**Fig. 1**

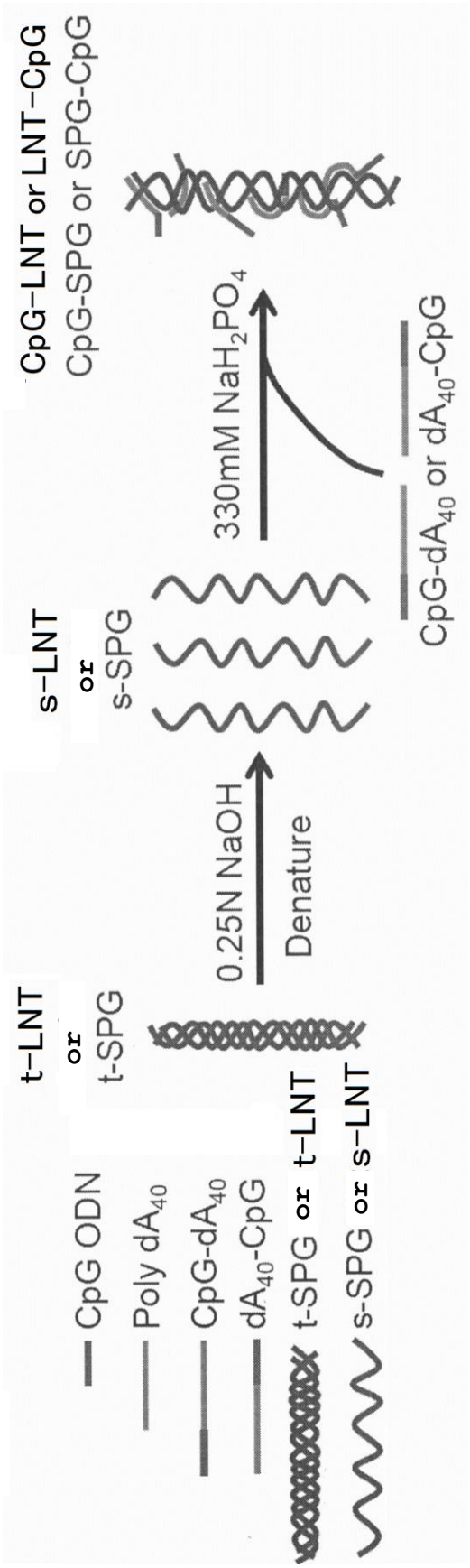

CpG ODN
Poly dA40
CpG-dA40
dA40-CpG
t-SPG or t-LNT
s-SPG or s-LNT
t-LNT
or
t-SPG
0.25N NaOH
Denature
s-LNT
or
s-SPG
330mM NaH2PO4
CpG-dA40 or dA40-CpG
CpG-LNT or LNT-CpG
CpG-SPG or SPG-CpG

**Fig. 2**

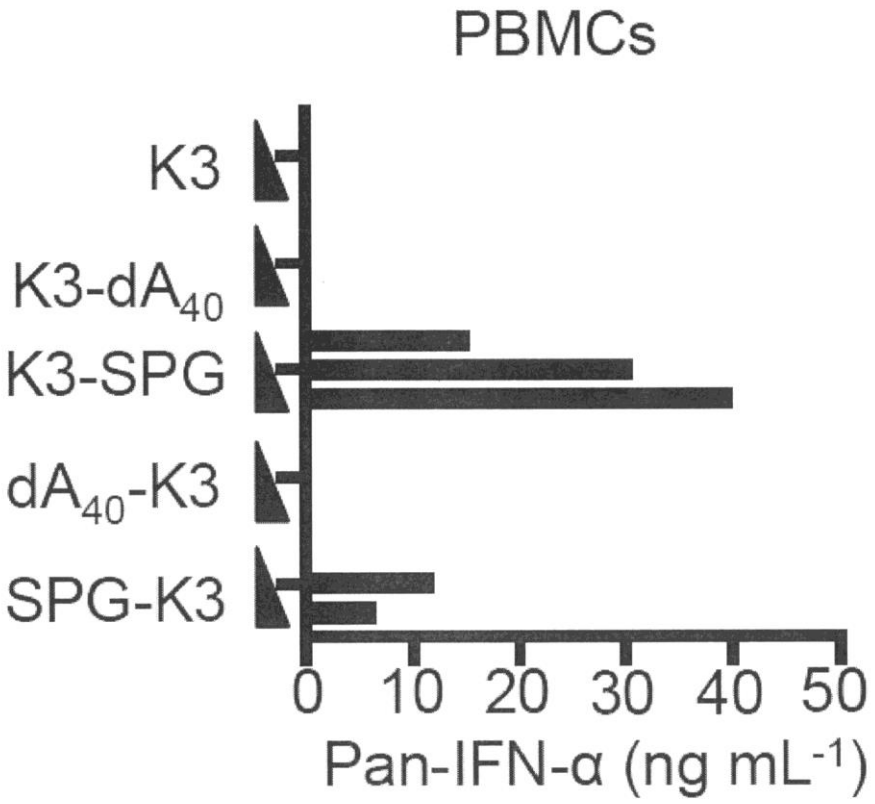

PBMCs
K3
K3-dA40
K3-SPG
dA40-K3
SPG-K3
0
10
20
30
40
50
Pan-IFN-α (ng mL-1)

**Fig. 3**

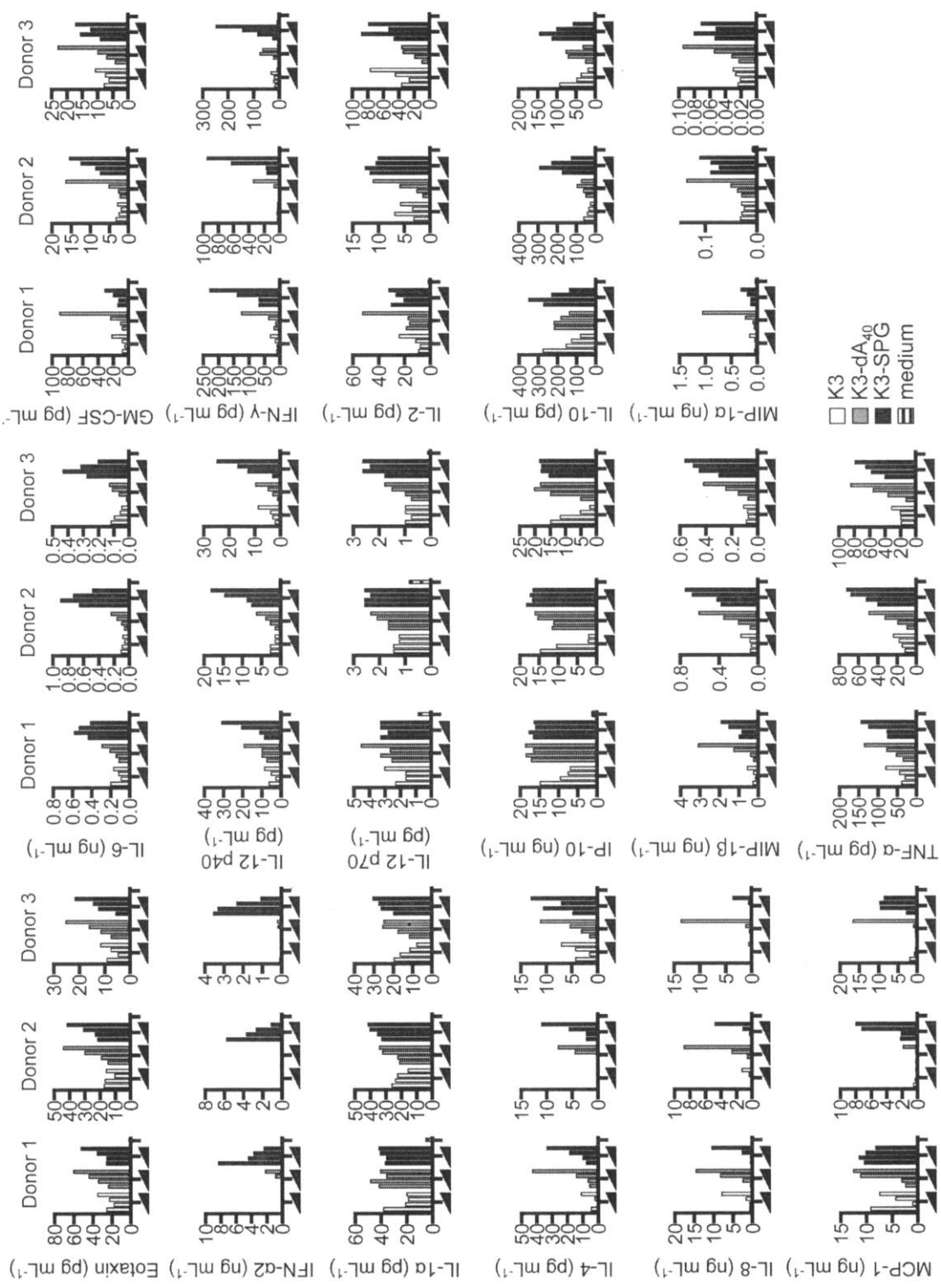

Donor 1
Donor 2
Donor 3
Eotaxin (pg mL-1)
IFN-α2 (ng mL-1)
IL-1α (pg mL-1)
IL-4 (pg mL-1)
IL-8 (ng mL-1)
MCP-1 (ng mL-1)
IL-6 (ng mL-1)
IL-12 p40 (pg mL-1)
IL-12 p70 (pg mL-1)
IP-10 (ng mL-1)
MIP-1β (ng mL-1)
TNF-α (pg mL-1)
GM-CSF (pg mL-1)
IFN-γ (pg mL-1)
IL-2 (pg mL-1)
IL-10 (pg mL-1)
MIP-1α (ng mL-1)
K3
K3-dA40
K3-SPG
medium

**Fig. 4**

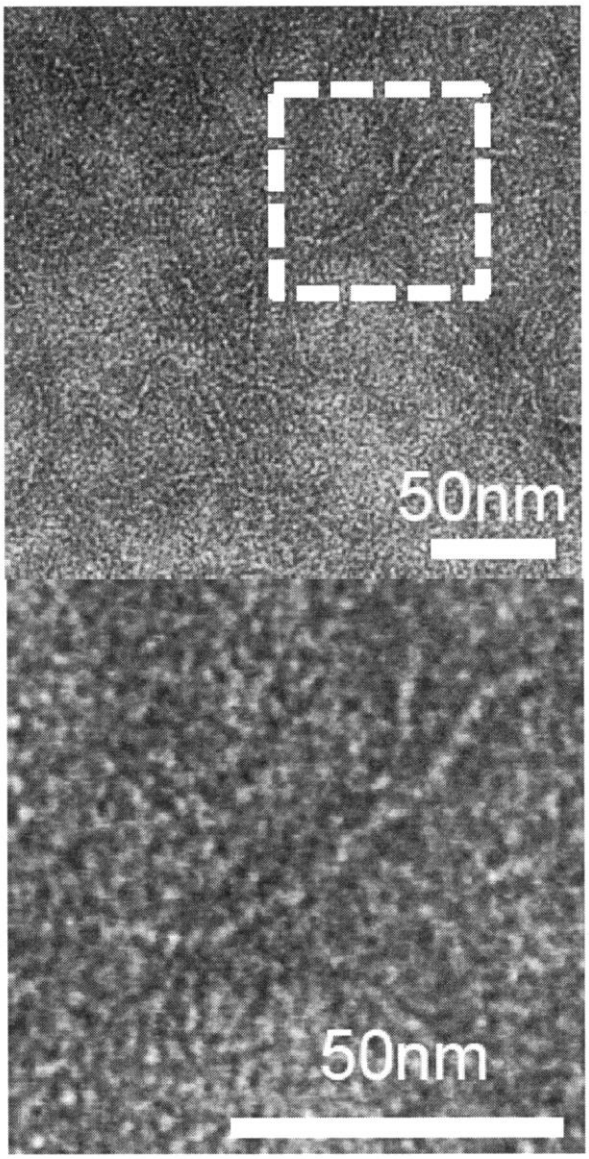


**Fig. 5**

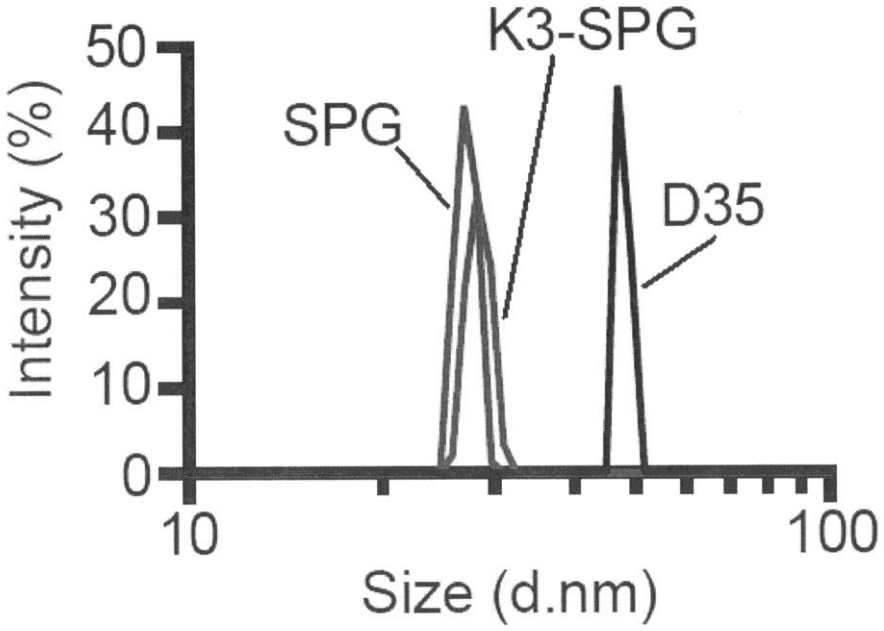


**Fig. 6**

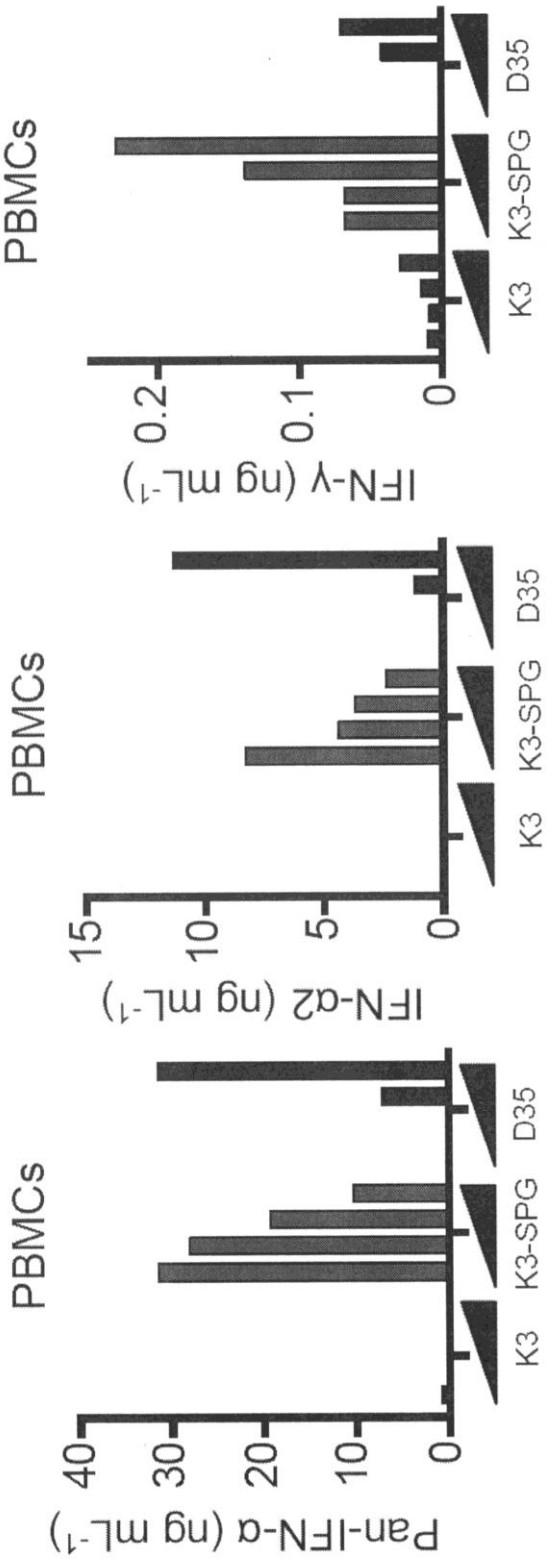

Pan-IFN-α (ng mL-1)
40
30
20
10
0
PBMCs
K3
K3-SPG
D35
IFN-α2 (ng mL-1)
15
10
5
0
PBMCs
K3
K3-SPG
D35
IFN-γ (ng mL-1)
0.2
0.1
0
PBMCs
K3
K3-SPG
D35

**Fig. 7**

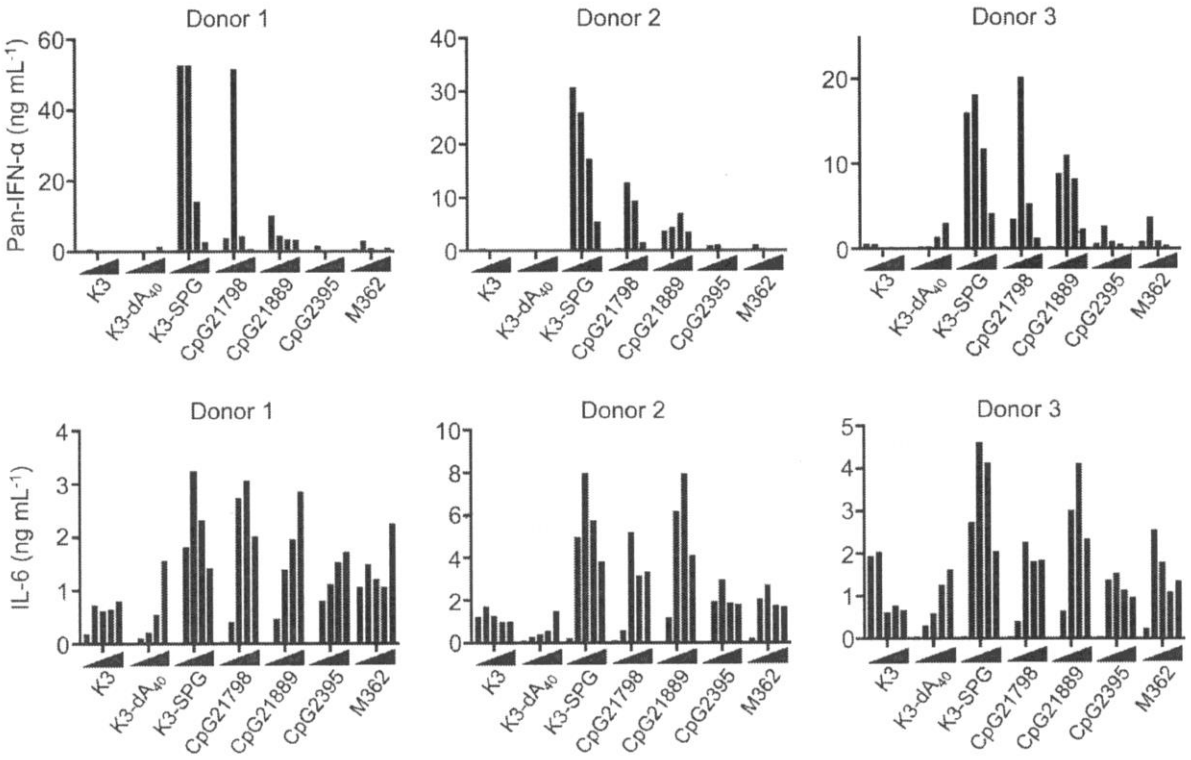

Donor 1
Donor 2
Donor 3
Pan-IFN-α (ng mL-1)
IL-6 (ng mL-1)
K3
K3-dA40
K3-SPG
CpG21798
CpG21889
CpG2395
M362

**Fig. 8**

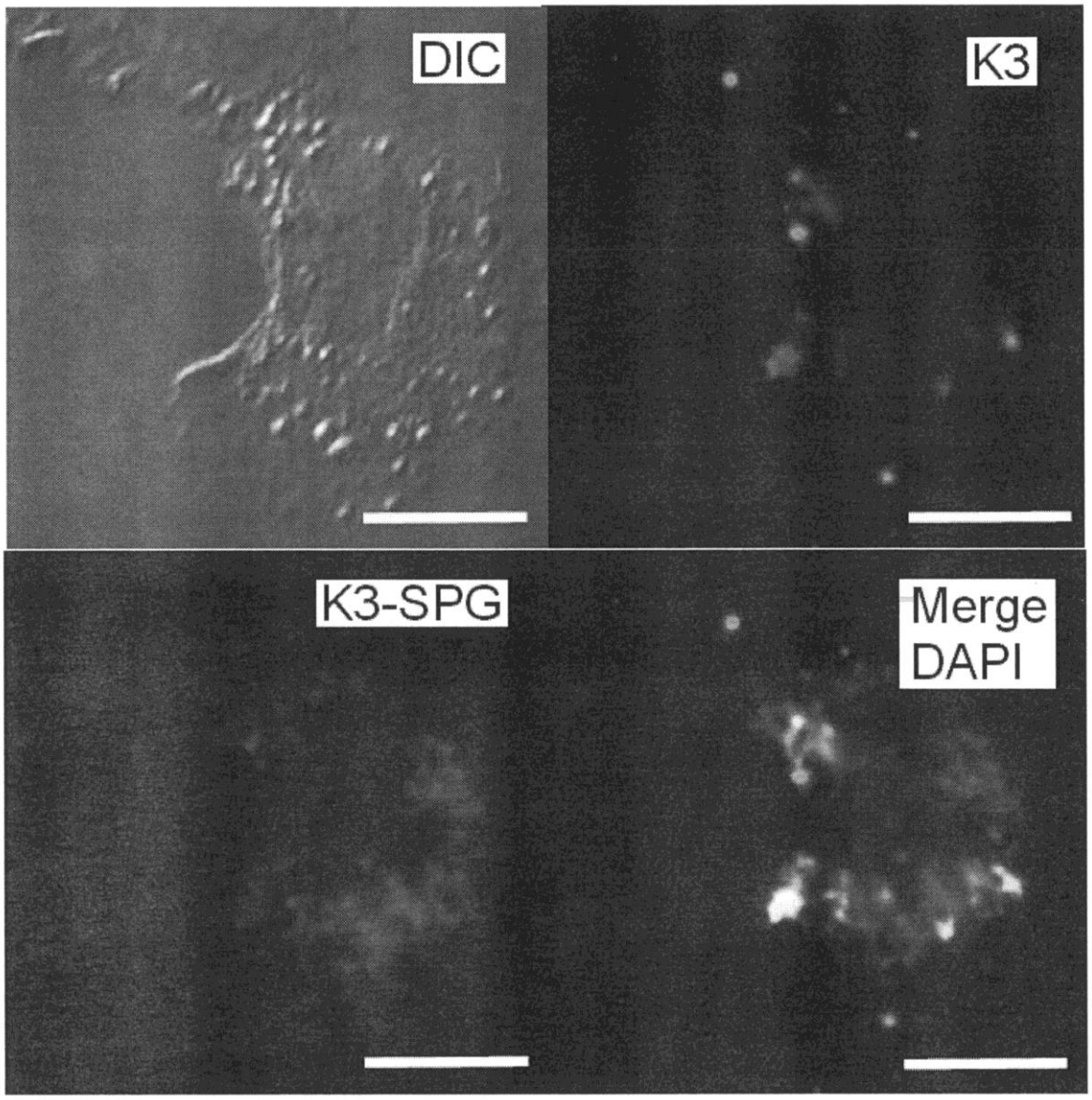


**Fig. 9**

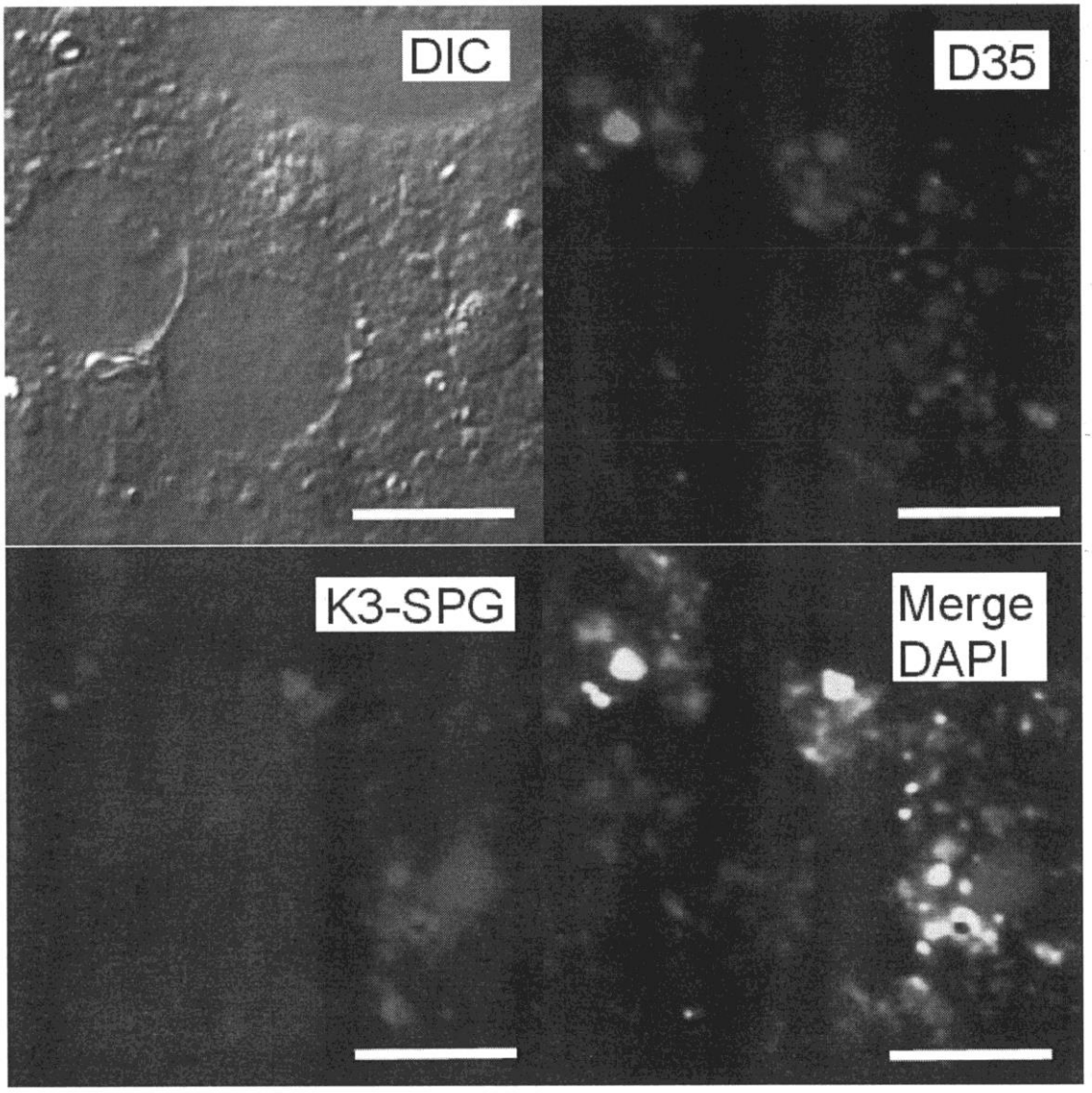


**Fig. 10**

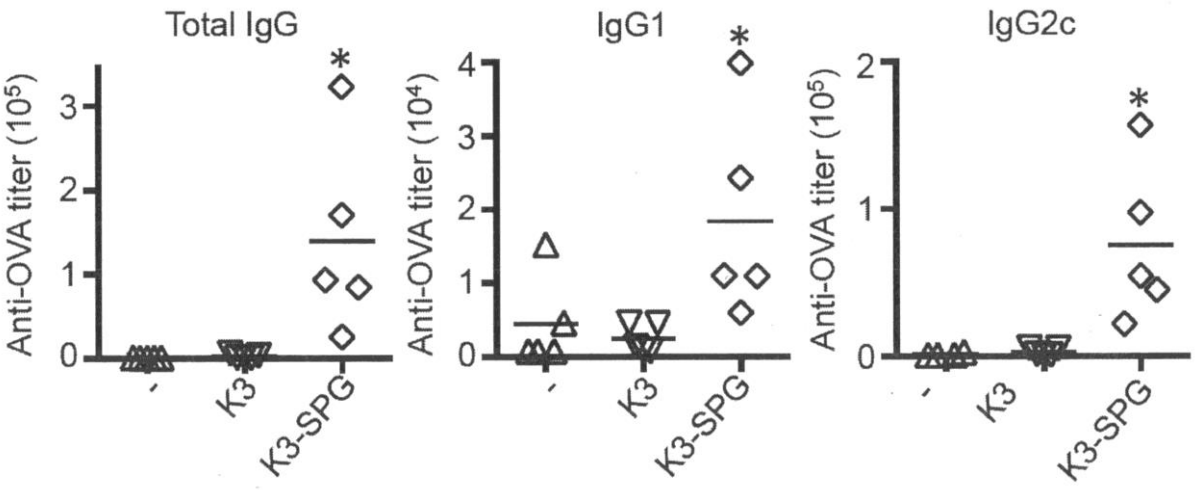

Total IgG
IgG1
IgG2c
Anti-OVA titer (10^5)
Anti-OVA titer (10^4)
Anti-OVA titer (10^5)
-
K3
K3-SPG
*

**Fig. 11**

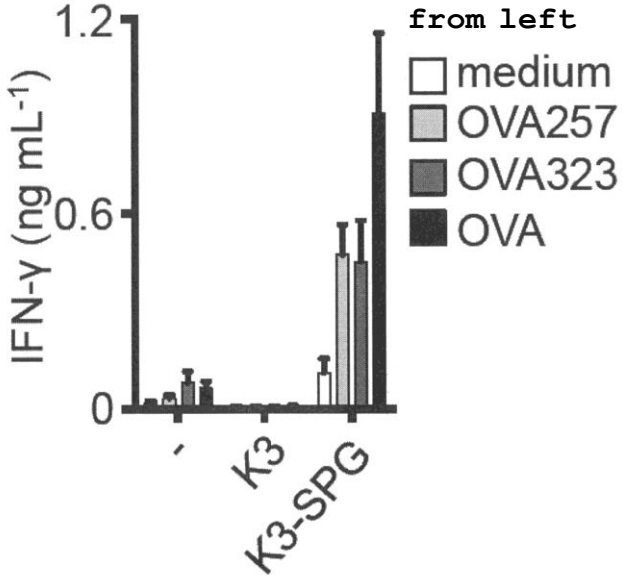

from left
medium
OVA257
OVA323
OVA
IFN-γ (ng mL-1)
1.2
0.6
0
-
K3
K3-SPG

**Fig. 12**

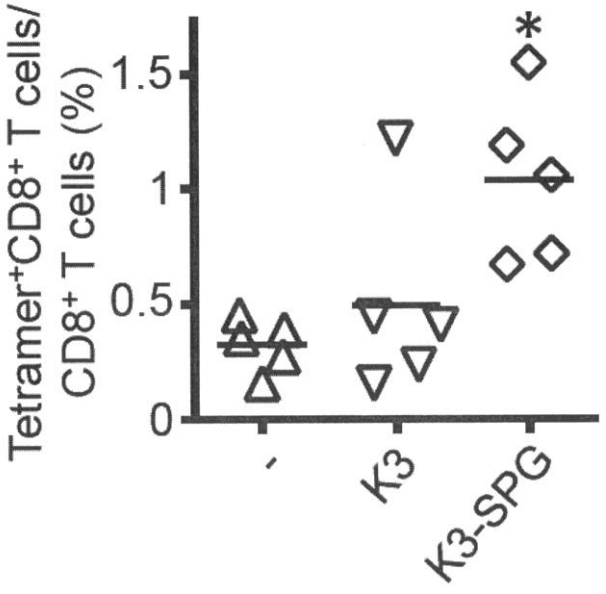

Tetramer+CD8+ T cells/
CD8+ T cells (%)
1.5
1
0.5
0
*
-
K3
K3-SPG

**Fig. 13**

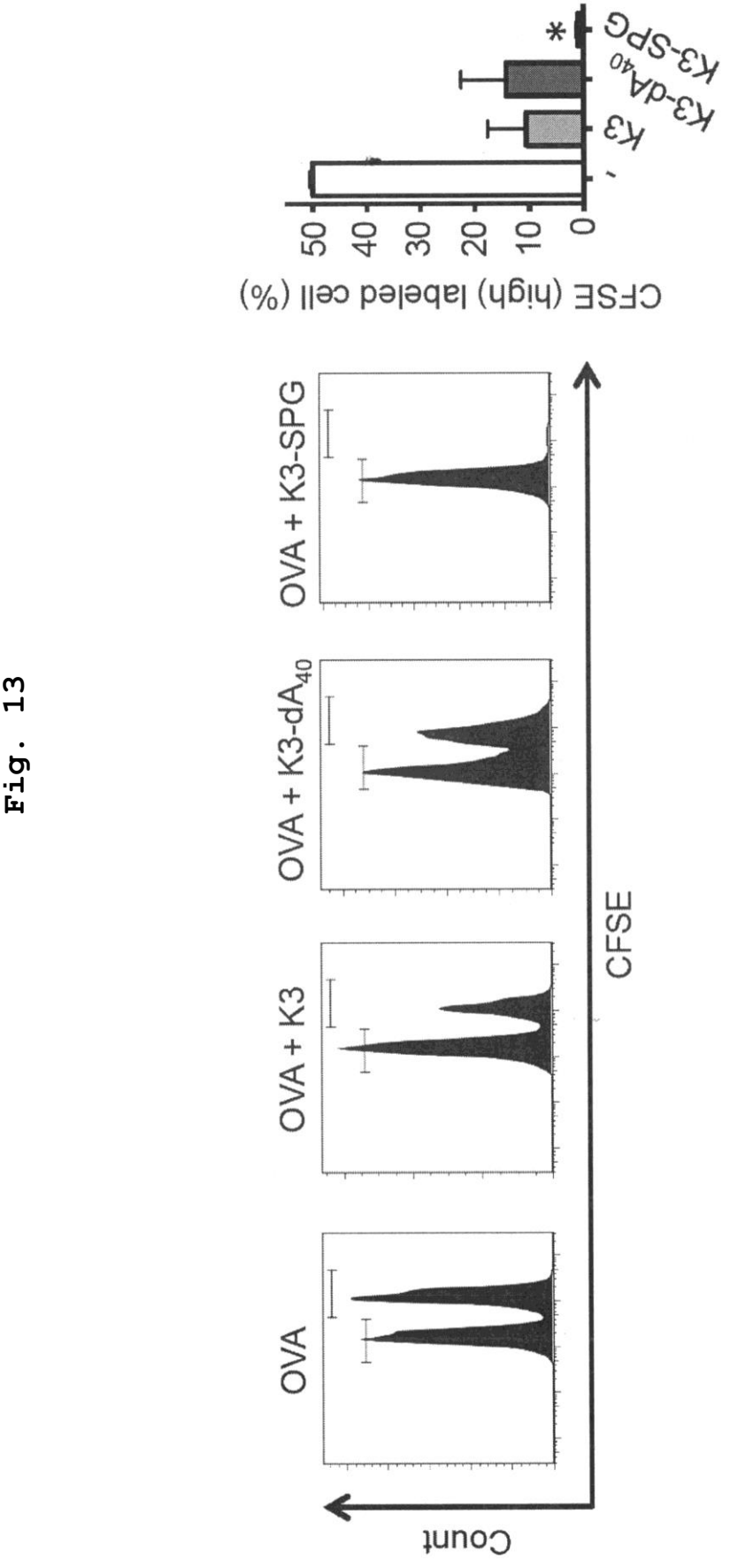

CFSE (high) labeled cell (%)
50
40
30
20
10
0
-
K3
K3-dA40
K3-SPG
*
Count
CFSE
OVA
OVA + K3
OVA + K3-dA40
OVA + K3-SPG

**Fig. 14**

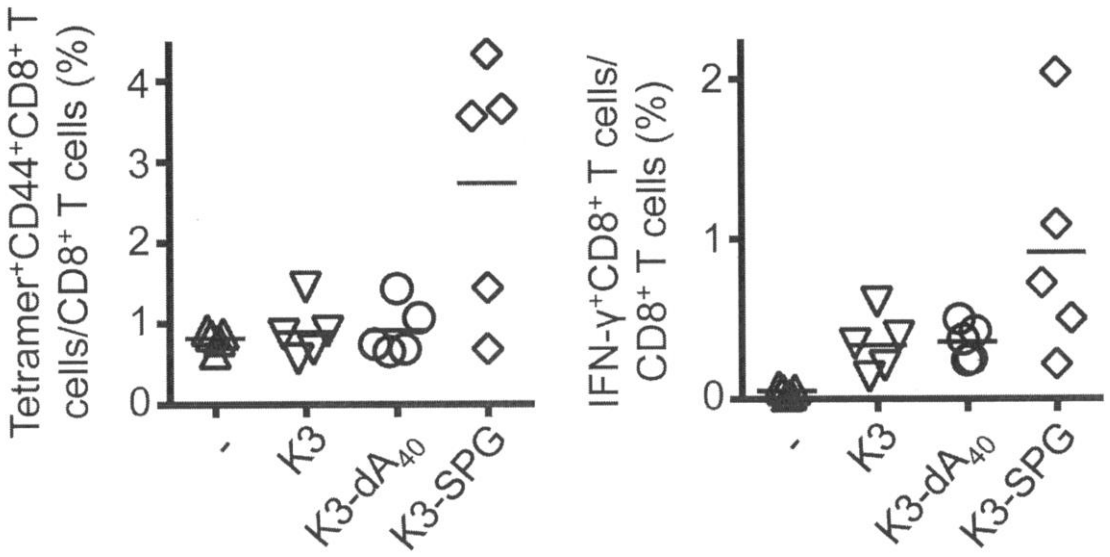

Tetramer+CD44+CD8+ T cells/CD8+ T cells (%)
IFN-γ+CD8+ T cells/ CD8+ T cells (%)
-
K3
K3-dA40
K3-SPG

**Fig. 15**

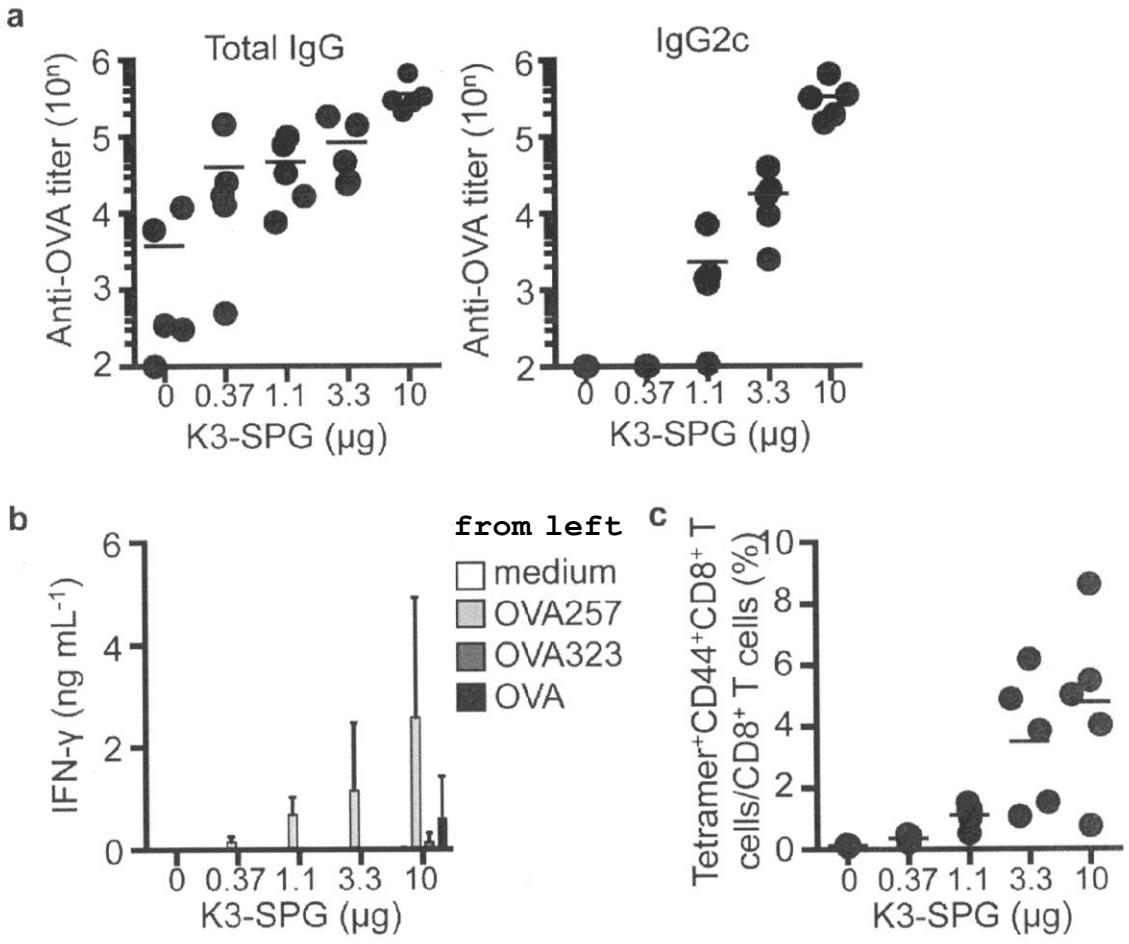

a
Total IgG
IgG2c
Anti-OVA titer (10n)
0 0.37 1.1 3.3 10
K3-SPG (μg)
b
IFN-γ (ng mL-1)
from left
medium
OVA257
OVA323
OVA
c
Tetramer+CD44+CD8+ T cells/CD8+ T cells (%)

**Fig. 16**

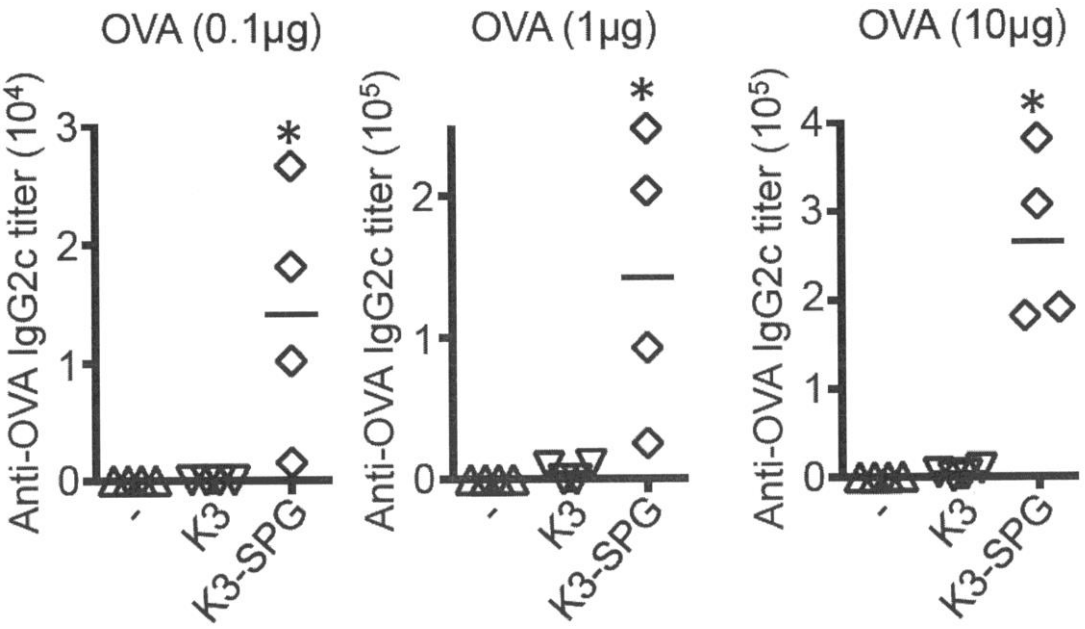

OVA (0.1μg)
OVA (1μg)
OVA (10μg)
Anti-OVA IgG2c titer (10⁴)
Anti-OVA IgG2c titer (10⁵)
Anti-OVA IgG2c titer (10⁵)
-
κ3
κ3-SPG
*

**Fig. 17**

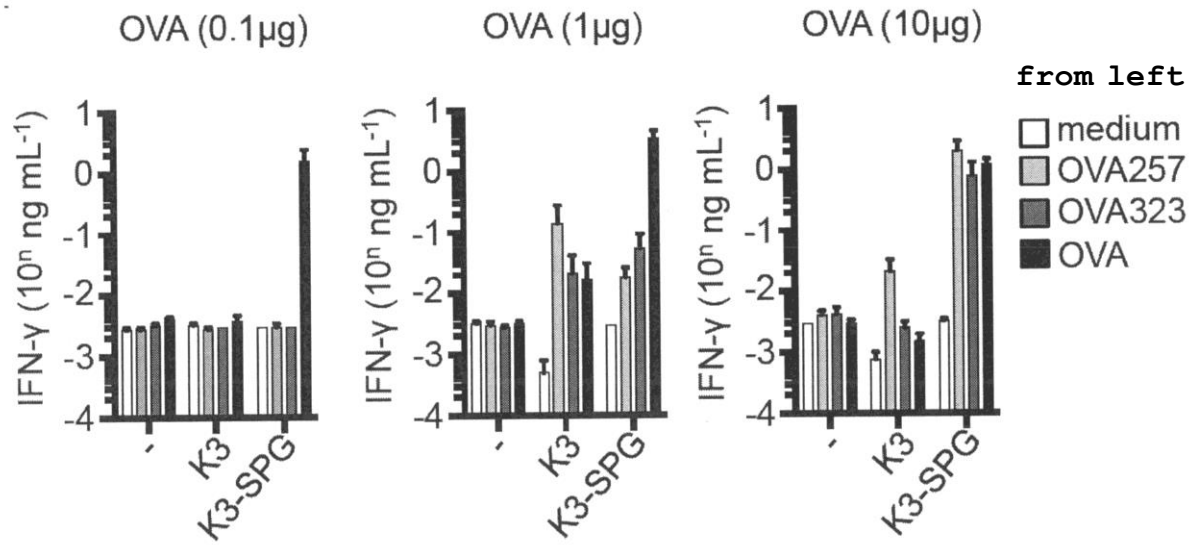

OVA (0.1μg)
OVA (1μg)
OVA (10μg)
IFN-γ (10ⁿ ng mL⁻¹)
-
κ3
κ3-SPG
from left
medium
OVA257
OVA323
OVA

**Fig. 18**

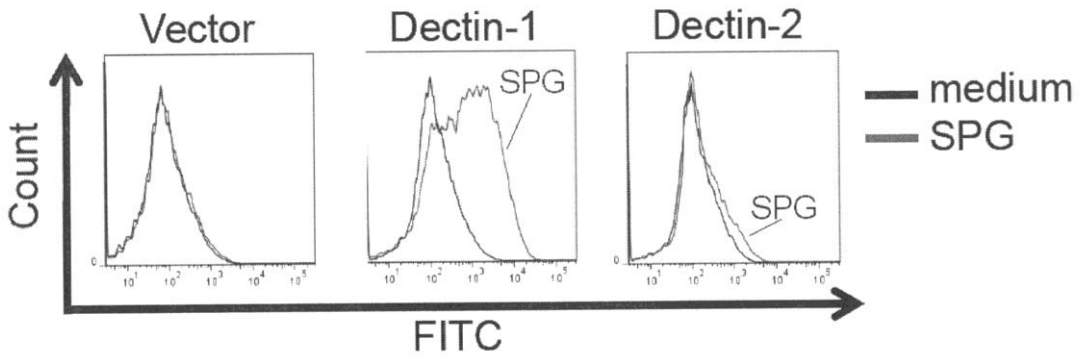



**Fig. 19**

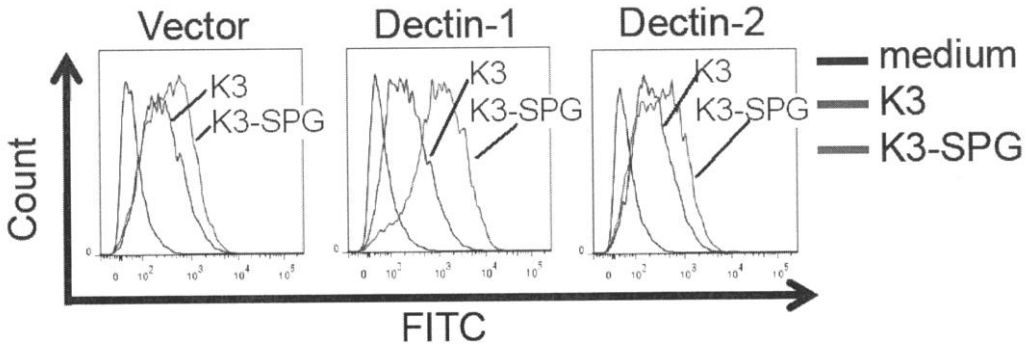



**Fig. 20**

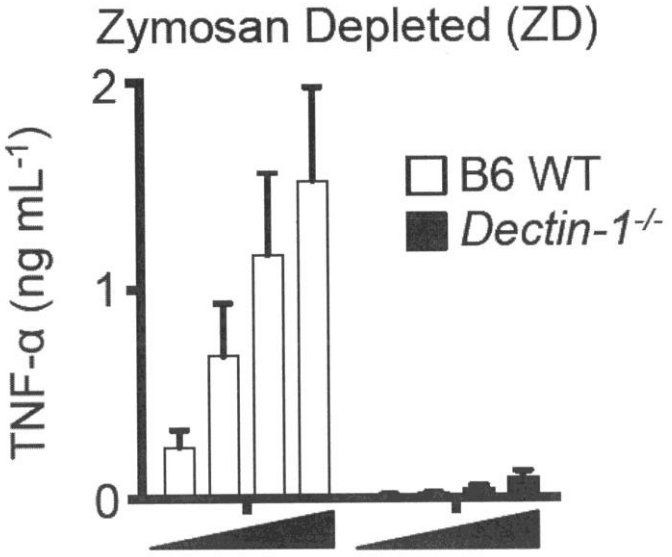


**Fig. 21**

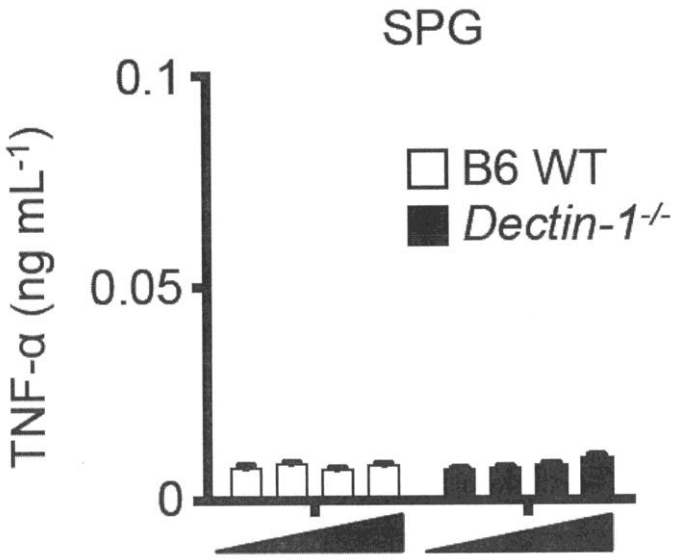

SPG
0.1
0.05
0
TNF-α (ng mL-1)
B6 WT
Dectin-1-/-

**Fig. 22**

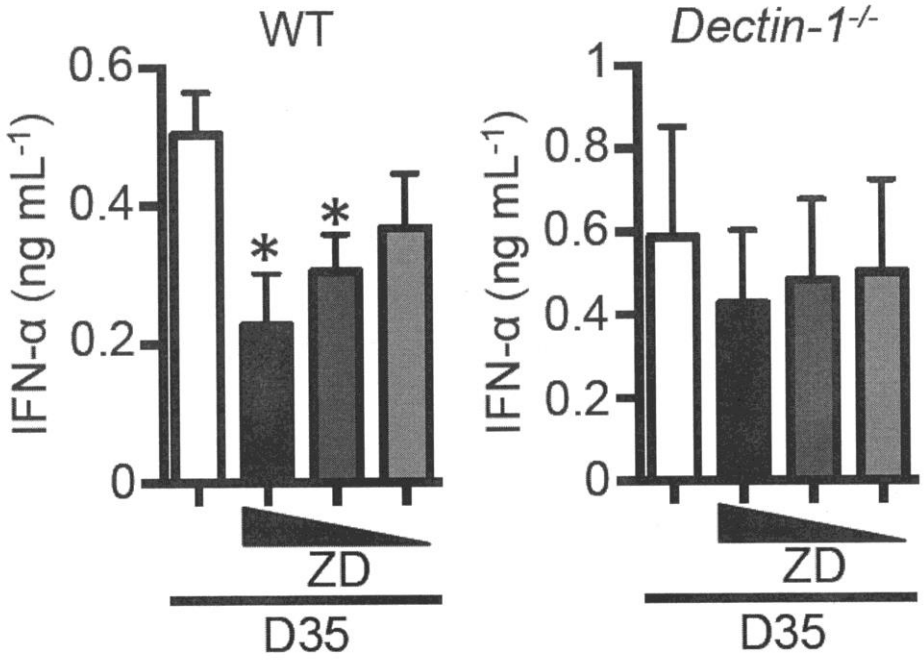

WT
Dectin-1-/-
0.6
0.4
0.2
0
1
0.8
0.6
0.4
0.2
0
IFN-α (ng mL-1)
IFN-α (ng mL-1)
*
*
ZD
ZD
D35
D35

**Fig. 23**

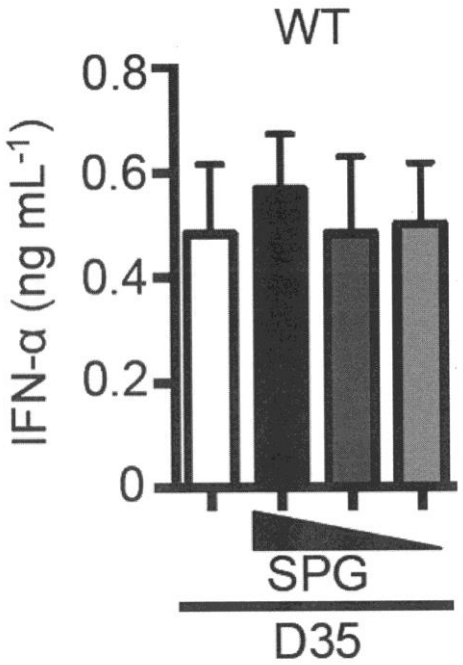


**Fig. 24**

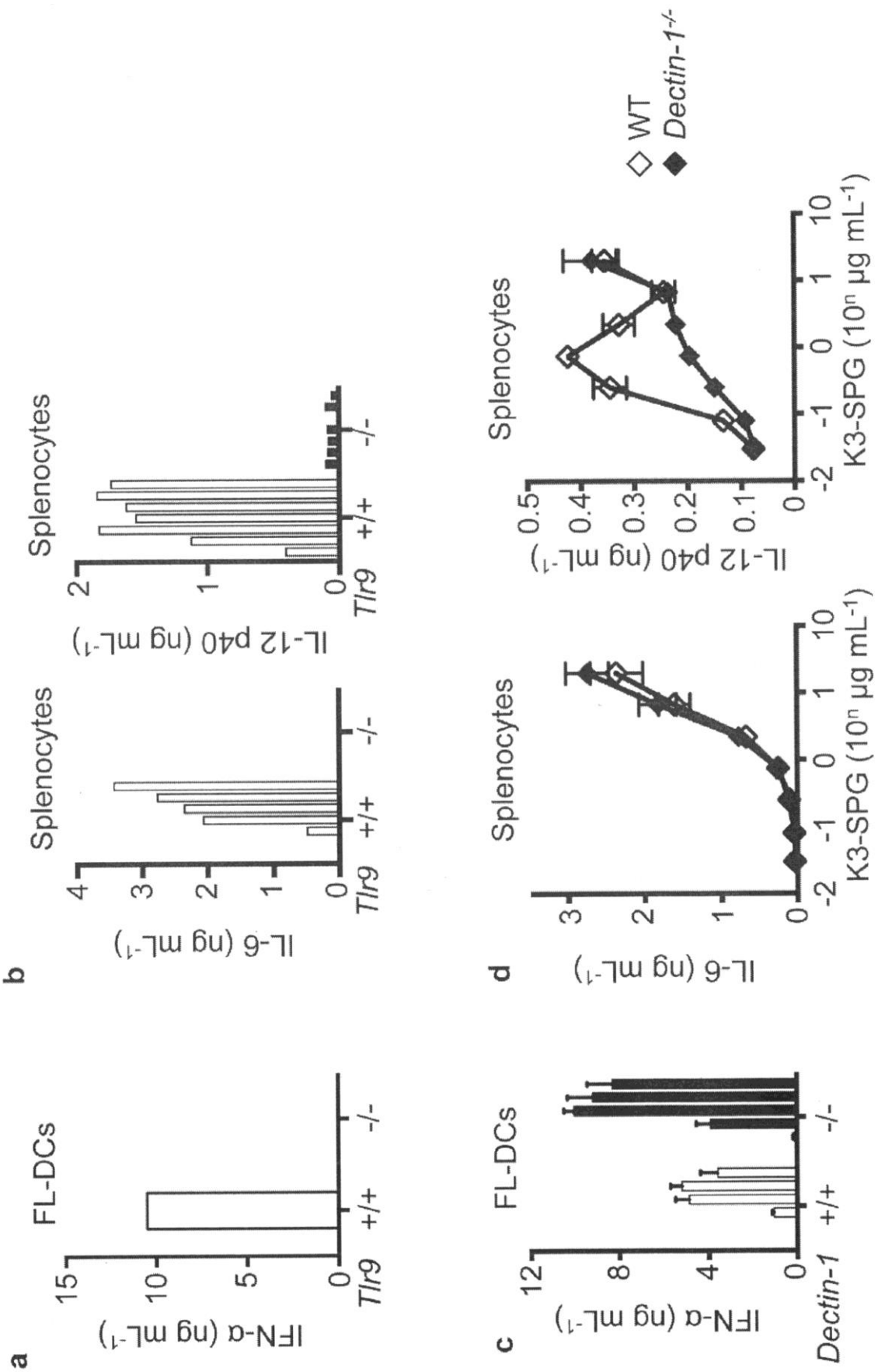

a
FL-DCs
IFN-α (ng mL-1)
Tlr9 +/+ -/-
b
Splenocytes
IL-6 (ng mL-1)
IL-12 p40 (ng mL-1)
Tlr9 +/+ -/-
c
FL-DCs
IFN-α (ng mL-1)
Dectin-1 +/+ -/-
d
Splenocytes
IL-6 (ng mL-1)
IL-12 p40 (ng mL-1)
K3-SPG (10n µg mL-1)
WT
Dectin-1-/-

**Fig. 25**

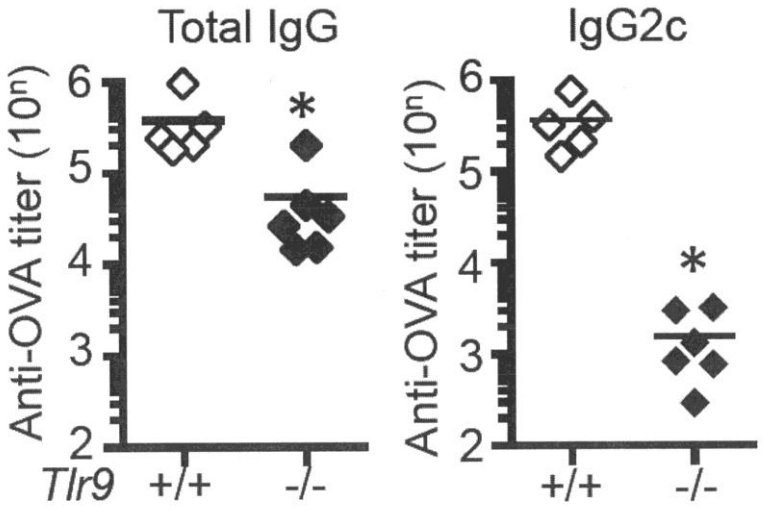

Total IgG
IgG2c
Anti-OVA titer ($10^n$)
6
5
4
3
2
*
*
Tlr9
+/+
-/-
+/+
-/-

**Fig. 26**

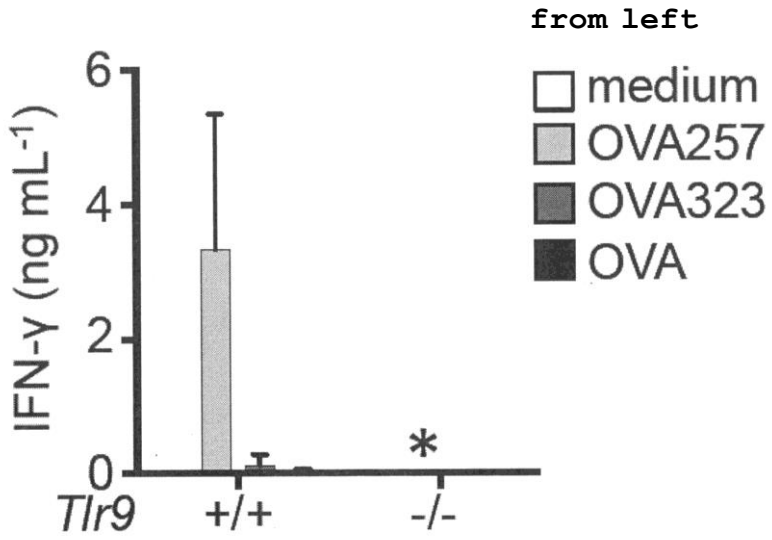

from left
medium
OVA257
OVA323
OVA
IFN-γ (ng mL$^{-1}$)
6
4
2
0
*
Tlr9
+/+
-/-

**Fig. 27**

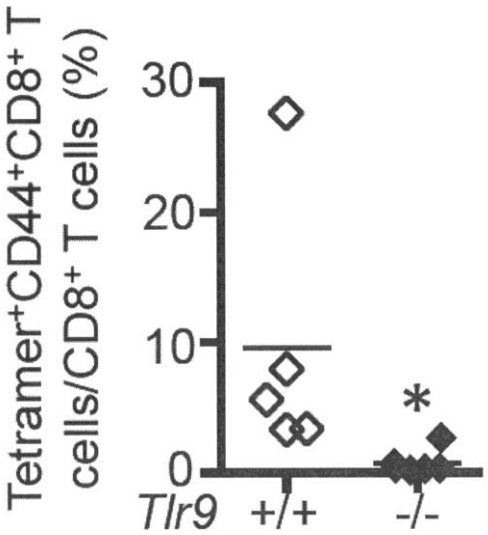

Tetramer+CD44+CD8+ T cells/CD8+ T cells (%)
30
20
10
0
*
Tlr9 +/+ -/-

**Fig. 28**

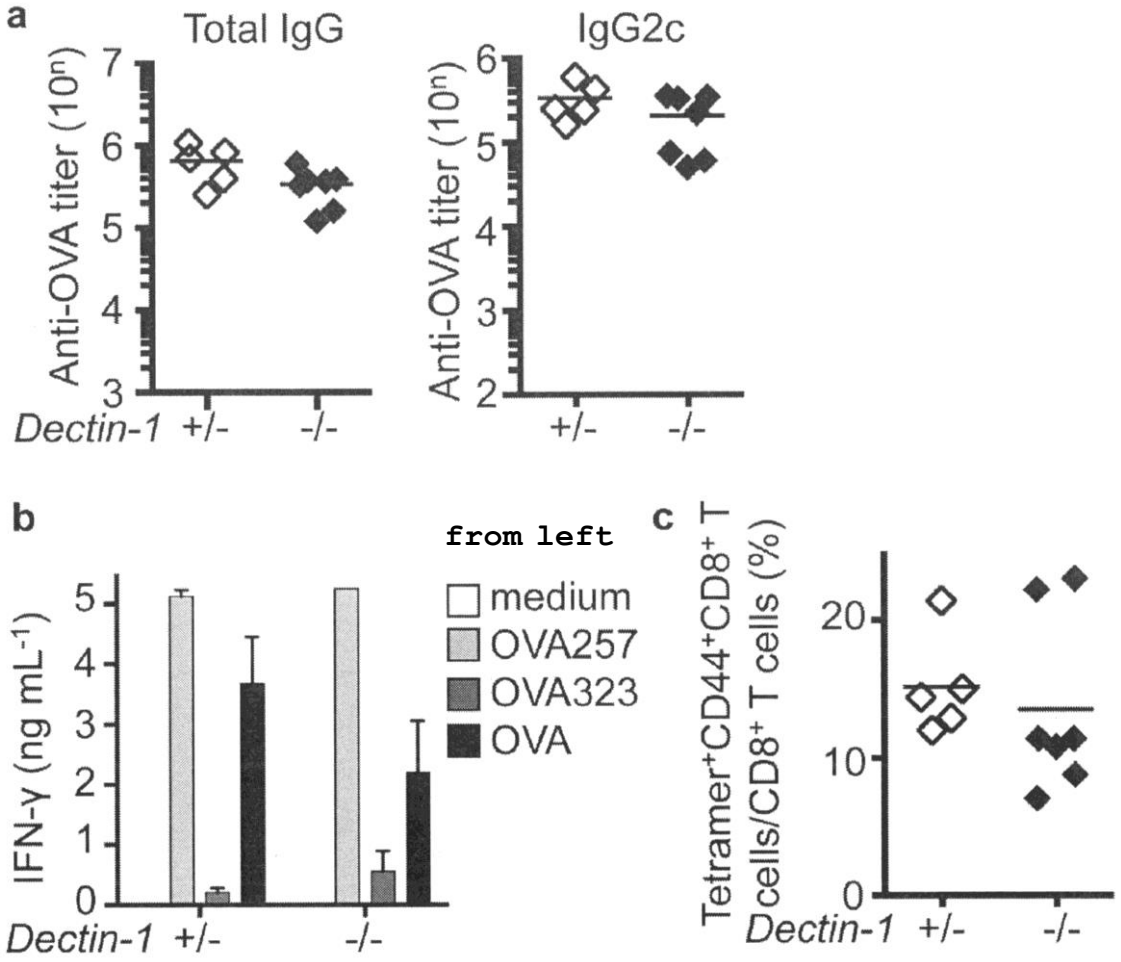

a
Total IgG
Anti-OVA titer (10n)
7
6
5
4
3
Dectin-1 +/- -/-
IgG2c
Anti-OVA titer (10n)
6
5
4
3
2
+/- -/-
b
IFN-γ (ng mL-1)
5
4
3
2
1
0
Dectin-1 +/- -/-
from left
medium
OVA257
OVA323
OVA
c
Tetramer+CD44+CD8+ T cells/CD8+ T cells (%)
20
10
0
Dectin-1 +/- -/-

**Fig. 29**

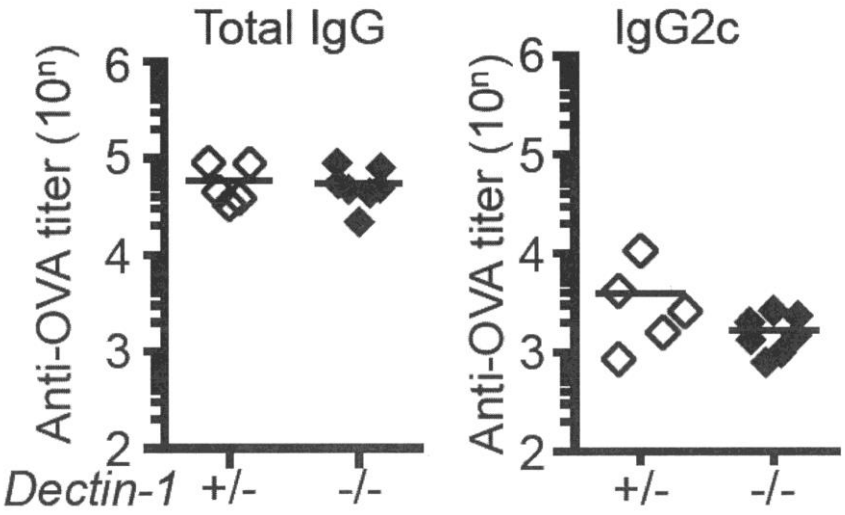

Total IgG
IgG2c
Anti-OVA titer ($10^n$)
6
5
4
3
2
Dectin-1 +/- -/-
+/- -/-

**Fig. 30**

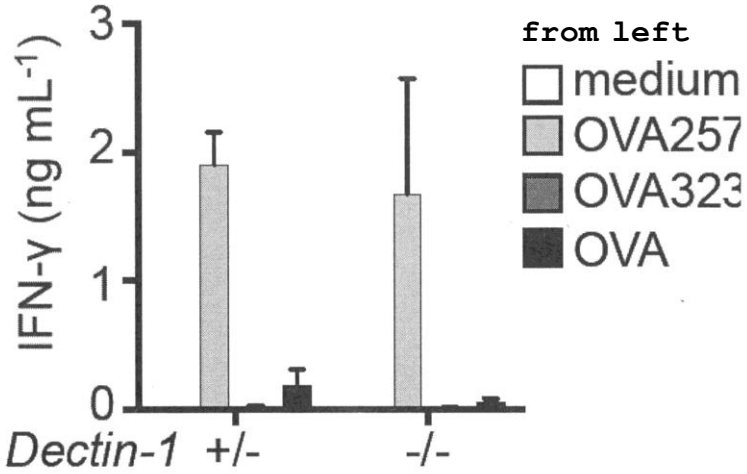

IFN-γ (ng mL$^{-1}$)
3
2
1
0
Dectin-1 +/- -/-
from left
medium
OVA257
OVA323
OVA

**Fig. 31**

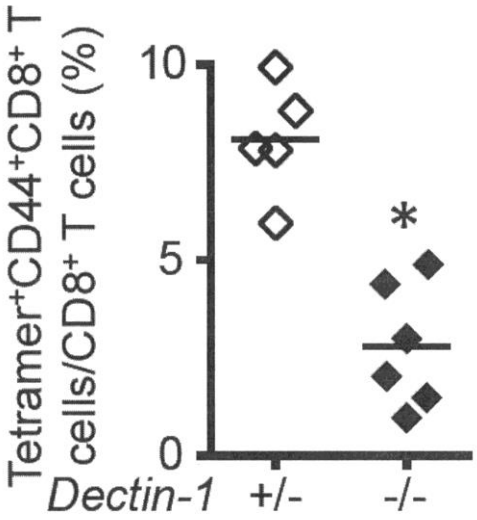

Tetramer+CD44+CD8+ T cells/CD8+ T cells (%)
10
5
0
*
Dectin-1 +/-
-/-

**Fig. 32**

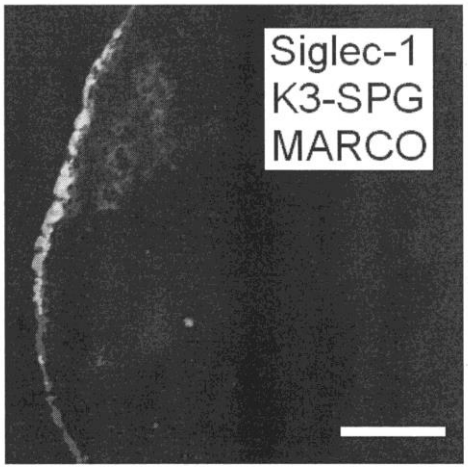

Siglec-1
K3-SPG
MARCO

**Fig. 33**

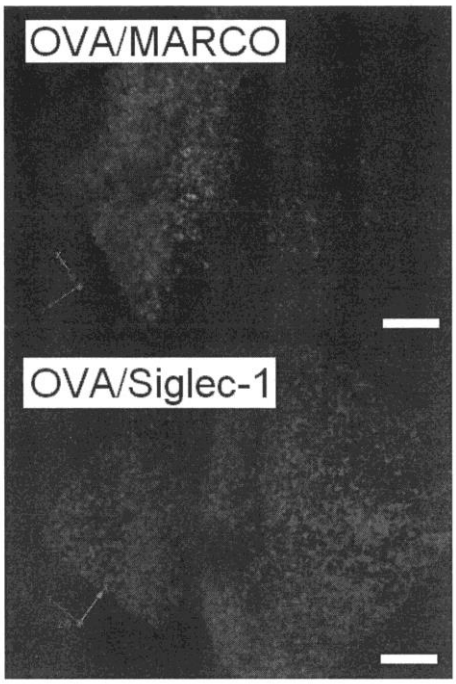

OVA/MARCO
OVA/Siglec-1

**Fig. 34**

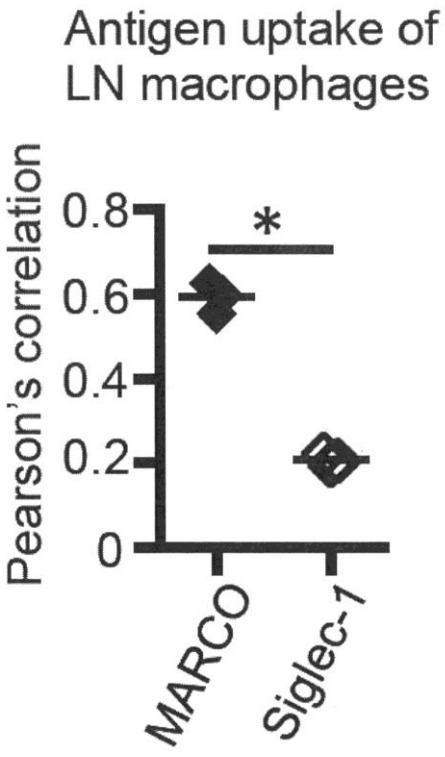

Antigen uptake of
LN macrophages
Pearson's correlation
0.8
0.6
0.4
0.2
0
*
MARCO
Siglec-1

**Fig. 35**

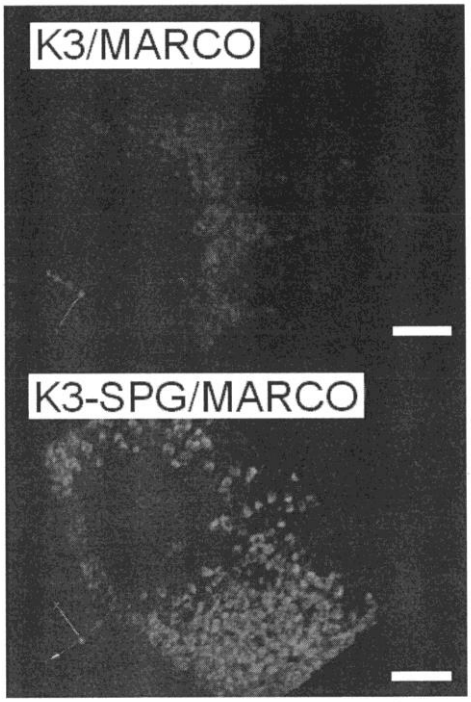

K3/MARCO
K3-SPG/MARCO

**Fig. 36**

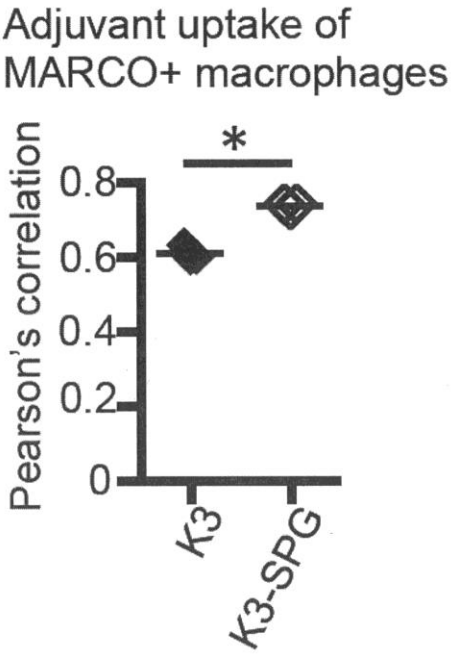

Adjuvant uptake of
MARCO+ macrophages
Pearson's correlation
0.8
0.6
0.4
0.2
0
*
K3
K3-SPG

**Fig. 37**

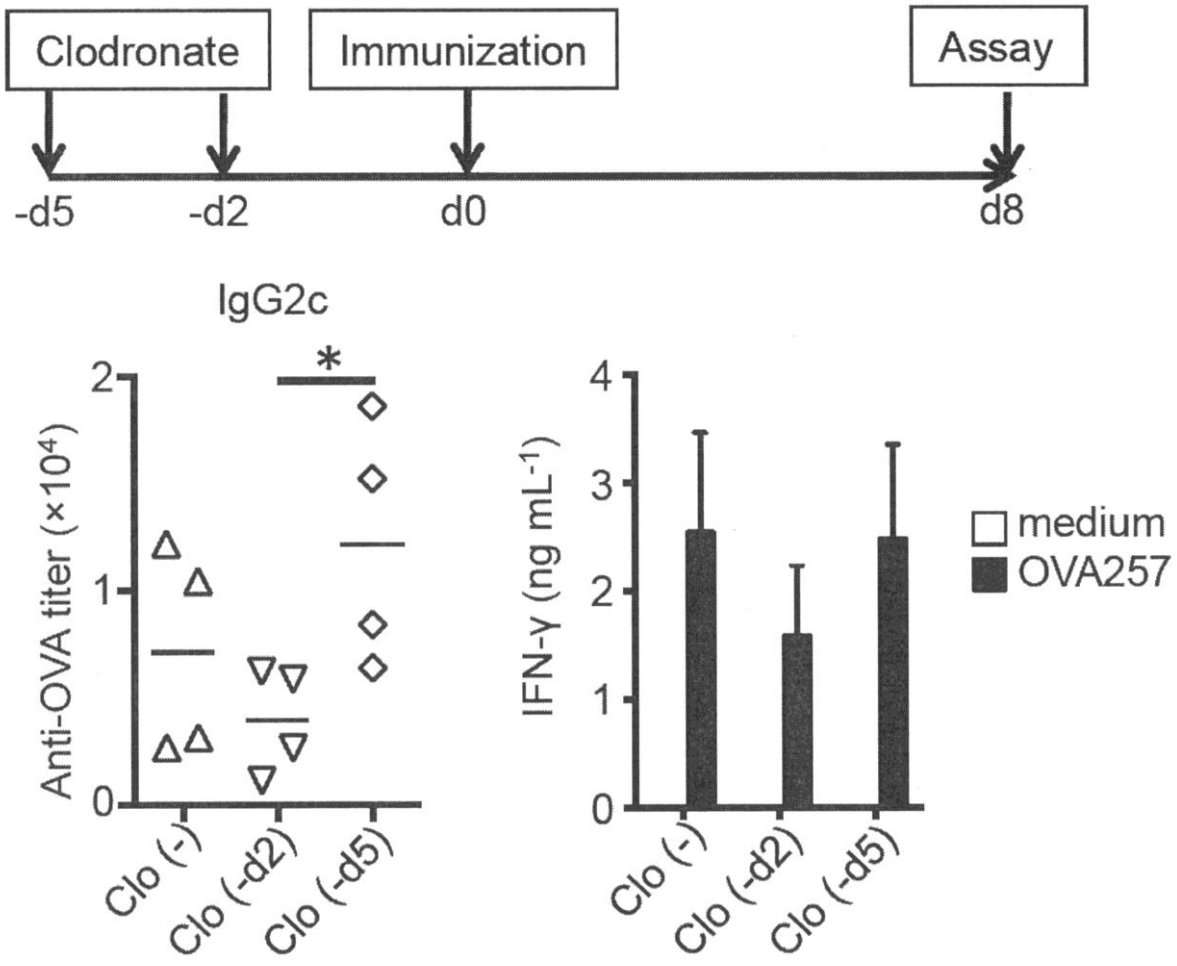

Clodronate
Immunization
Assay
-d5
-d2
d0
d8
IgG2c
Anti-OVA titer (×10⁴)
2
1
0
*
Clo (-)
Clo (-d2)
Clo (-d5)
IFN-γ (ng mL⁻¹)
4
3
2
1
0
medium
OVA257
Clo (-)
Clo (-d2)
Clo (-d5)

**Fig. 38**

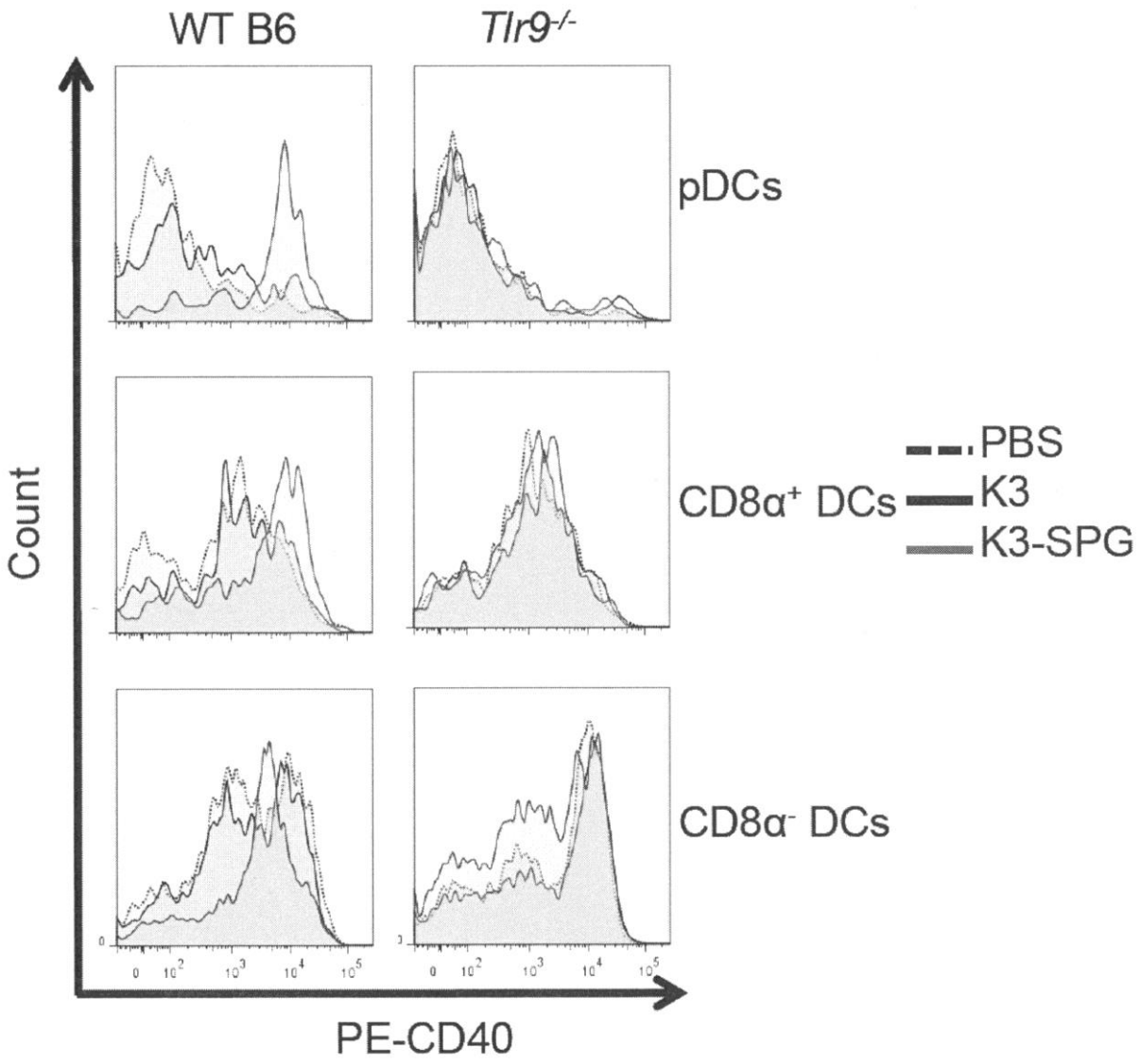

WT B6
Tlr9-/-
pDCs
CD8α+ DCs
CD8α- DCs
PBS
K3
K3-SPG
Count
PE-CD40
0
10^2
10^3
10^4
10^5

**Fig. 39**

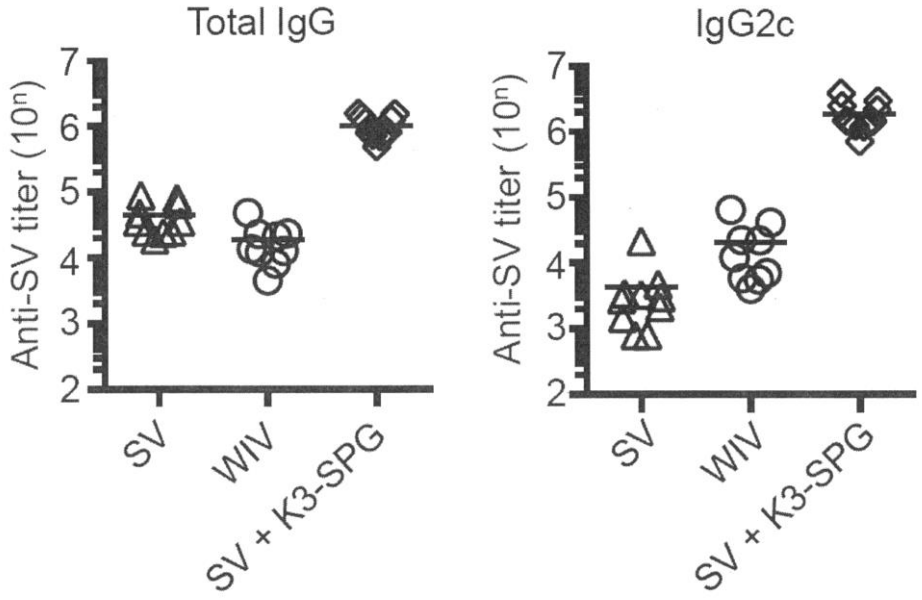

Total IgG
IgG2c
Anti-SV titer (10^n)
7
6
5
4
3
2
SV
WIV
SV + K3-SPG

**Fig. 40**

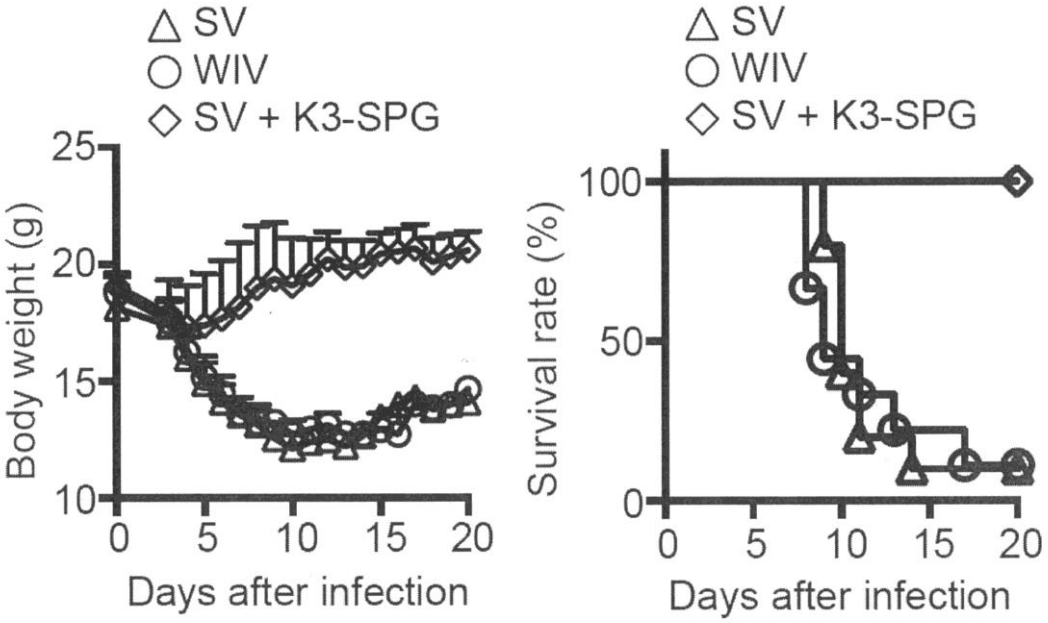

SV
WIV
SV + K3-SPG
Body weight (g)
25
20
15
10
0
5
10
15
20
Days after infection
Survival rate (%)
100
50
0

**Fig. 41**

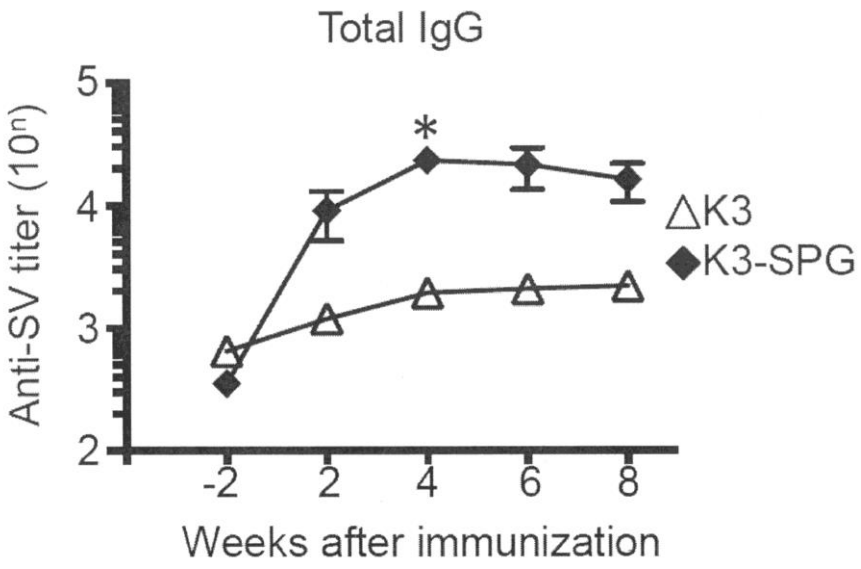

Total IgG
Anti-SV titer ($10^n$)
5
4
3
2
*
△K3
◆K3-SPG
-2
2
4
6
8
Weeks after immunization

**Fig. 42**

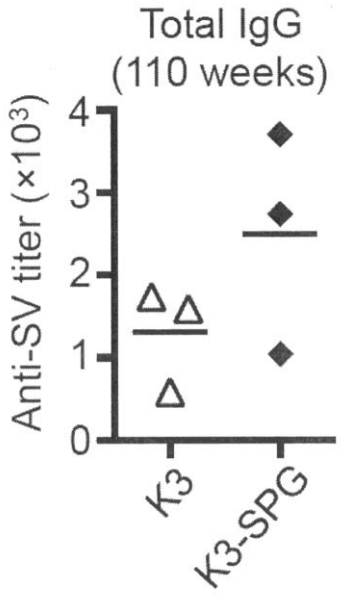

Total IgG
(110 weeks)
Anti-SV titer (×$10^3$)
4
3
2
1
0
K3
K3-SPG

**Fig. 43**

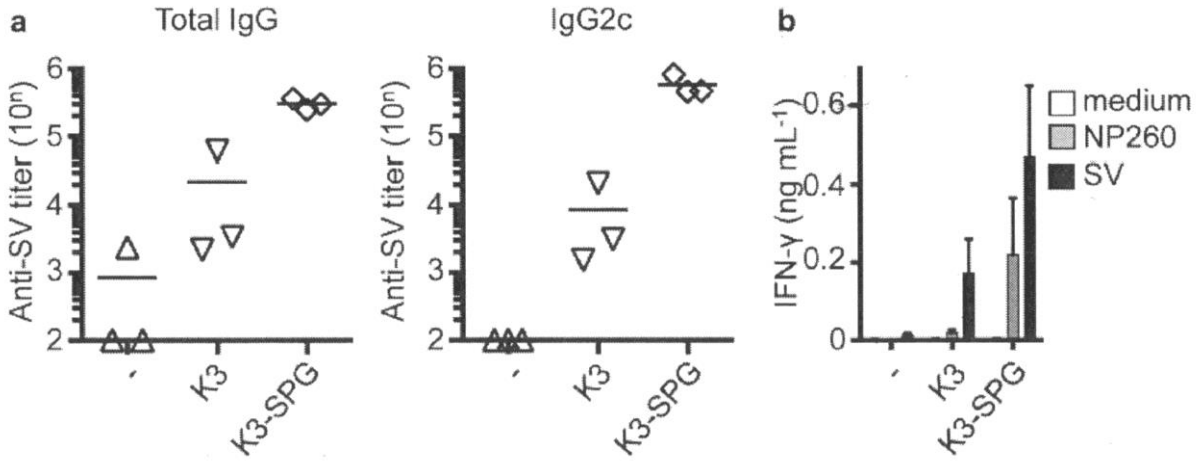

a
Total IgG
IgG2c
b
Anti-SV titer (10^n)
IFN-γ (ng mL^-1)
medium
NP260
SV
-
K3
K3-SPG

Fig. 44

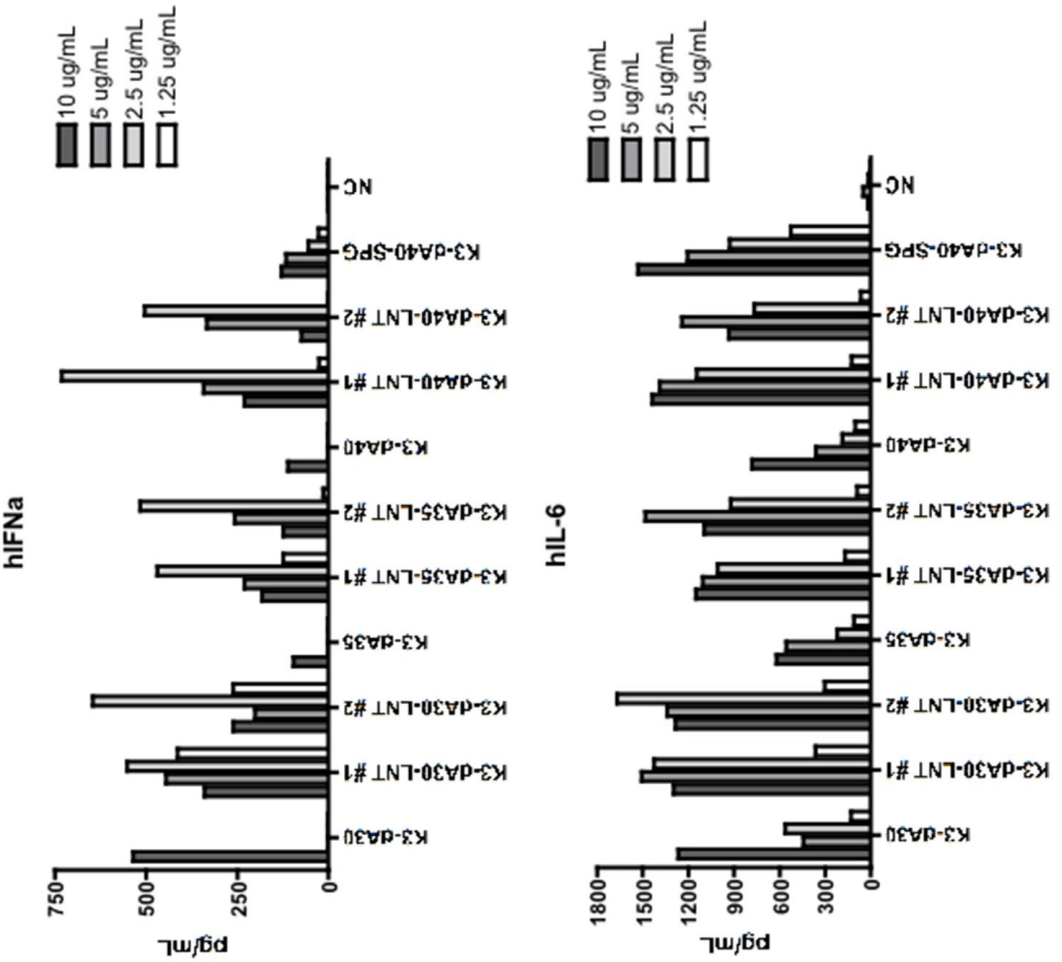

hIFNa
10 ug/mL
5 ug/mL
2.5 ug/mL
1.25 ug/mL
pg/mL
0
250
500
750
K3-dA30
K3-dA30-LNT #1
K3-dA30-LNT #2
K3-dA35
K3-dA35-LNT #1
K3-dA35-LNT #2
K3-dA40
K3-dA40-LNT #1
K3-dA40-LNT #2
K3-dA40-SPG
NC
hIL-6
10 ug/mL
5 ug/mL
2.5 ug/mL
1.25 ug/mL
pg/mL
0
300
600
900
1200
1500
1800
K3-dA30
K3-dA30-LNT #1
K3-dA30-LNT #2
K3-dA35
K3-dA35-LNT #1
K3-dA35-LNT #2
K3-dA40
K3-dA40-LNT #1
K3-dA40-LNT #2
K3-dA40-SPG
NC

Fig. 45

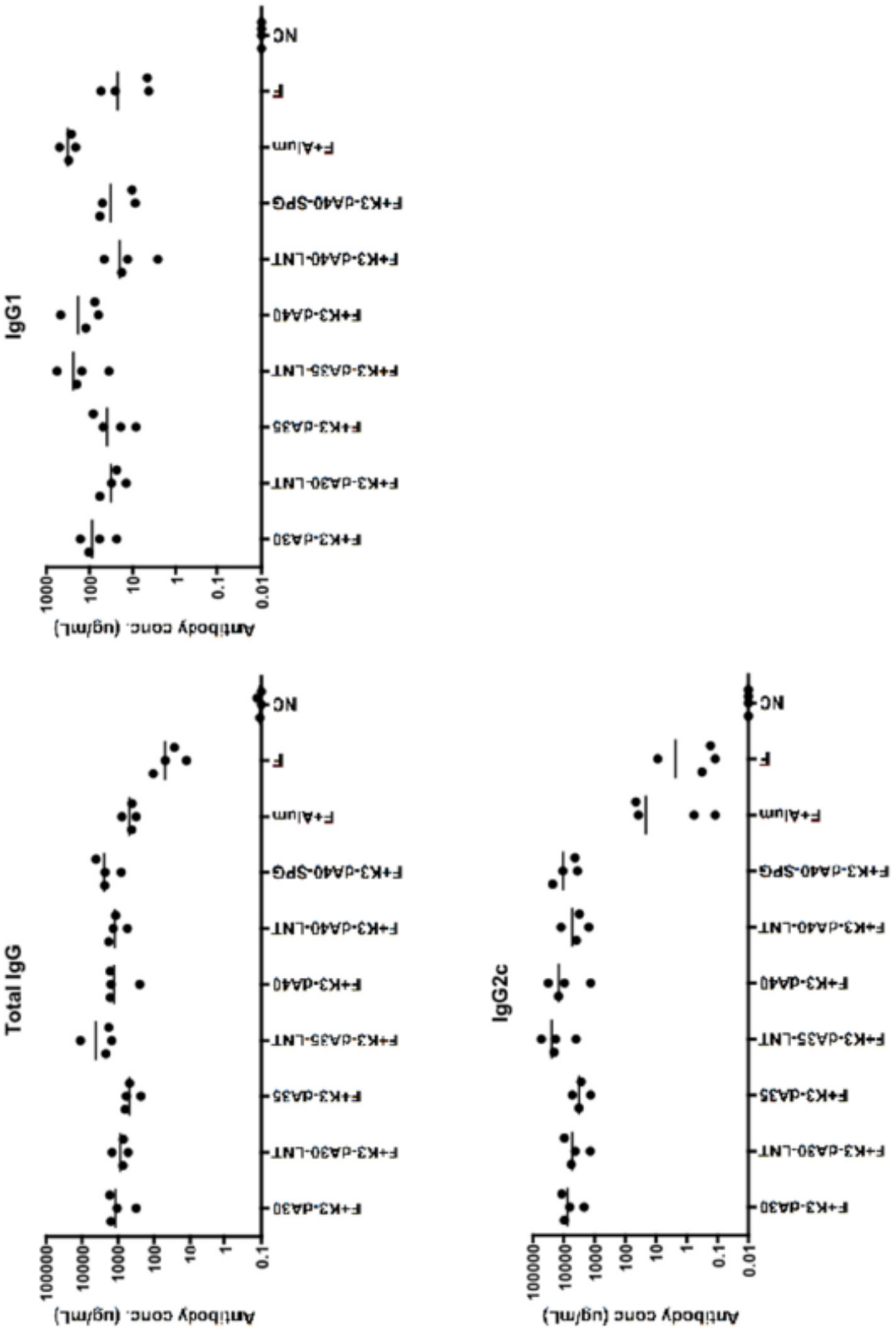

IgG1
Antibody conc. (ug/mL)
1000
100
10
1
0.1
0.01
F+K3-dA30
F+K3-dA30-LNT
F+K3-dA35
F+K3-dA35-LNT
F+K3-dA40
F+K3-dA40-LNT
F+K3-dA40-SPG
F+Alum
F
NC
Total IgG
Antibody conc. (ug/mL)
100000
10000
1000
100
10
1
0.1
F+K3-dA30
F+K3-dA30-LNT
F+K3-dA35
F+K3-dA35-LNT
F+K3-dA40
F+K3-dA40-LNT
F+K3-dA40-SPG
F+Alum
F
NC
IgG2c
Antibody conc (ug/mL)
100000
10000
1000
100
10
1
0.1
0.01
F+K3-dA30
F+K3-dA30-LNT
F+K3-dA35
F+K3-dA35-LNT
F+K3-dA40
F+K3-dA40-LNT
F+K3-dA40-SPG
F+Alum
F
NC

Fig. 46

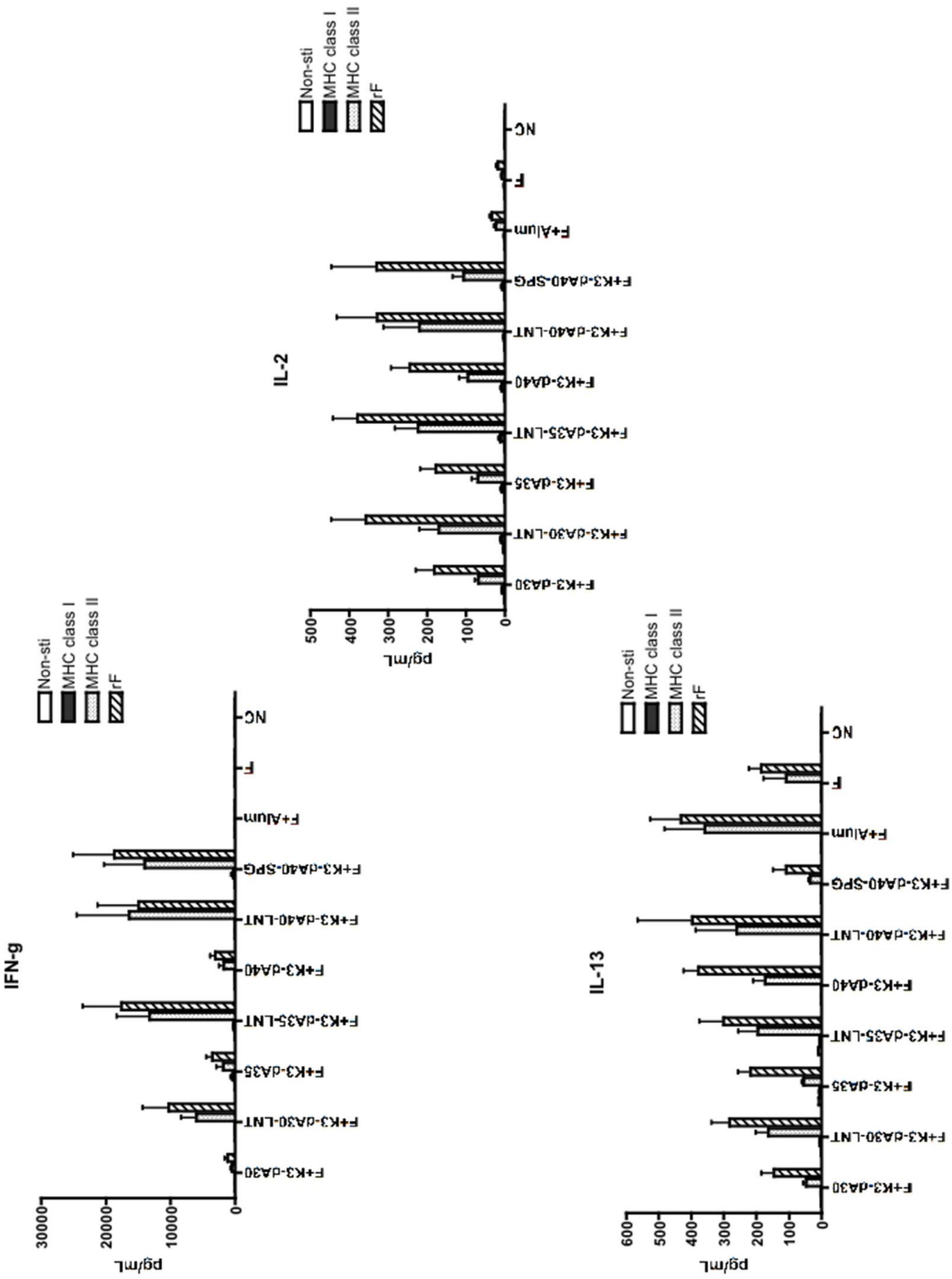
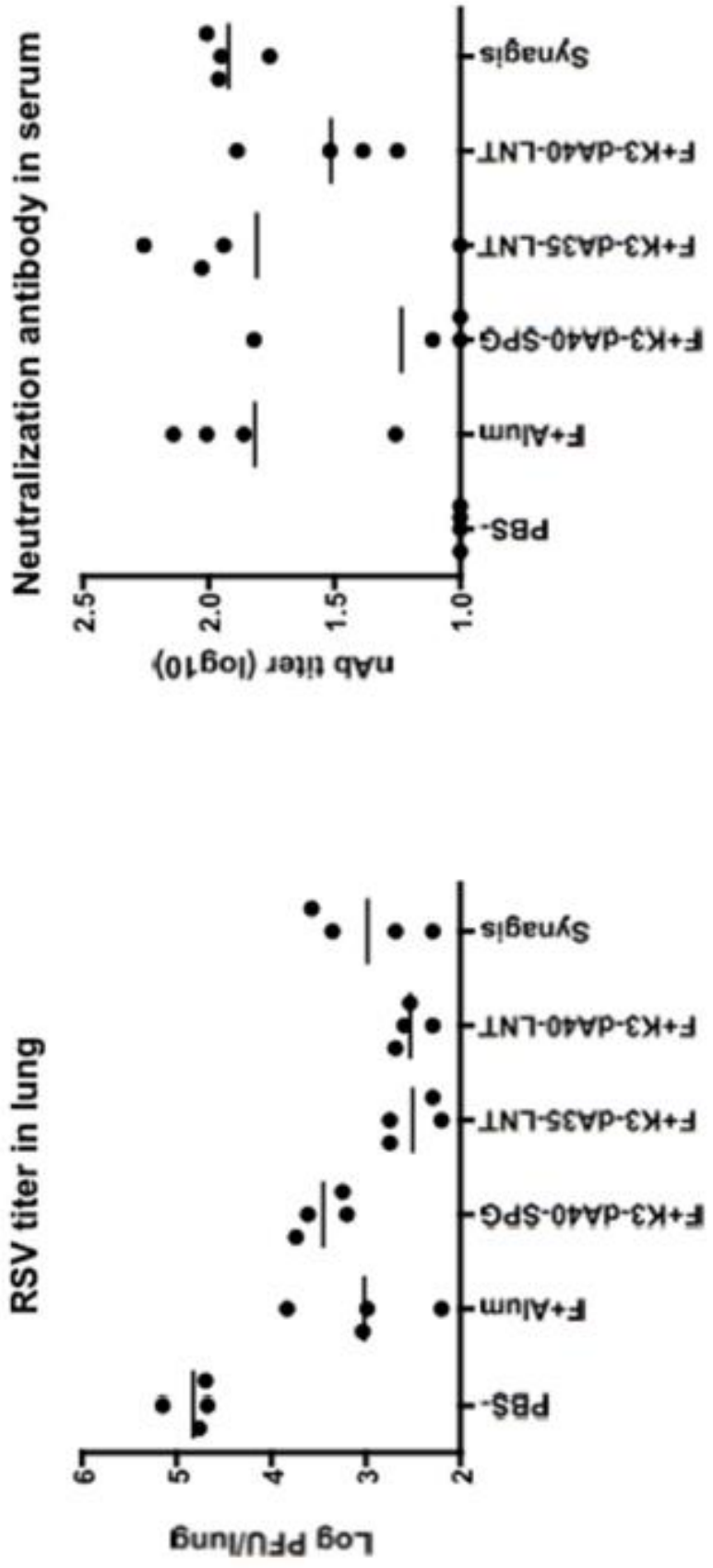

IFN-g
IL-2
IL-13
Non-sti
MHC class I
MHC class II
rF
pg/mL
NC
F
F+Alum
F+K3-dA40-SPG
F+K3-dA40-LNT
F+K3-dA40
F+K3-dA35-LNT
F+K3-dA35
F+K3-dA30-LNT
F+K3-dA30

Fig. 47


Neutralization antibody in serum
nAb titer (log10)
2.5
2.0
1.5
1.0
PBS-
F+Alum
F+K3-dA40-SPG
F+K3-dA35-LNT
F+K3-dA40-LNT
Synagis
RSV titer in lung
Log PFU/lung
6
5
4
3
2
PBS-
F+Alum
F+K3-dA40-SPG
F+K3-dA35-LNT
F+K3-dA40-LNT
Synagis