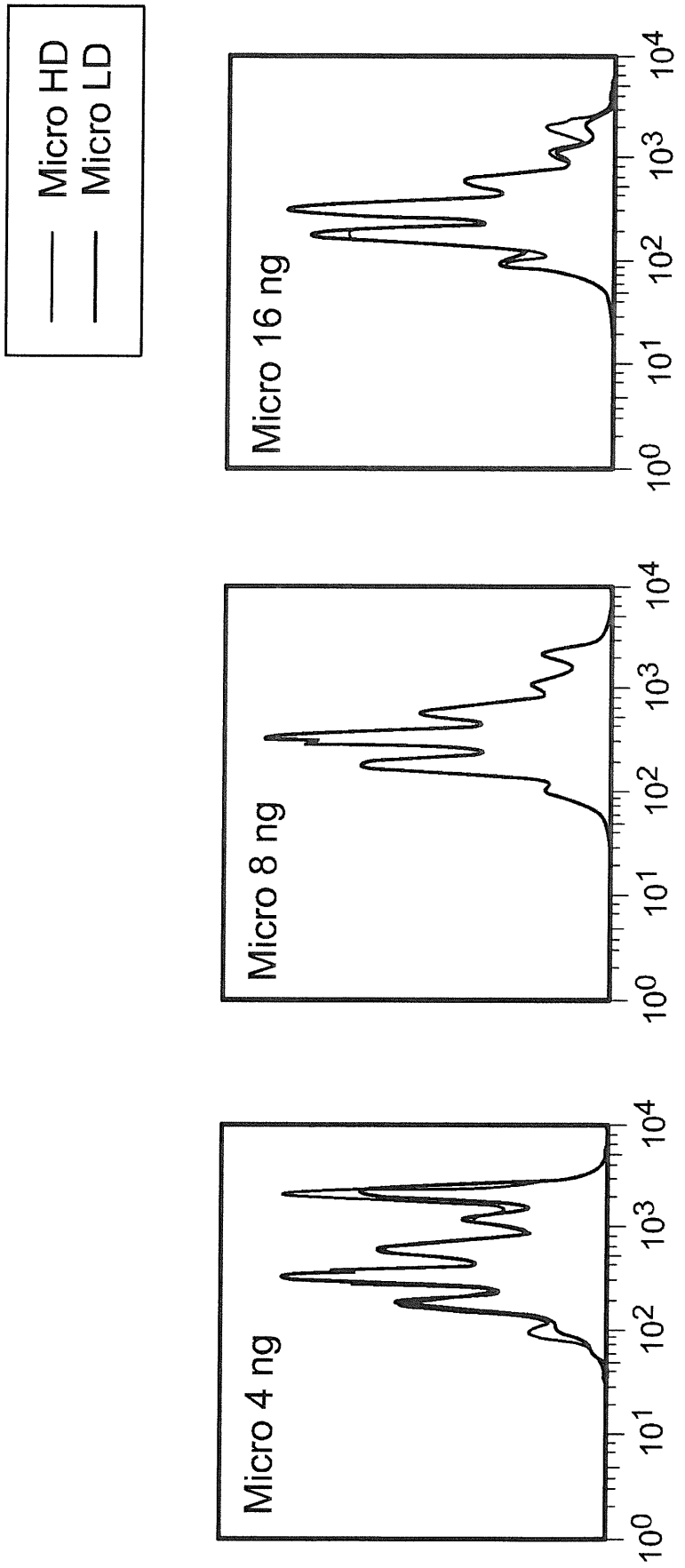

Micro HD
Micro LD
Micro 16 ng
Micro 8 ng
Micro 4 ng
10^0
10^1
10^2
10^3
10^4

FIG. 14D

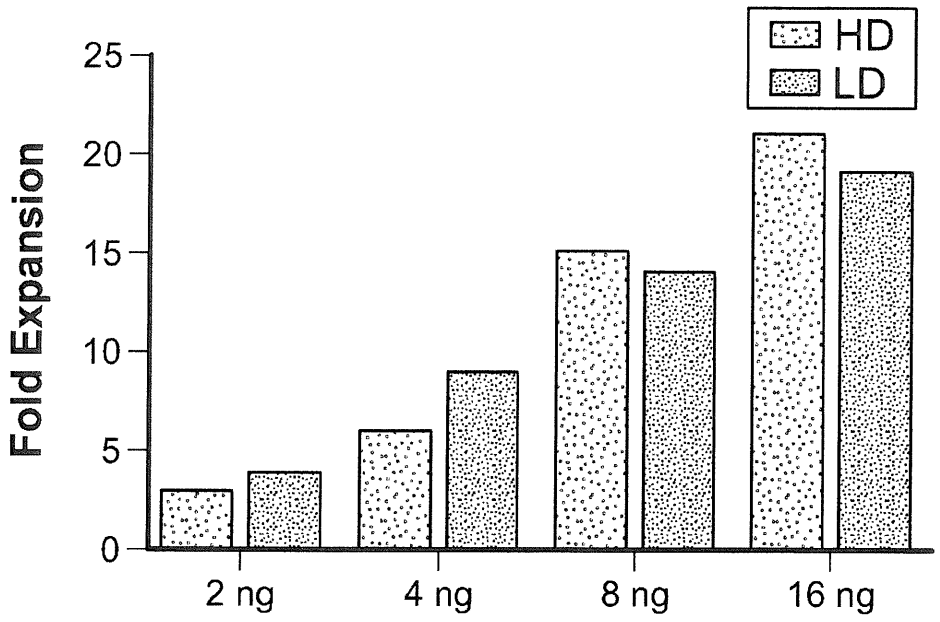


FIG. 14E

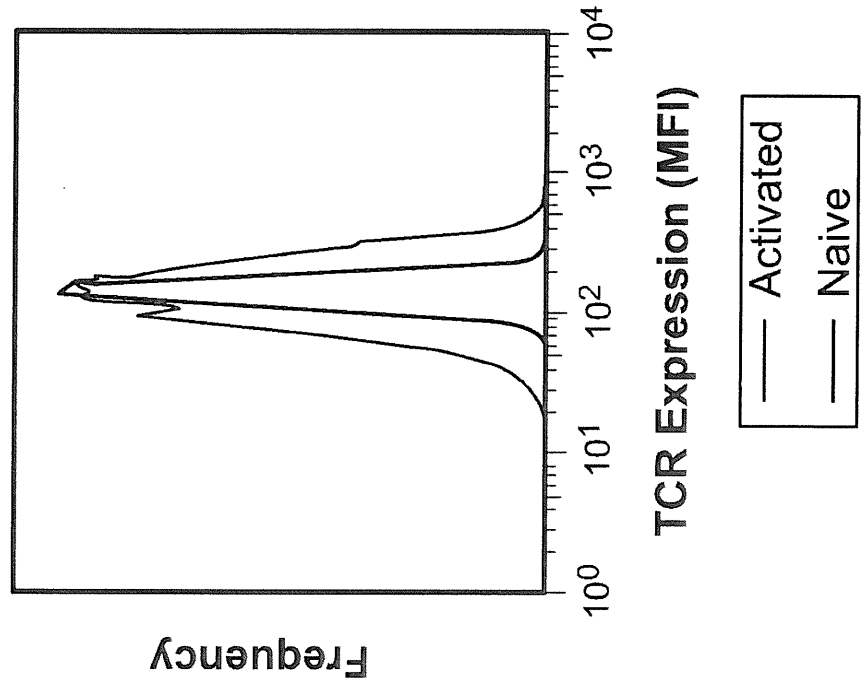


FIG. 15B

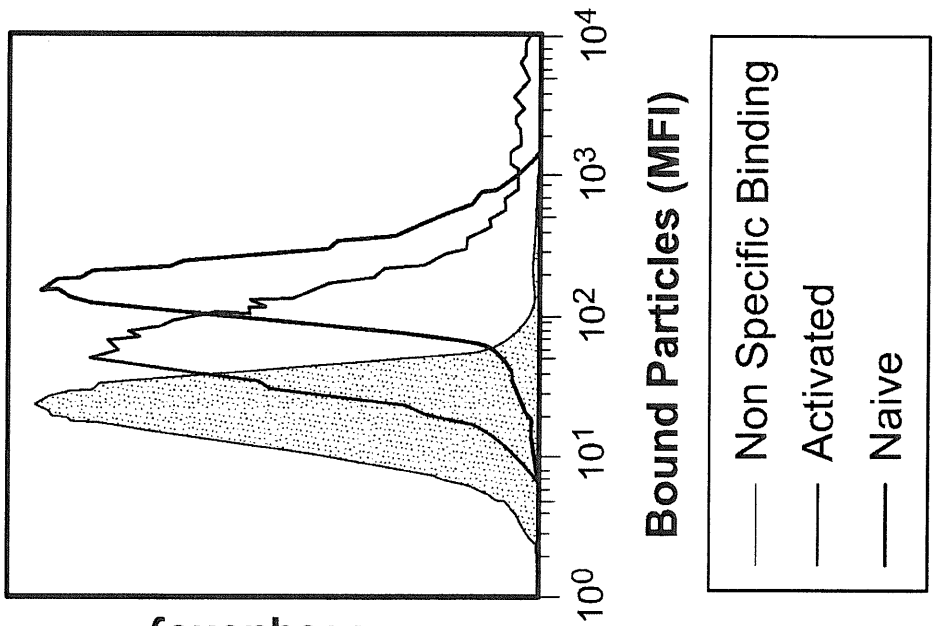


FIG. 15A

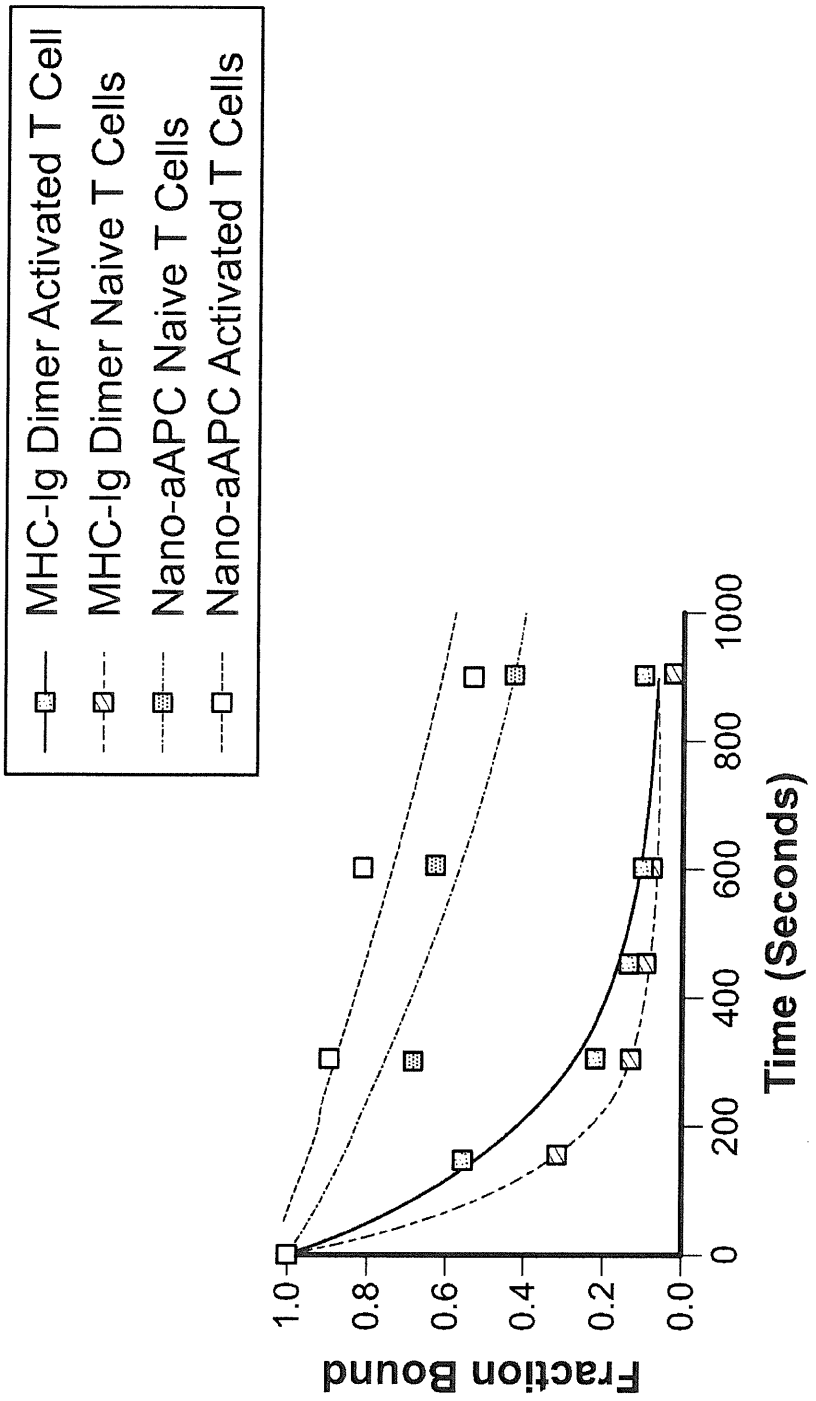

MHC-Ig Dimer Activated T Cell
MHC-Ig Dimer Naive T Cells
Nano-aAPC Naive T Cells
Nano-aAPC Activated T Cells
Fraction Bound
1.0
0.8
0.6
0.4
0.2
0.0
0
200
400
600
800
1000
Time (Seconds)

FIG. 15C

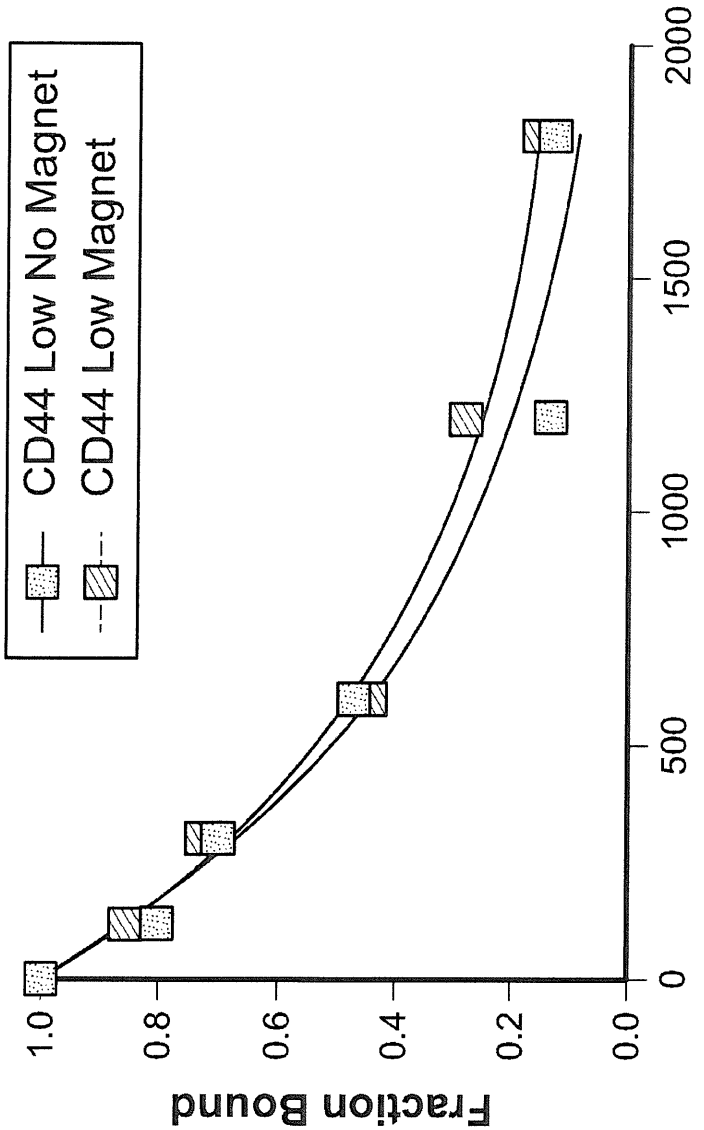

CD44 Low No Magnet
CD44 Low Magnet
Fraction Bound
1.0
0.8
0.6
0.4
0.2
0.0
0
500
1000
1500
2000
Time (Seconds)

FIG. 15D

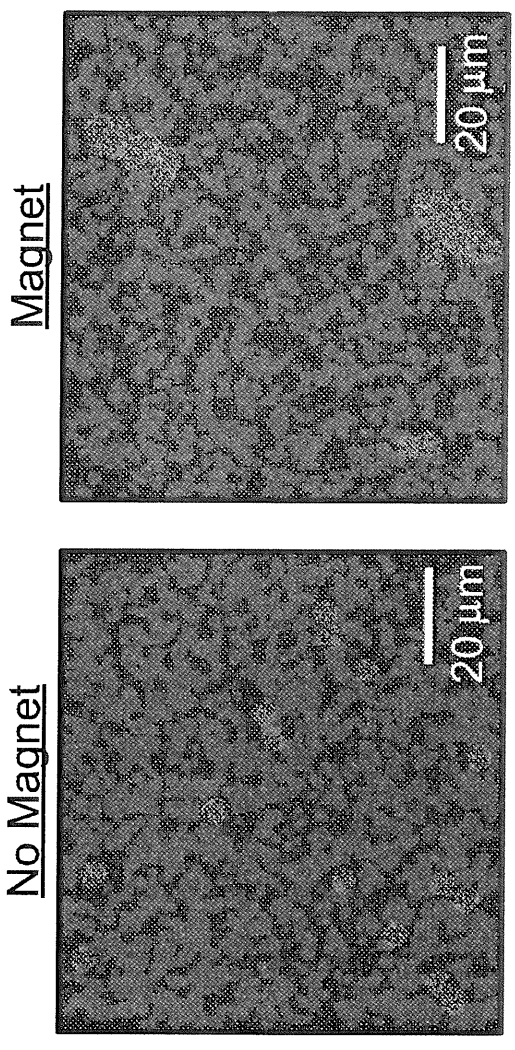


FIG. 16A

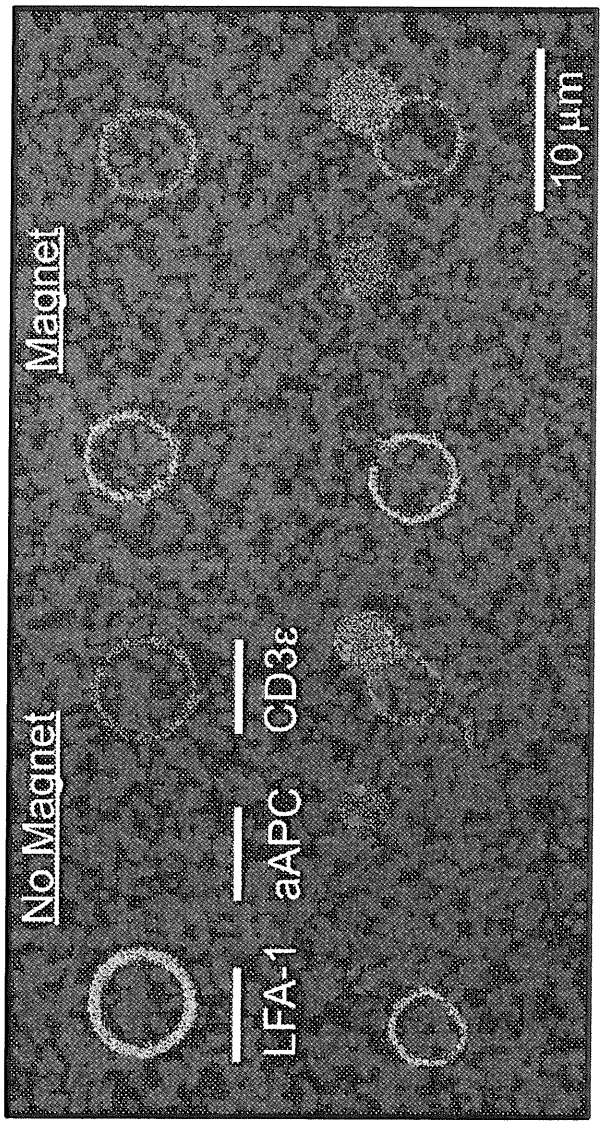


FIG. 16B

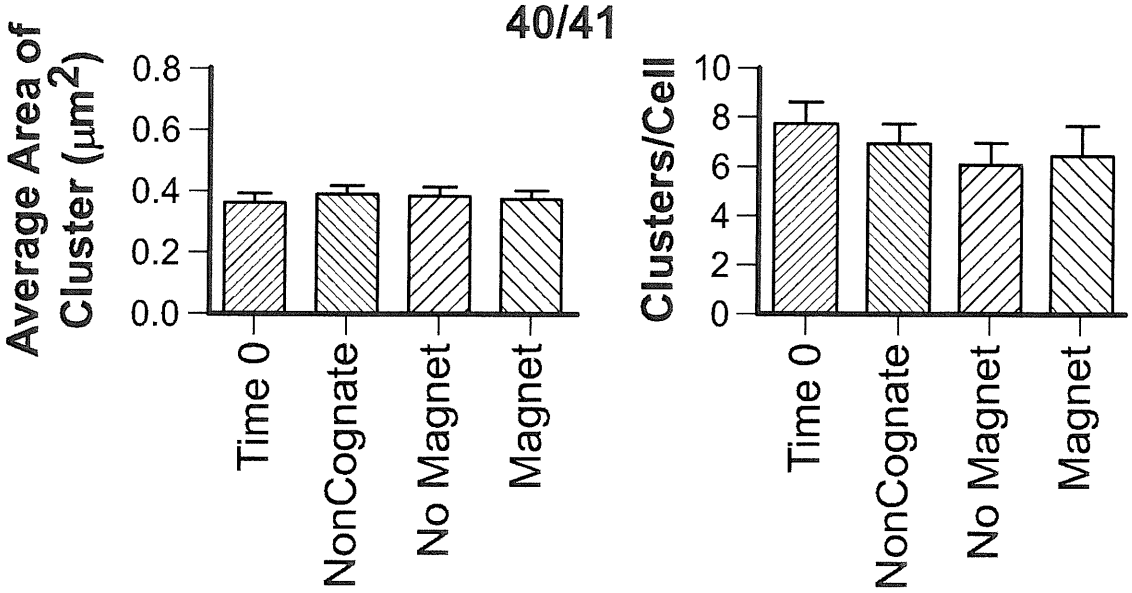


FIG. 16C

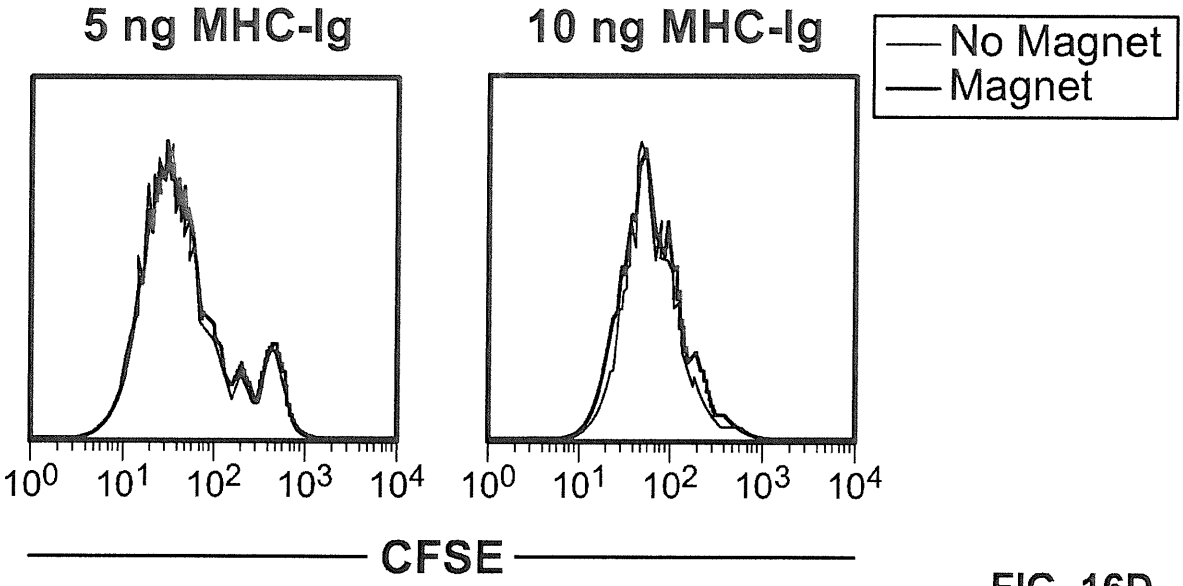


FIG. 16D

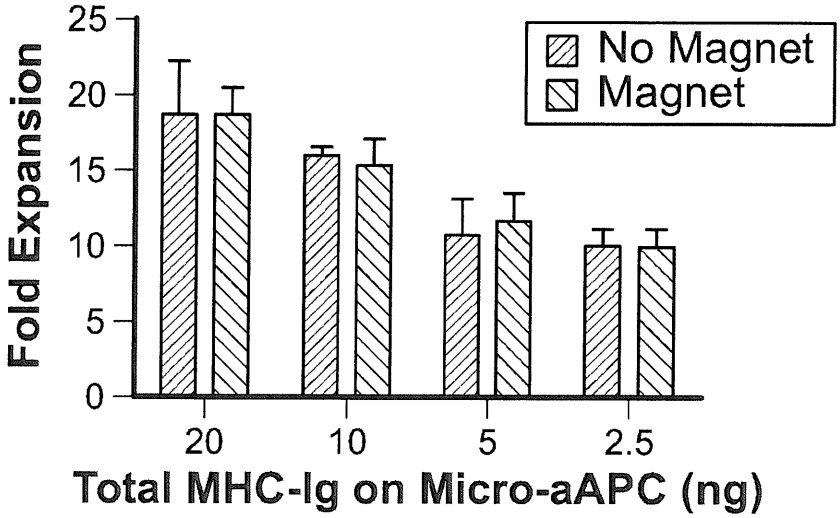


FIG. 16E

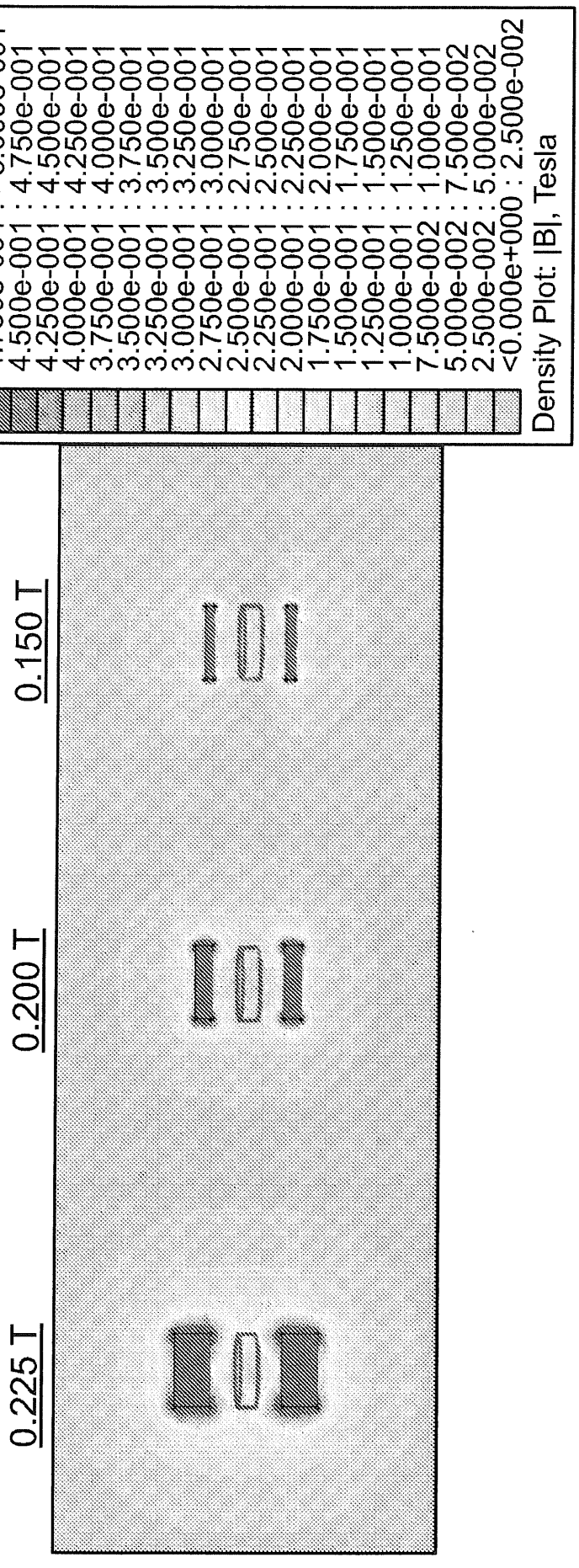

4.750e-001 : >5.000e-001
4.500e-001 : 4.750e-001
4.250e-001 : 4.500e-001
4.000e-001 : 4.250e-001
3.750e-001 : 4.000e-001
3.500e-001 : 3.750e-001
3.250e-001 : 3.500e-001
3.000e-001 : 3.250e-001
2.750e-001 : 3.000e-001
2.500e-001 : 2.750e-001
2.250e-001 : 2.500e-001
2.000e-001 : 2.250e-001
1.750e-001 : 2.000e-001
1.500e-001 : 1.750e-001
1.250e-001 : 1.500e-001
1.000e-001 : 1.250e-001
7.500e-002 : 1.000e-001
5.000e-002 : 7.500e-002
2.500e-002 : 5.000e-002
<0.000e+000 : 2.500e-002
Density Plot: |B|, Tesla
0.150 T
0.200 T
0.225 T

FIG. 17