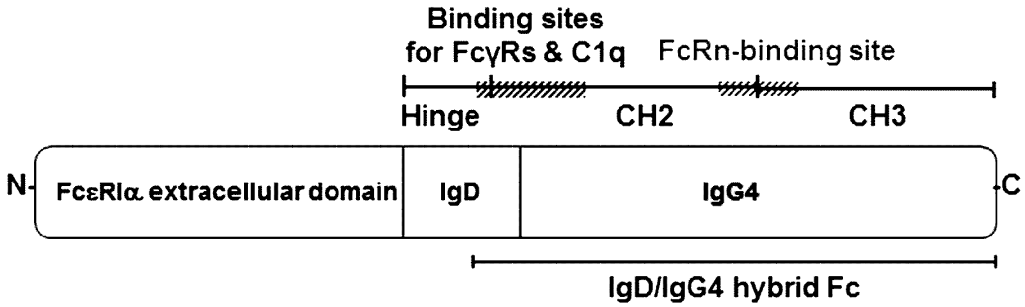
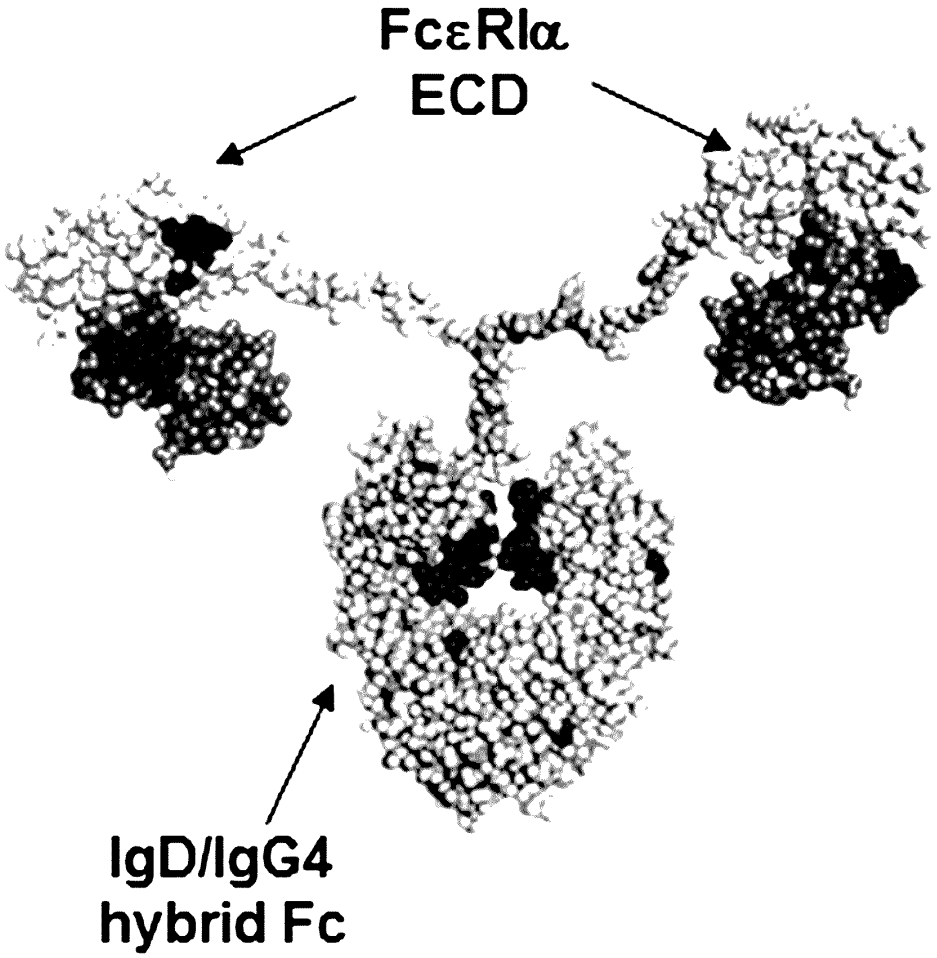
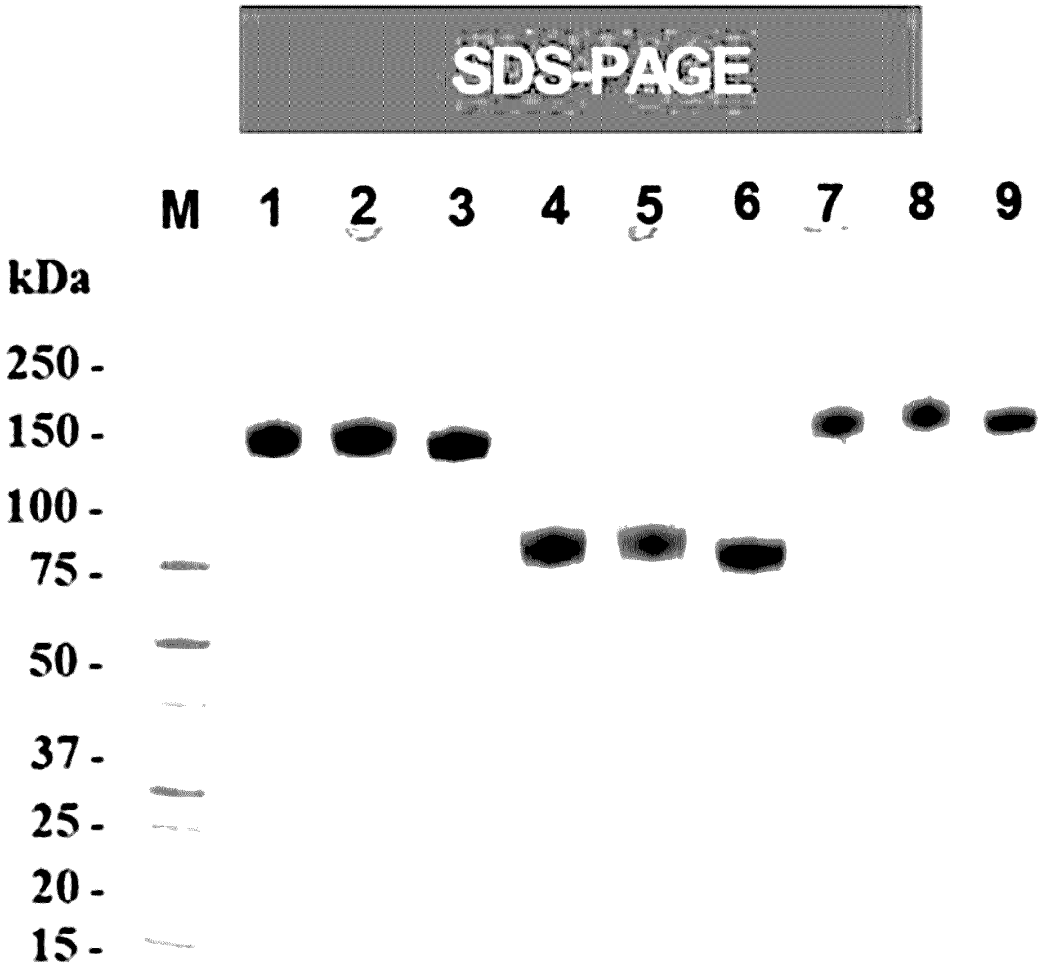
[도1]


Binding sites
for FcγRs & C1q
FcRn-binding site
Hinge
CH2
CH3
N
FcεRIα extracellular domain
IgD
IgG4
C
IgD/IgG4 hybrid Fc

[도2]


FcεRIα
ECD
IgD/IgG4
hybrid Fc

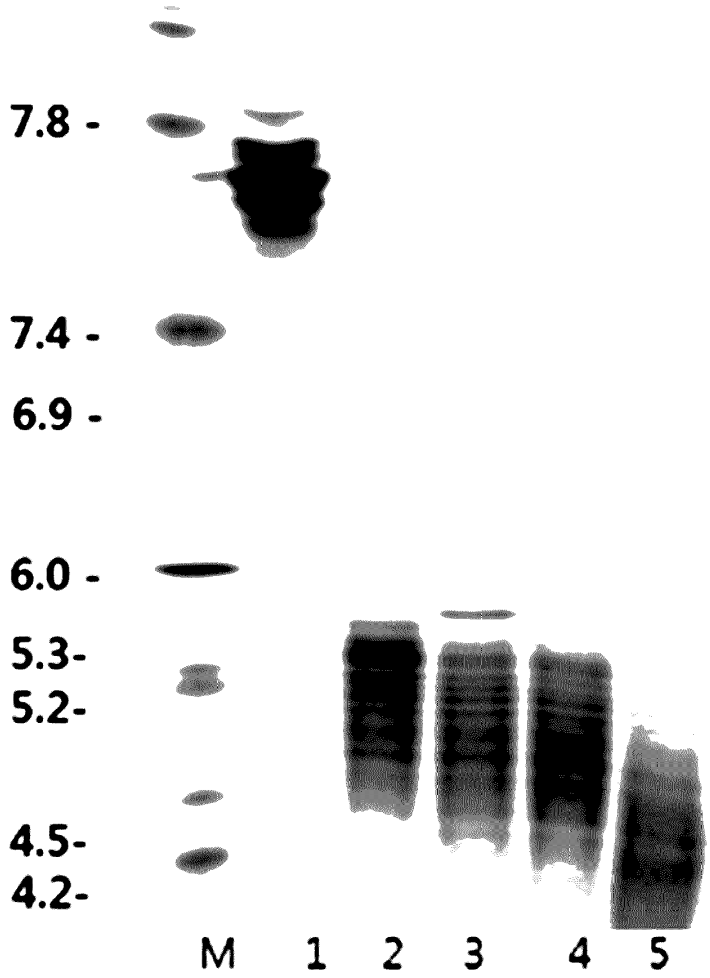
[도3a]



[도3b]

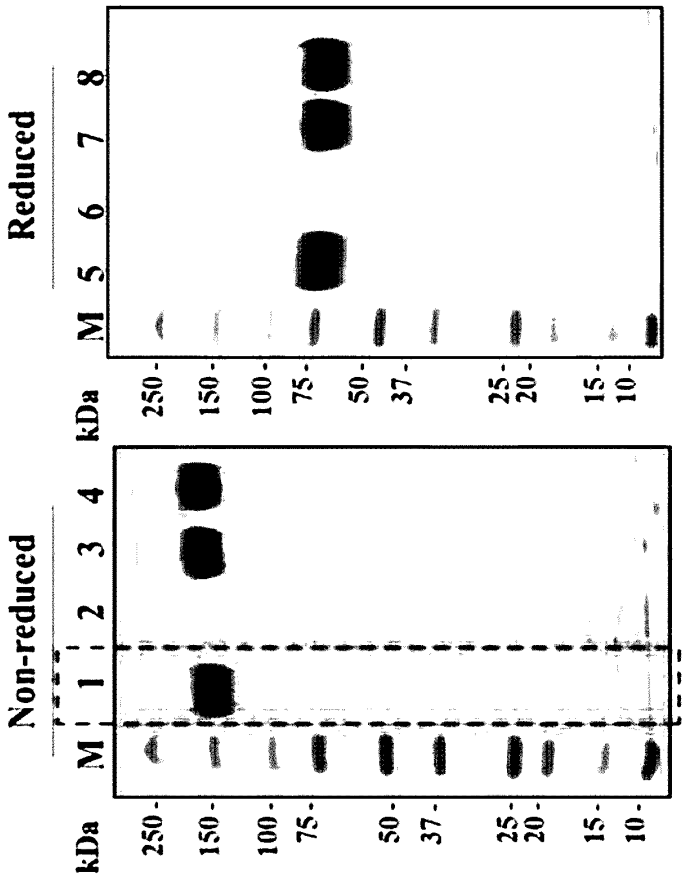
Lane #	Sample	Purification	Purity (SE-HPLC)	Sample condition	
M	Protein standard	One-step (Protein-A column) purification	.	.	.
1	FcεR1α ECD-Fc3		94.5%	.	Non-reducing
2	FcεR1α ECD-Fc3+2,6 ST		93.7%		
3	FcεR1α ECD-Fc2+2,6 ST		93.2%		
4	FcεR1α ECD-Fc3		94.5%	.	Reducing
5	FcεR1α ECD-Fc3+2,6 ST		93.7%		
6	FcεR1α ECD-Fc2+2,6 ST		93.2%		
7	FcεR1α ECD-Fc3		94.5%	Freezing/ Thawing test	Non-reducing
8	FcεR1α ECD-Fc3+2,6 ST		93.7%		
9	FcεR1α ECD-Fc2+2,6 ST		93.2%		

[도4]



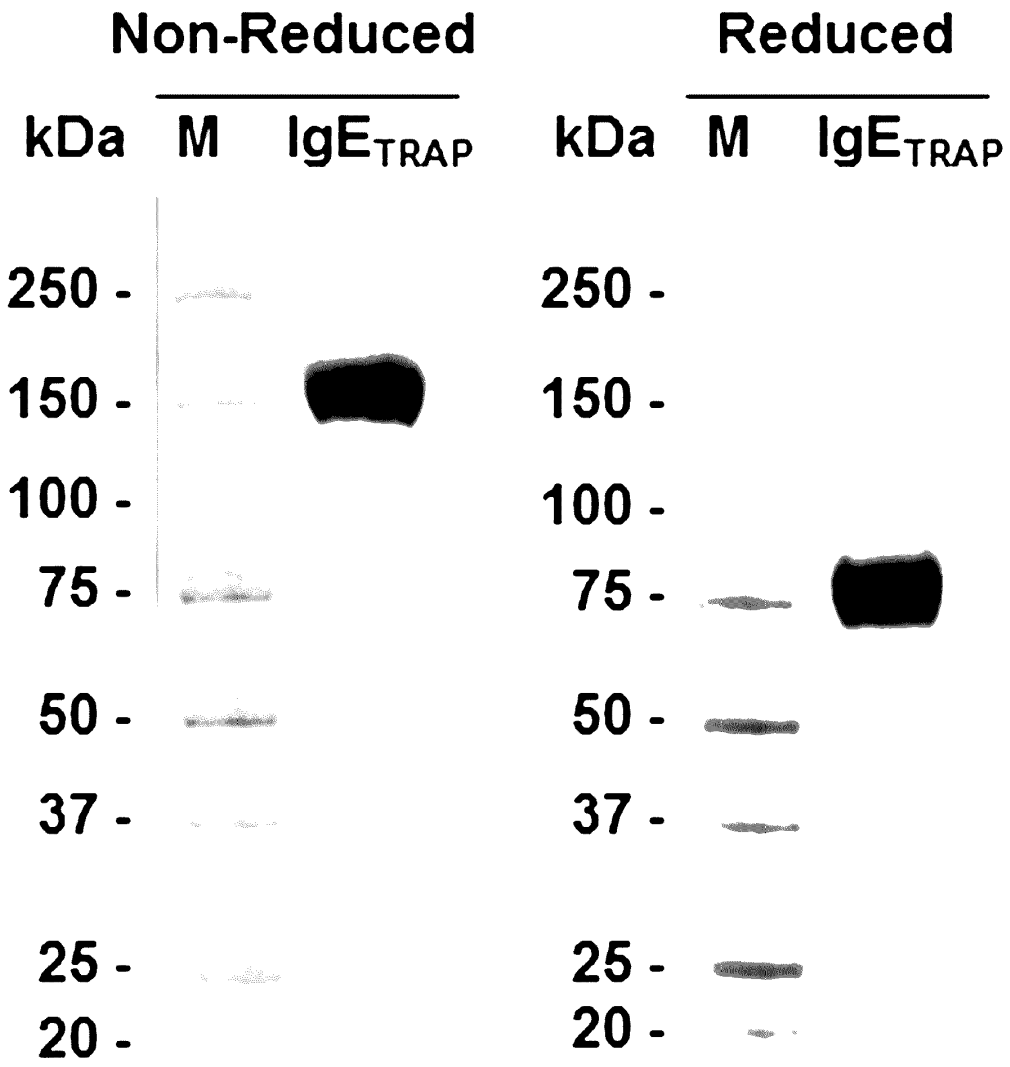
Lane	Loading sample	이론 pI
M	Marker (SERVA pH3-10, 5uL)	
1	Xolair	7.03
2	FcεRIα ECD-FC2	5.62
3	FcεRIα ECD-FC2+2,6 ST	5.62
4	FcεRIα ECD-FC3	5.63
5	FcεRIα ECD-FC3+2,6 ST	5.63

[도5]

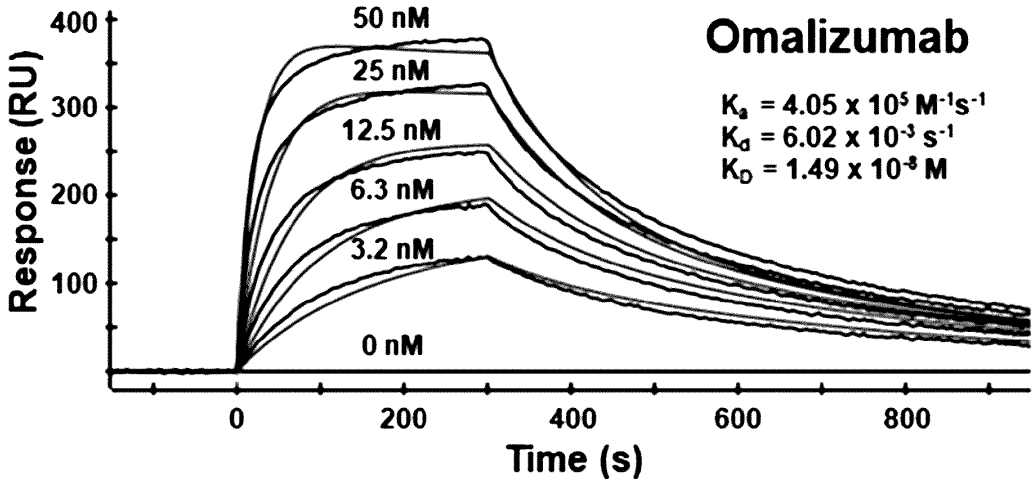


Lane	Sample name	Loading amount
M	Size Marker	3ul
1	**Input**	**Max**
2	FT	Max
3	Elute	3 ug
4	Elute_N	3 ug
M	Size Marker	3ul
5	Input	Max
6	FT	Max
7	Elute	3 ug
8	Elute_N	3 ug

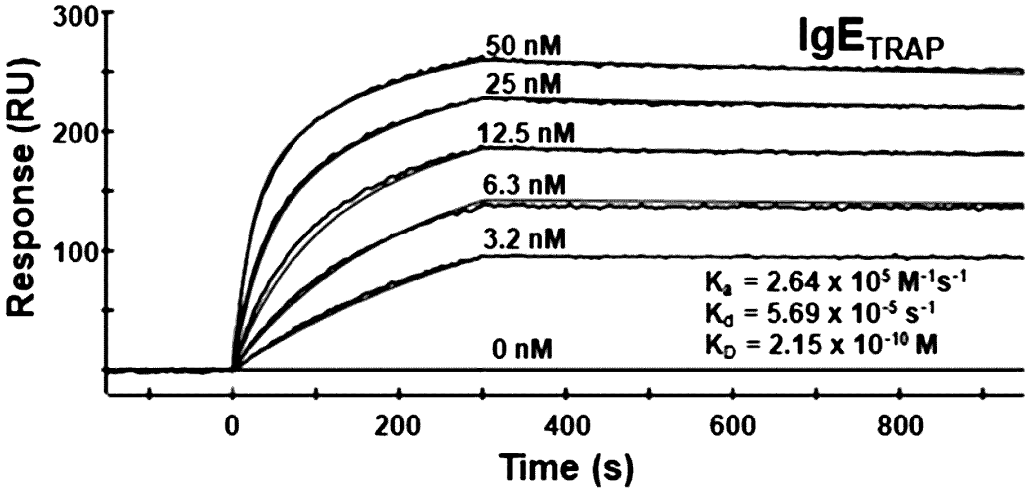
[도6]


Non-Reduced
Reduced
kDa
M
IgE$_{TRAP}$
kDa
M
IgE$_{TRAP}$
250 -
150 -
100 -
75 -
50 -
37 -
25 -
20 -
250 -
150 -
100 -
75 -
50 -
37 -
25 -
20 -

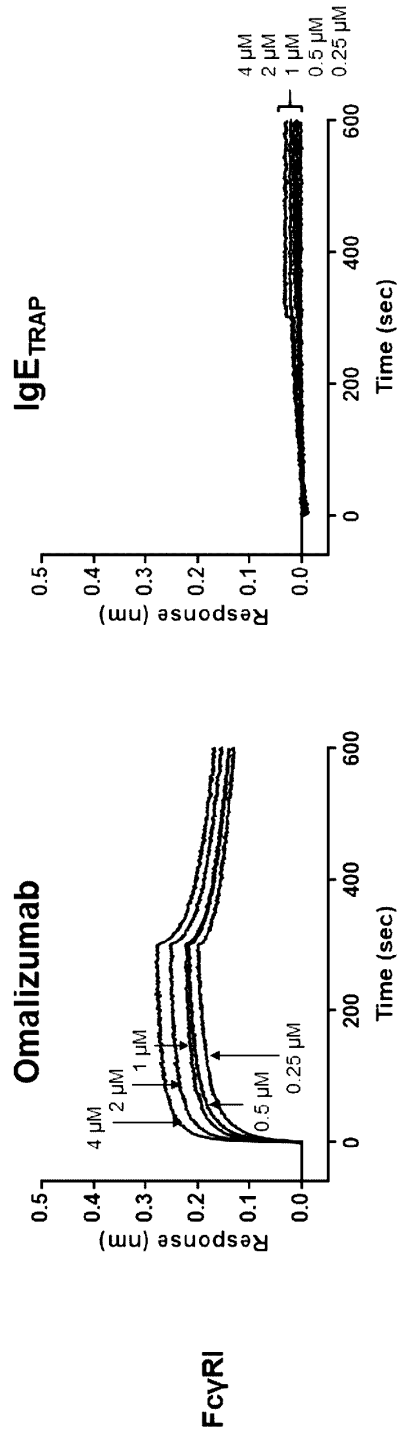
[도7]


Omalizumab
K_a = 4.05 x 10^5 $M^{-1}s^{-1}$
K_d = 6.02 x 10^{-3} s^{-1}
K_D = 1.49 x 10^{-8} M
50 nM
25 nM
12.5 nM
6.3 nM
3.2 nM
0 nM
Response (RU)
400
300
200
100
0
200
400
600
800
Time (s)

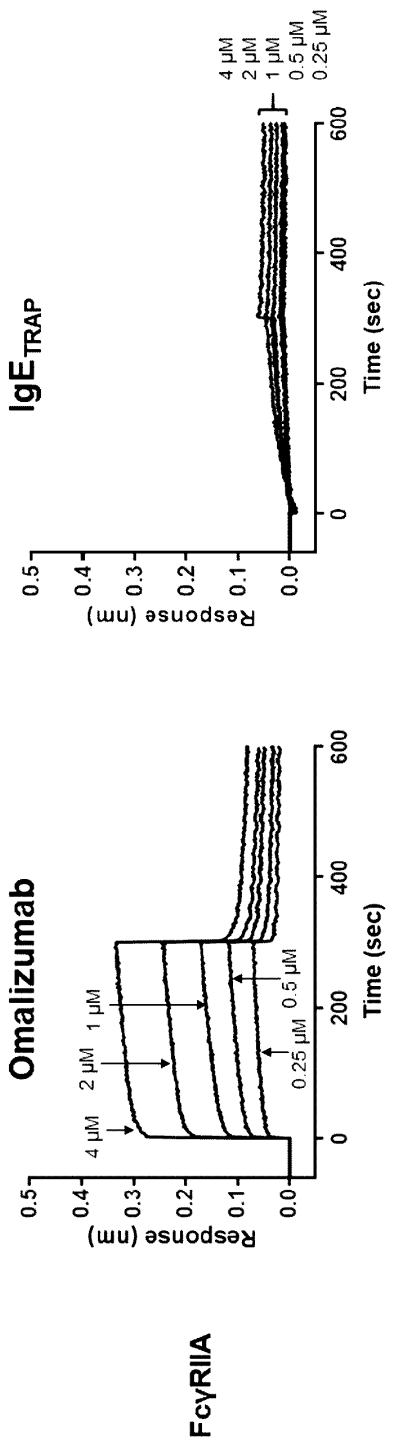
[도8]


IgE_{TRAP}
50 nM
25 nM
12.5 nM
6.3 nM
3.2 nM
0 nM
K_a = 2.64 x 10^5 $M^{-1}s^{-1}$
K_d = 5.69 x 10^{-5} s^{-1}
K_D = 2.15 x 10^{-10} M
Response (RU)
300
200
100
0
200
400
600
800
Time (s)

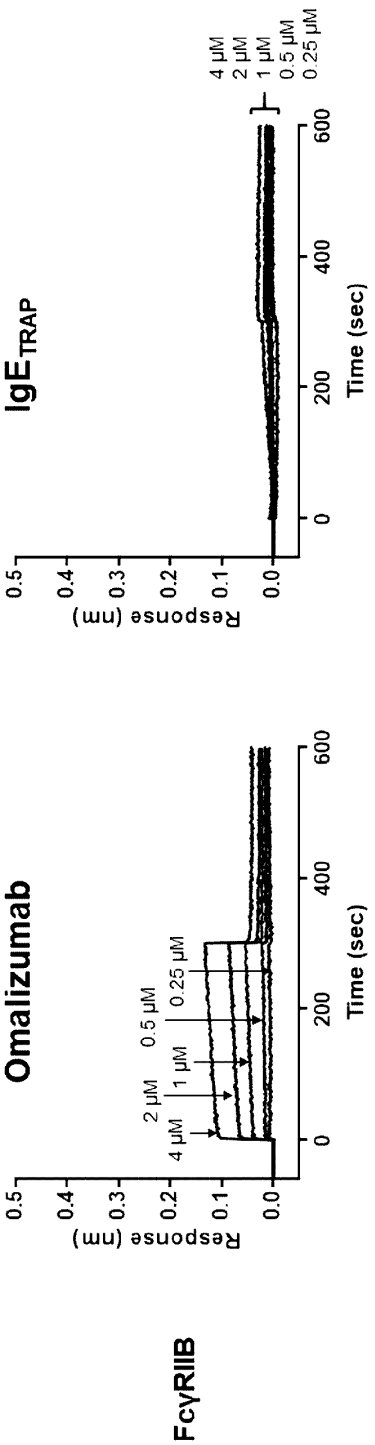
[도9]


IgE TRAP
4 μM
2 μM
1 μM
0.5 μM
0.25 μM
Response (nm)
Time (sec)
Omalizumab
FcγRI

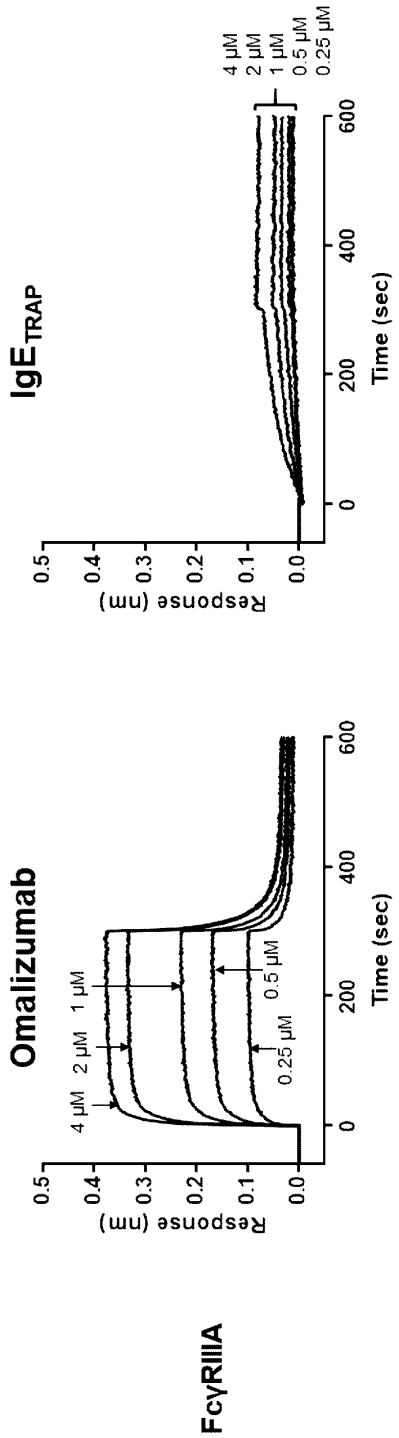
[도10]


FcγRIIA
Omalizumab
4 μM
2 μM
1 μM
0.5 μM
0.25 μM
Response (nm)
Time (sec)
IgE TRAP
4 μM
2 μM
1 μM
0.5 μM
0.25 μM
Response (nm)
Time (sec)

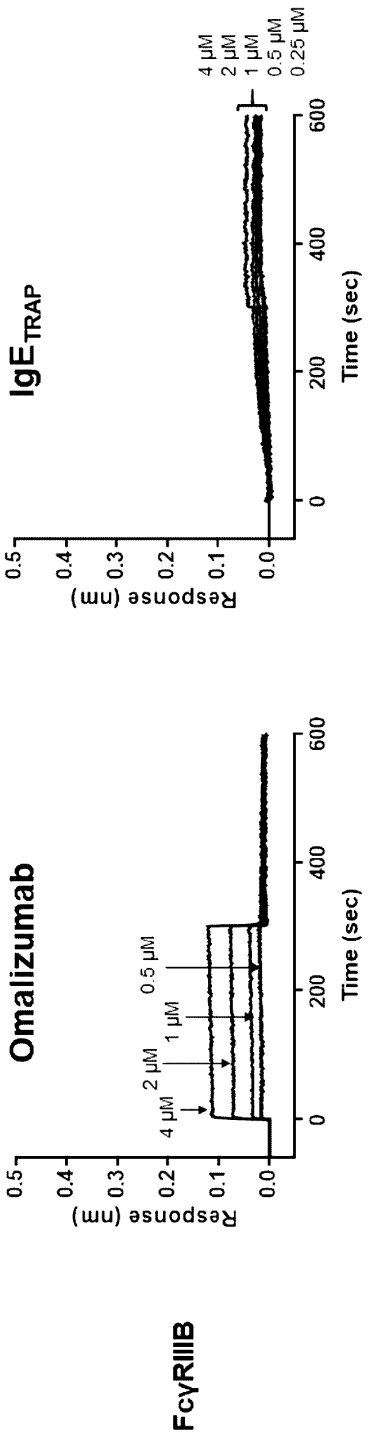
[도11]


FcγRIIB
Omalizumab
IgE$_{TRAP}$
Response (nm)
Time (sec)
4 μM
2 μM
1 μM
0.5 μM
0.25 μM
0.0
0.1
0.2
0.3
0.4
0.5
0
200
400
600

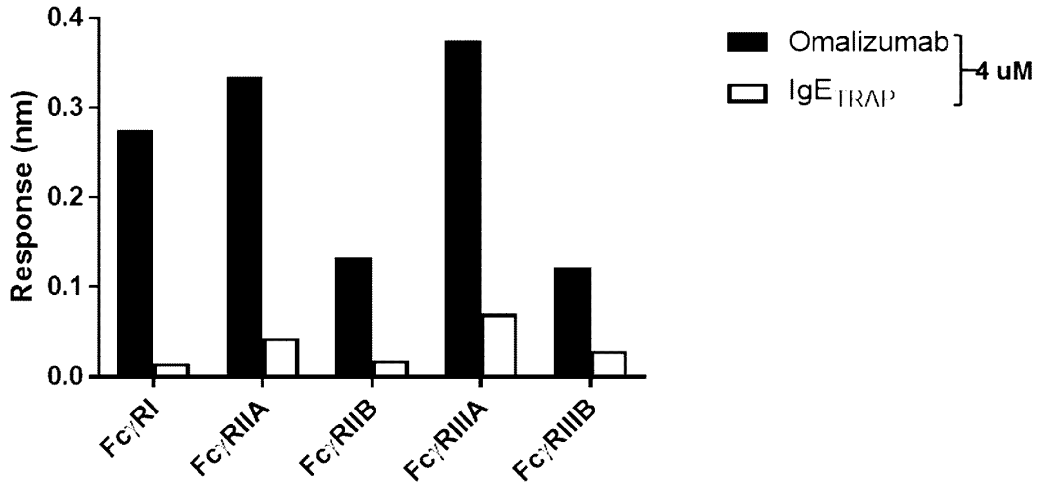
[도12]


FcγRIIIA
Omalizumab
4 μM
2 μM
1 μM
0.5 μM
0.25 μM
Response (nm)
Time (sec)
IgE TRAP
4 μM
2 μM
1 μM
0.5 μM
0.25 μM
Response (nm)
Time (sec)

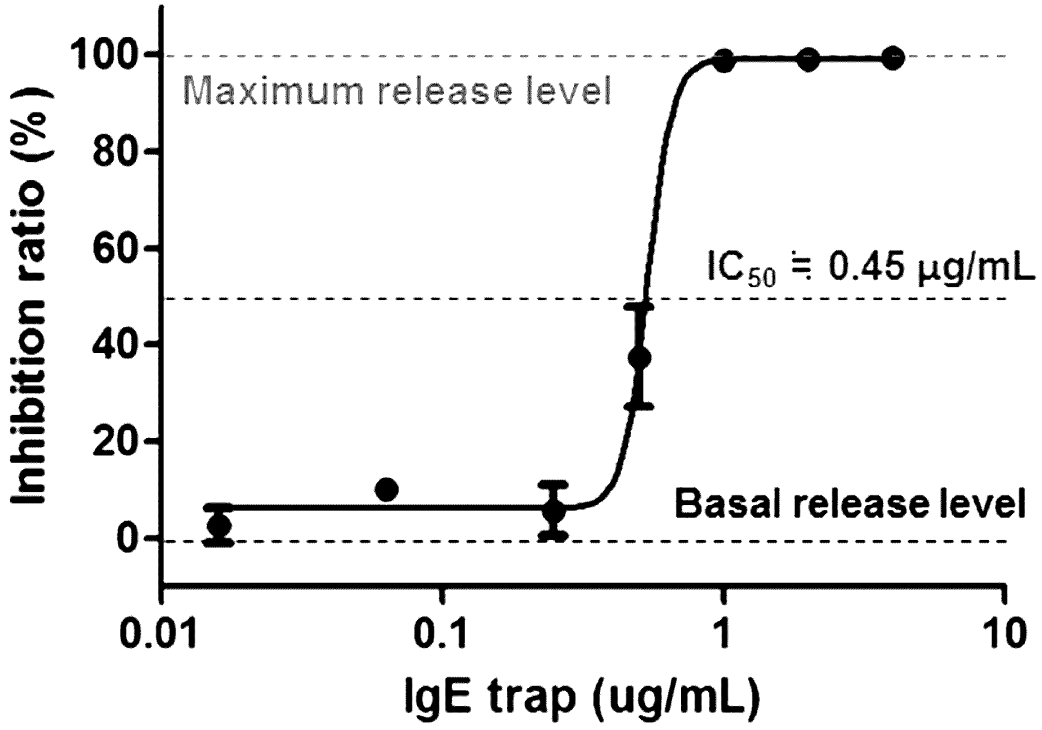
[도13]


FcγRIIIB
Omalizumab
4 μM
2 μM
1 μM
0.5 μM
Response (nm)
Time (sec)
IgE TRAP
4 μM
2 μM
1 μM
0.5 μM
0.25 μM
Response (nm)
Time (sec)

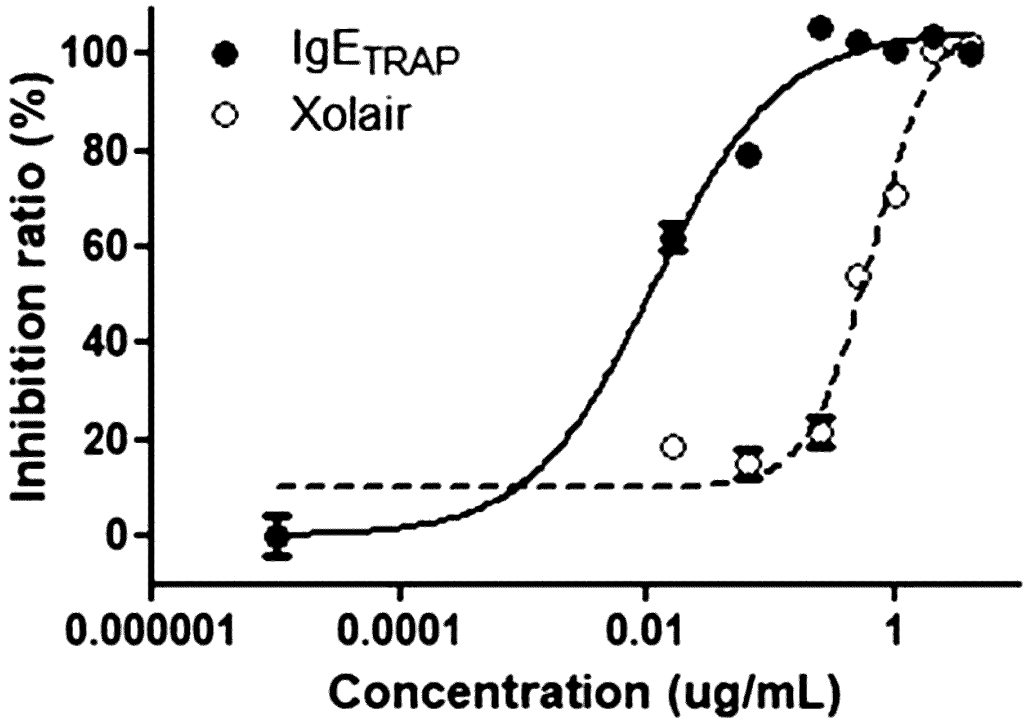
[도14]


Response (nm)
0.4
0.3
0.2
0.1
0.0
Omalizumab
IgE TRAP
4 uM
FcγRI
FcγRIIA
FcγRIIB
FcγRIIIA
FcγRIIIB

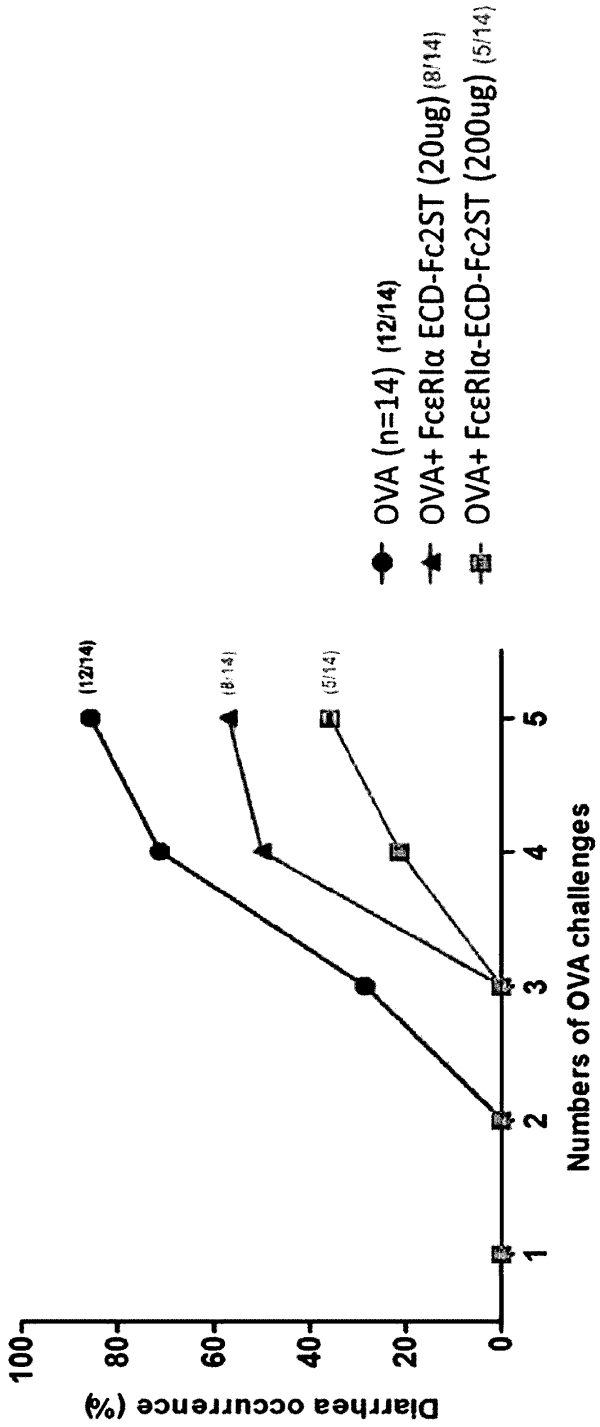
[도15a]


Inhibition ratio (%)
100
80
60
40
20
0
Maximum release level
IC50 ≒ 0.45 μg/mL
Basal release level
0.01
0.1
1
10
IgE trap (ug/mL)

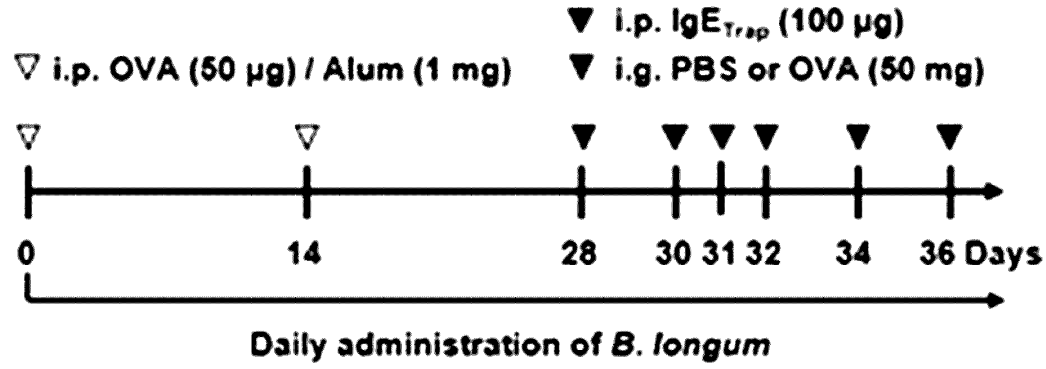
[도15b]


IgE$_{TRAP}$
Xolair
Inhibition ratio (%)
100
80
60
40
20
0
0.000001
0.0001
0.01
1
Concentration (ug/mL)

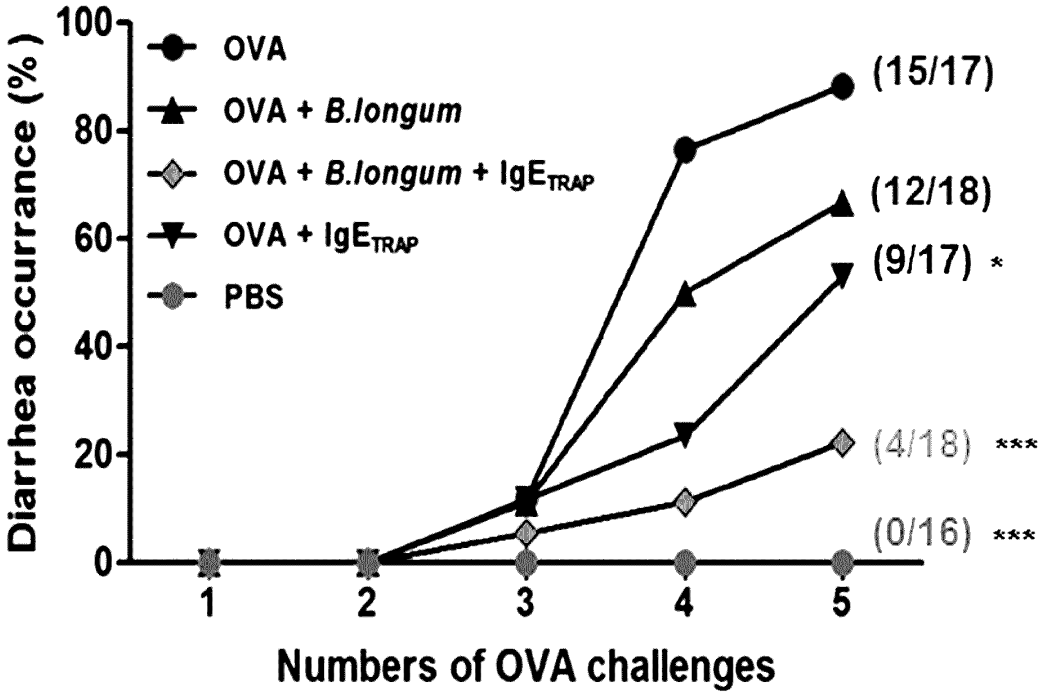
[도16]


OVA (n=14) (12/14)
OVA+ FcεRIα ECD-Fc2ST (20ug) (8/14)
OVA+ FcεRIα-ECD-Fc2ST (200ug) (5/14)
(12/14)
(8/14)
(5/14)
Diarrhea occurrence (%)
0
20
40
60
80
100
1
2
3
4
5
Numbers of OVA challenges

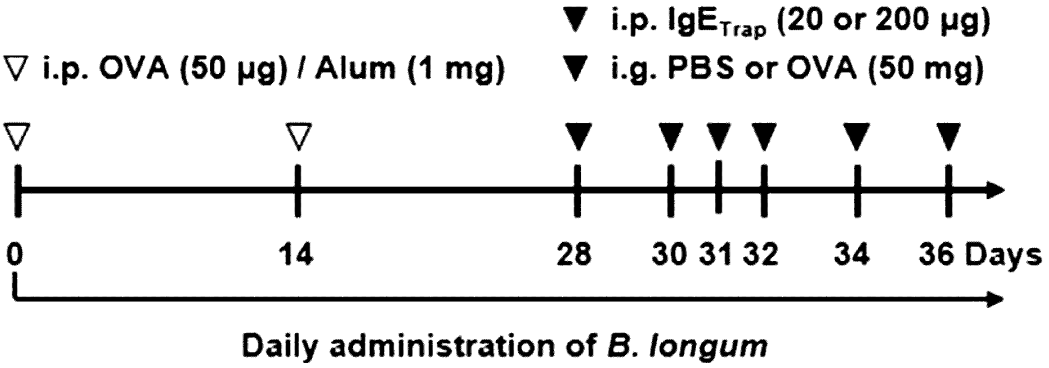
[도17]


▽ i.p. OVA (50 μg) / Alum (1 mg)
▼ i.p. IgE$_{Trap}$ (100 μg)
▼ i.g. PBS or OVA (50 mg)
0
14
28
30 31 32
34
36 Days
Daily administration of B. longum

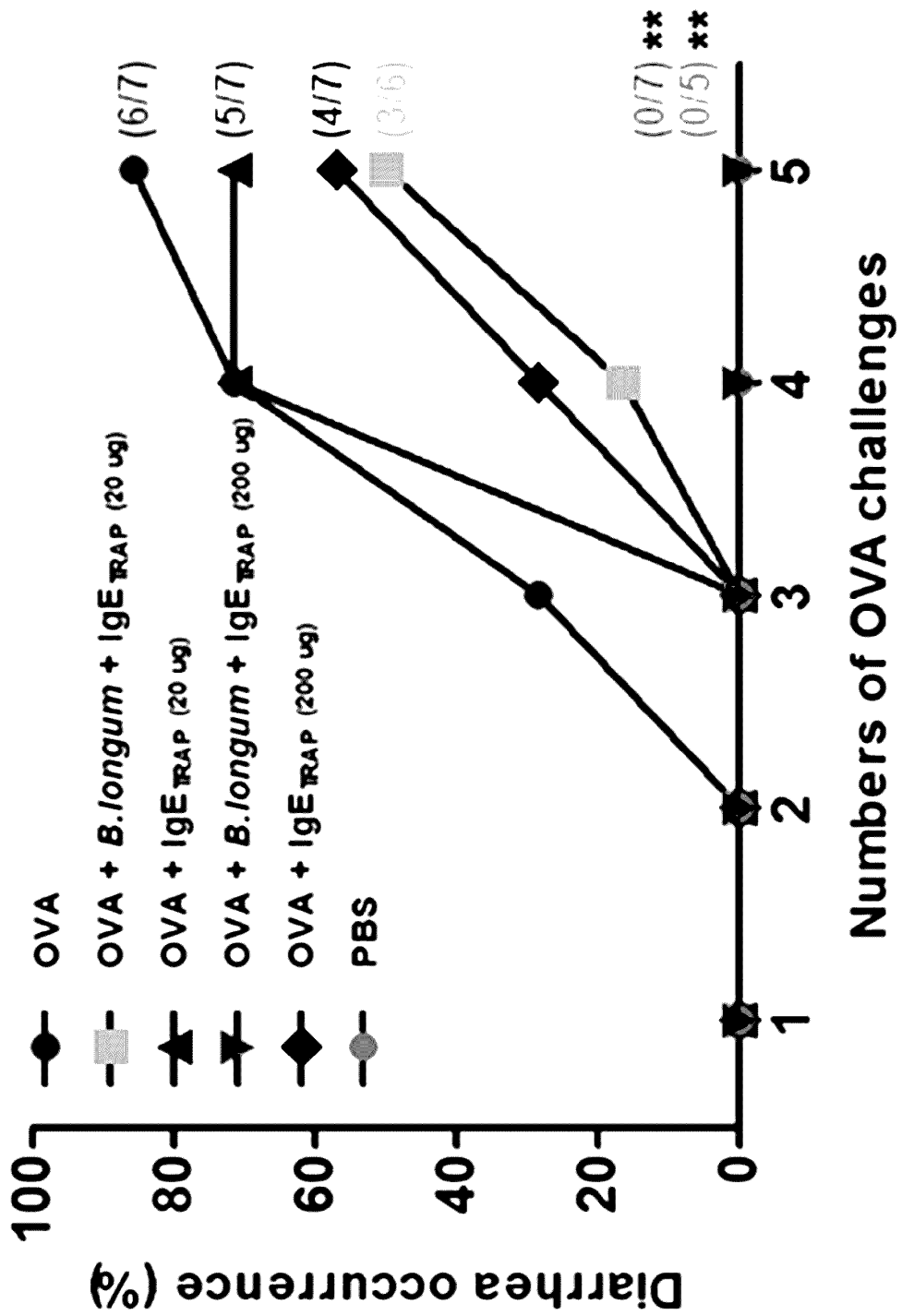
[도18]


Diarrhea occurrance (%)
100
80
60
40
20
0
OVA
OVA + B.longum
OVA + B.longum + IgE$_{TRAP}$
OVA + IgE$_{TRAP}$
PBS
(15/17)
(12/18)
(9/17) *
(4/18) ***
(0/16) ***
1
2
3
4
5
Numbers of OVA challenges

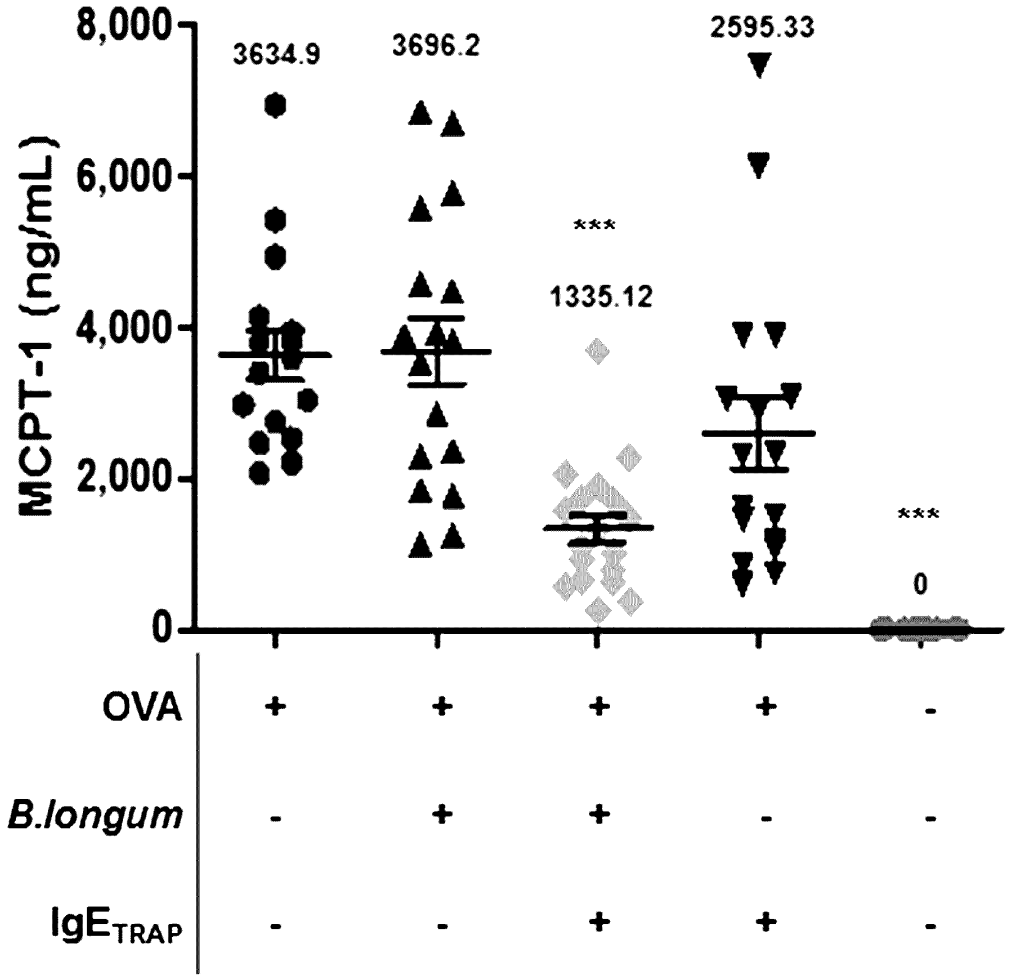
[도19a]


▽ i.p. OVA (50 μg) / Alum (1 mg)
▼ i.p. IgE$_{Trap}$ (20 or 200 μg)
▼ i.g. PBS or OVA (50 mg)
0
14
28
30 31 32
34
36 Days
Daily administration of B. longum

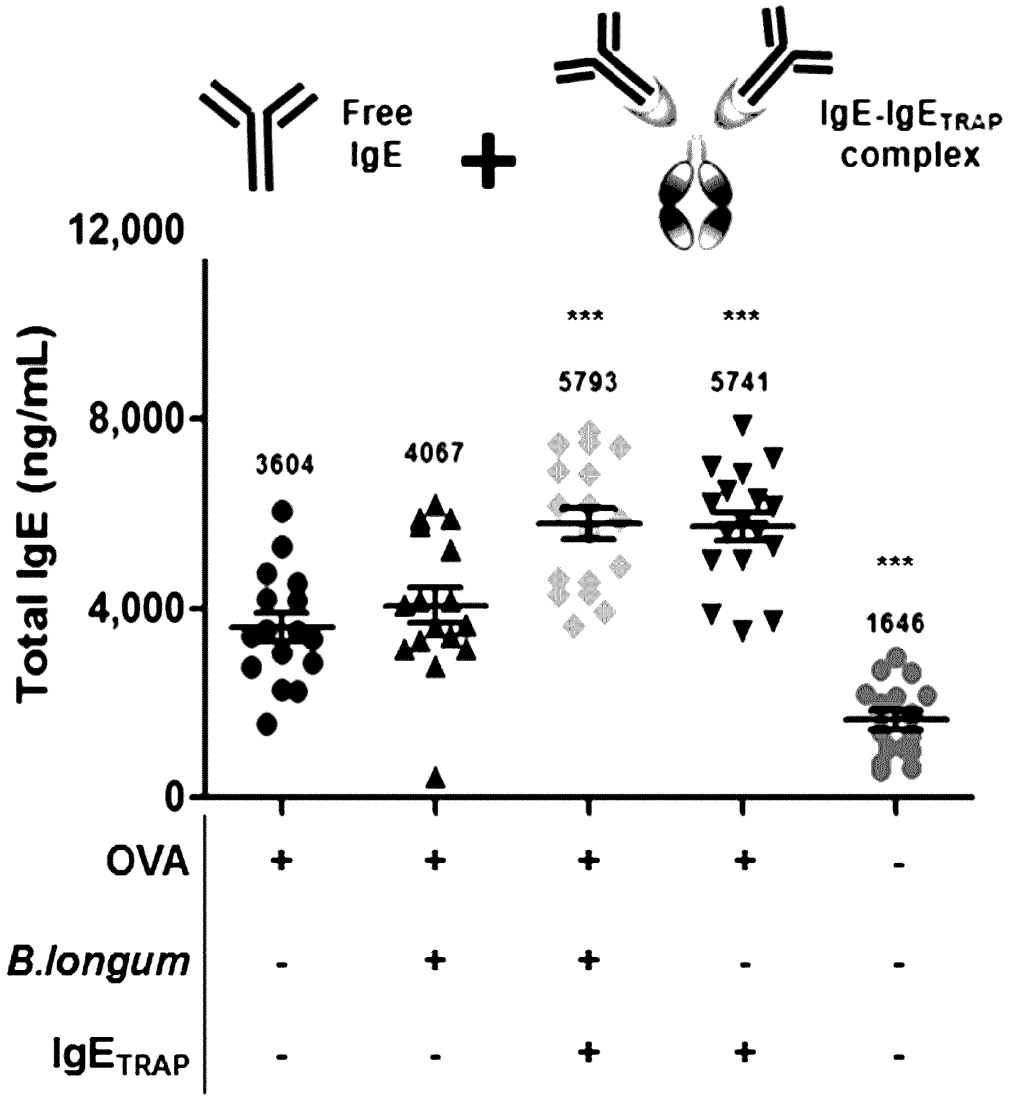
[도19b]


Diarrhea occurrence (%)
100
80
60
40
20
0
1
2
3
4
5
Numbers of OVA challenges
OVA
OVA + B.longum + IgE TRAP (20 ug)
OVA + IgE TRAP (20 ug)
OVA + B.longum + IgE TRAP (200 ug)
OVA + IgE TRAP (200 ug)
PBS
(6/7)
(5/7)
(4/7)
(3/6)
(0/7) **
(0/5) **

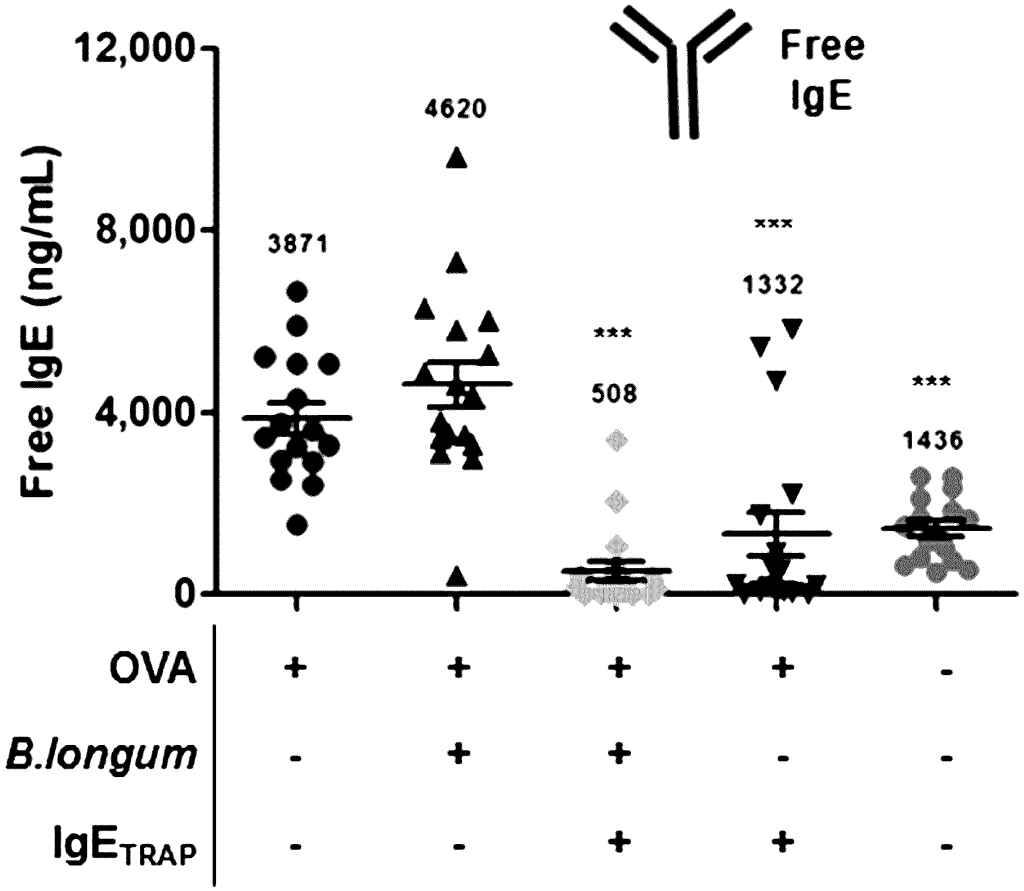
[도20]


8,000
6,000
4,000
2,000
0
MCPT-1 (ng/mL)
3634.9
3696.2
***
1335.12
2595.33
***
0
OVA + + + + -
B.longum - + + - -
IgE TRAP - - + + -

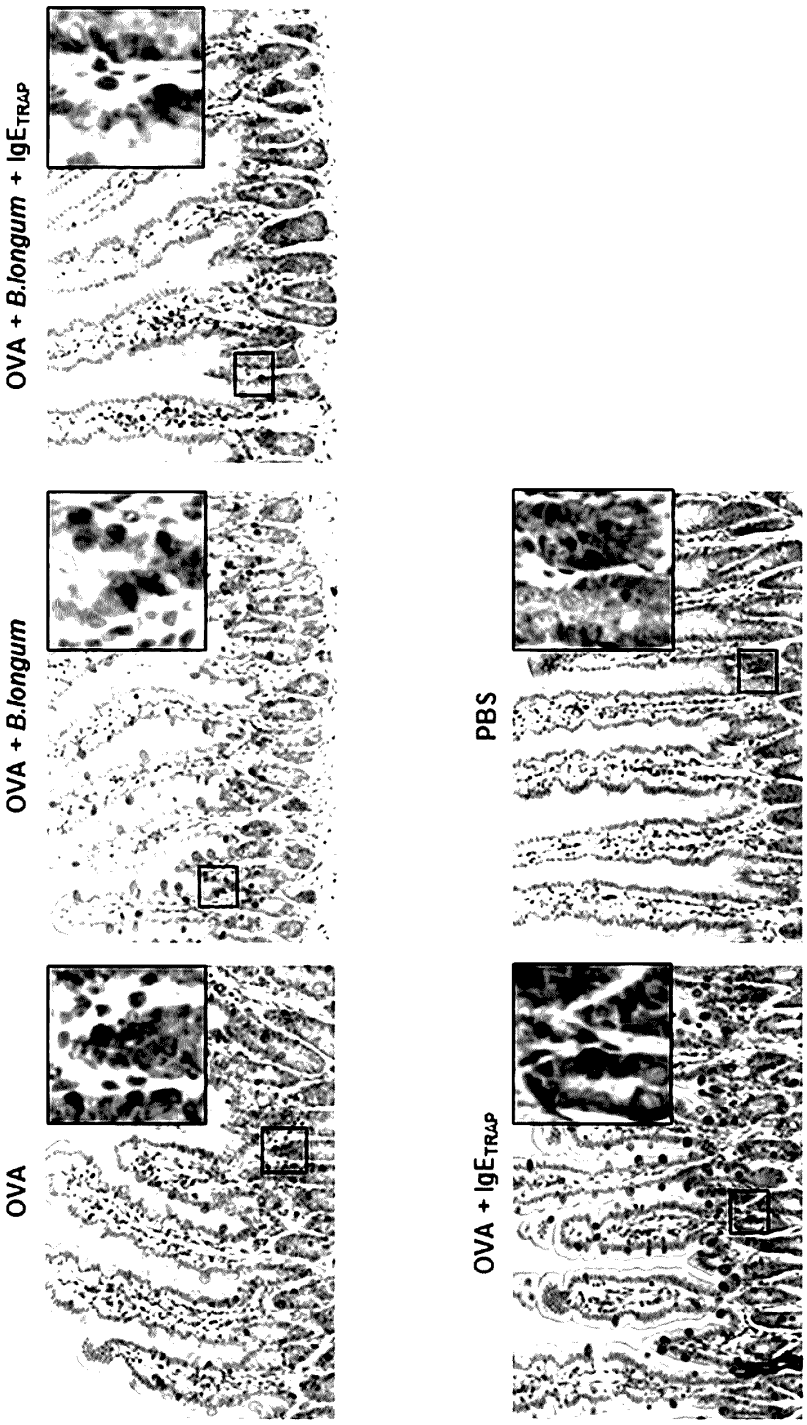
[도21]


Free IgE
IgE-IgE$_{TRAP}$ complex
12,000
8,000
4,000
0
Total IgE (ng/mL)
3604
4067
5793
5741
1646
***
***
***
OVA + + + + -
B.longum - + + - -
IgE$_{TRAP}$ - - + + -

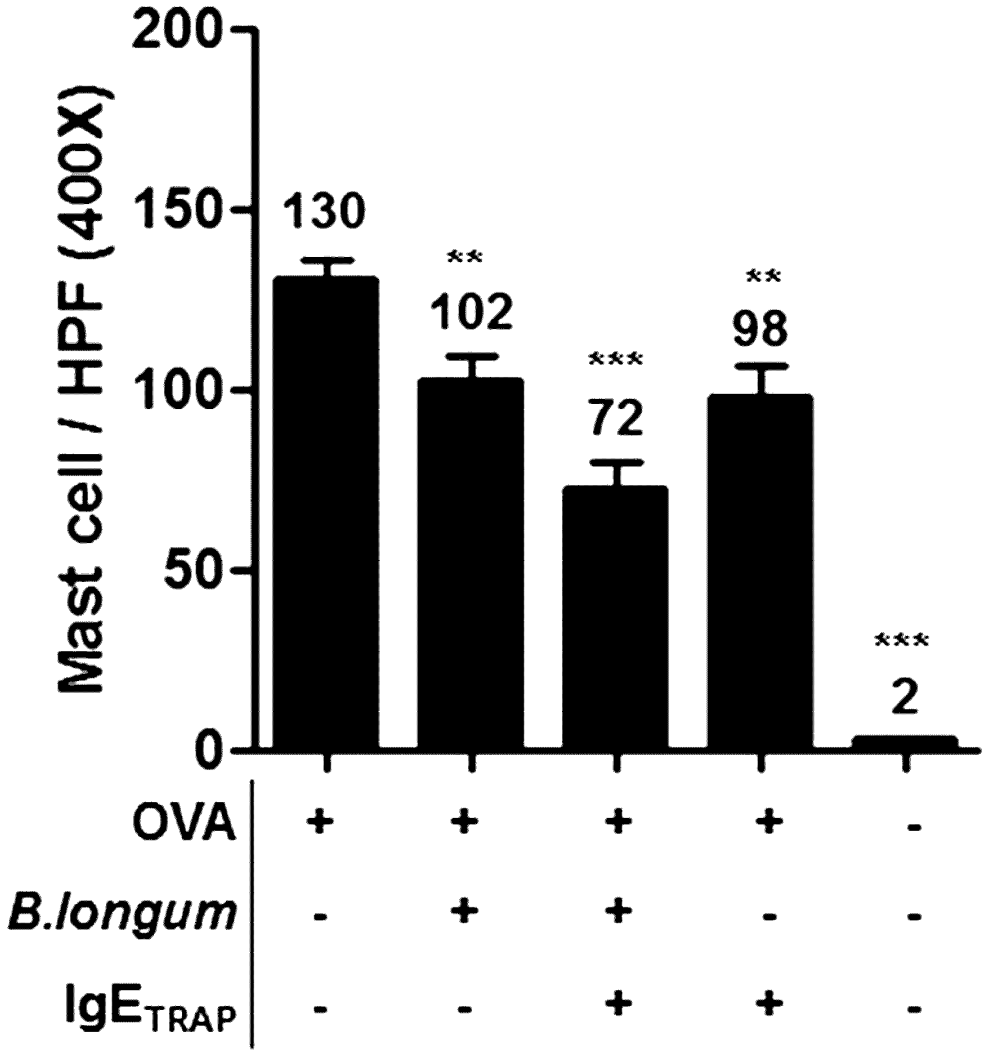
[도22]


Free IgE
Free IgE (ng/mL)
12,000
8,000
4,000
0
3871
4620
***
508
***
1332
***
1436
OVA + + + + -
B.longum - + + - -
IgE TRAP - - + + -

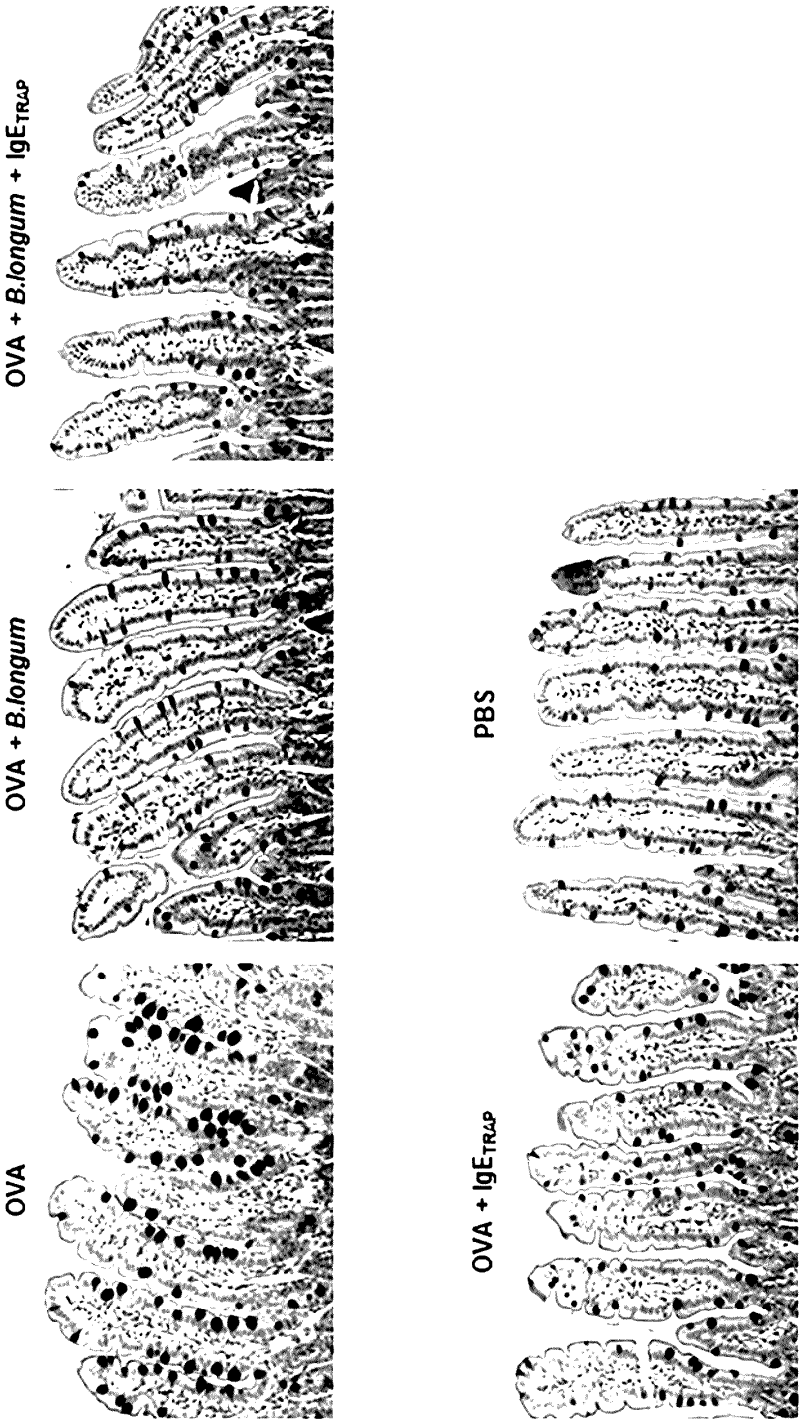
[도23]



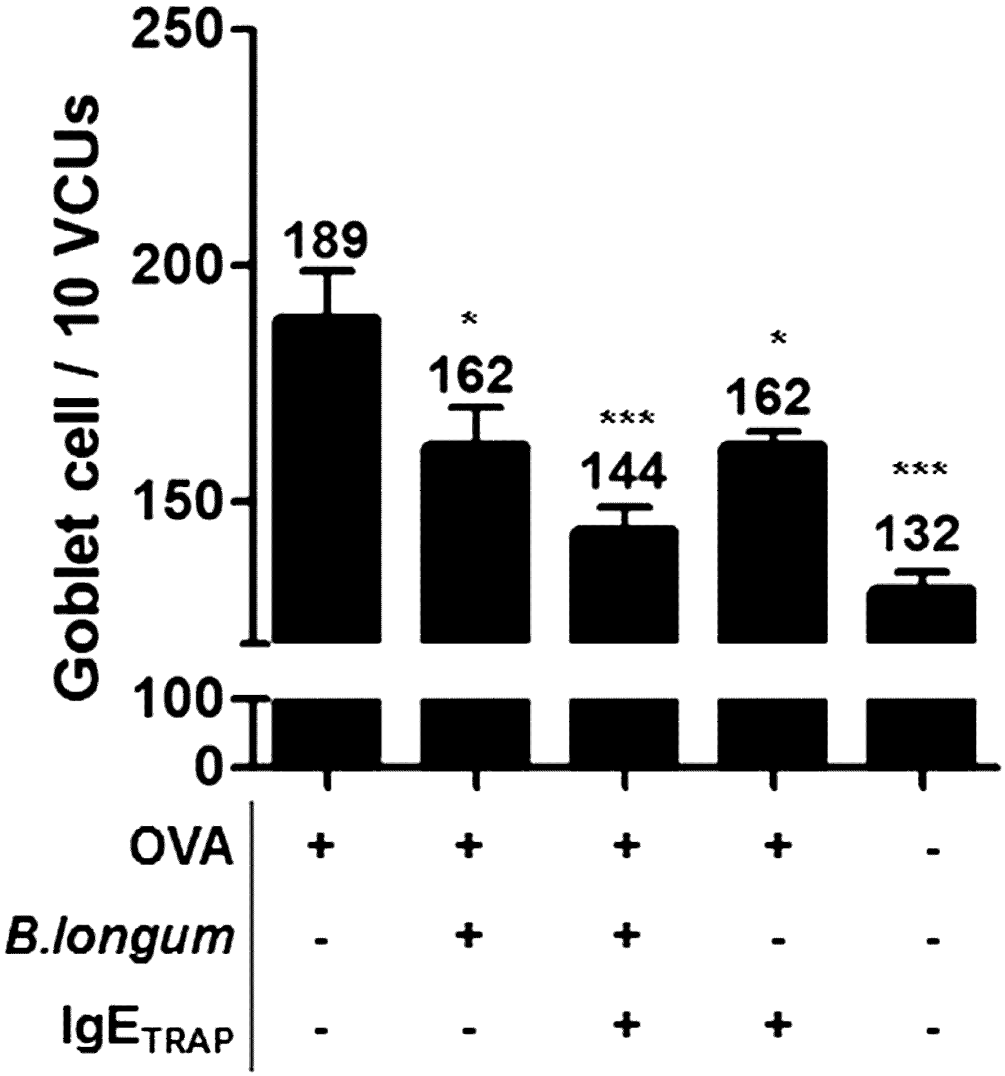
[도24]


Mast cell / HPF (400X)
200
150
100
50
0
130
**
102
***
72
**
98
***
2
OVA + + + + -
B.longum - + + - -
IgE TRAP - - + + -

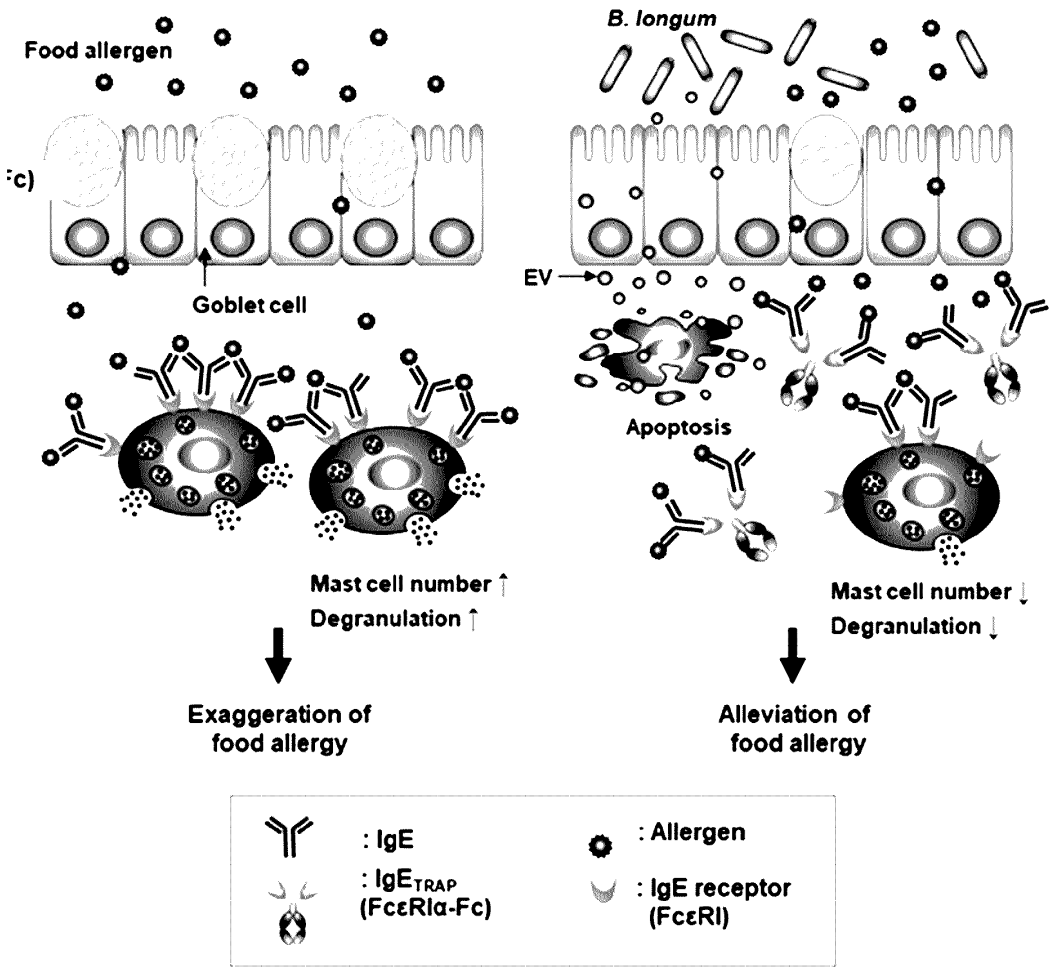
[도25]



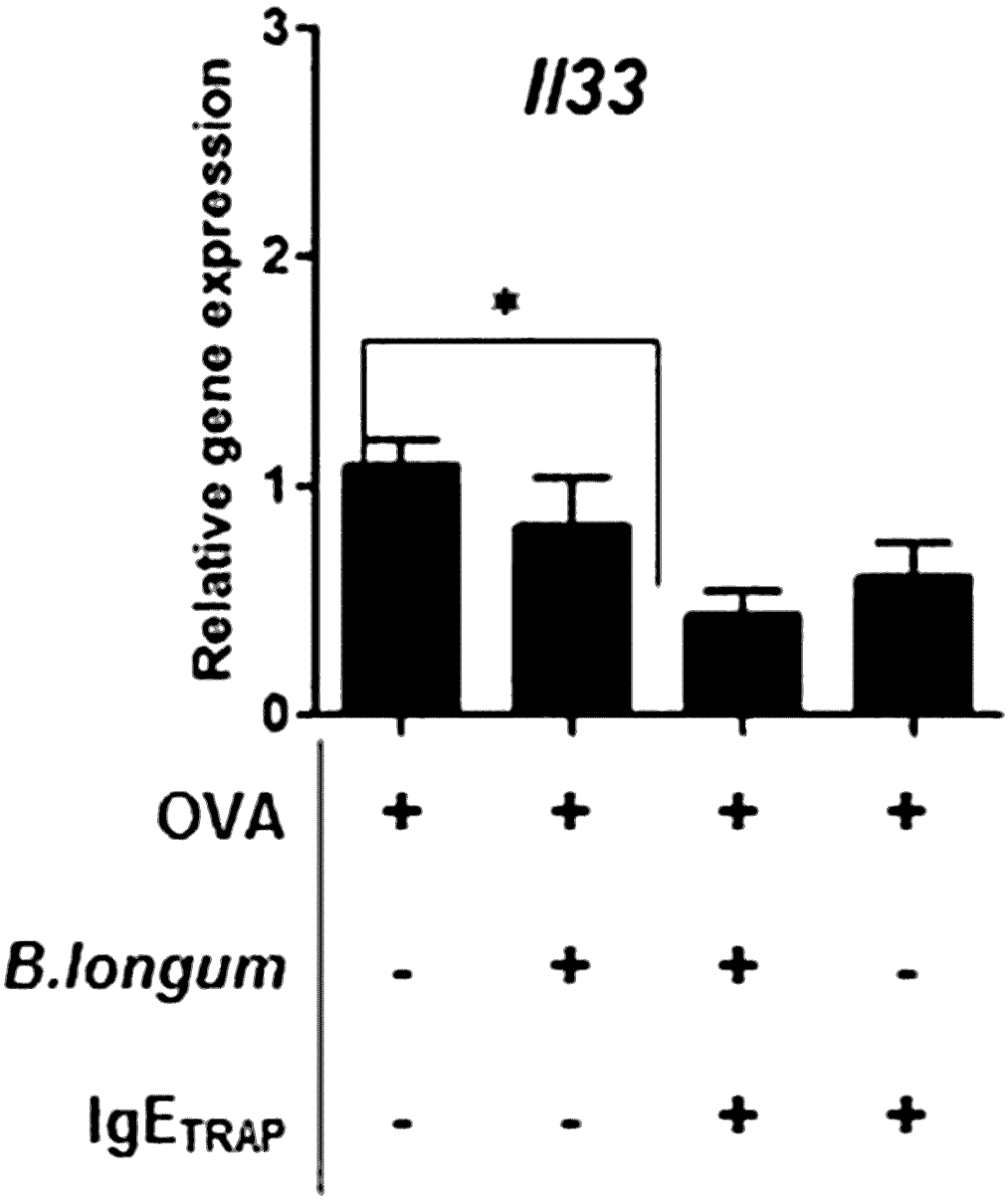
[도26]


250
200
150
100
0
Goblet cell / 10 VCUs
189
*
162
***
144
*
162
***
132
OVA + + + + -
B.longum - + + - -
IgE TRAP - - + + -

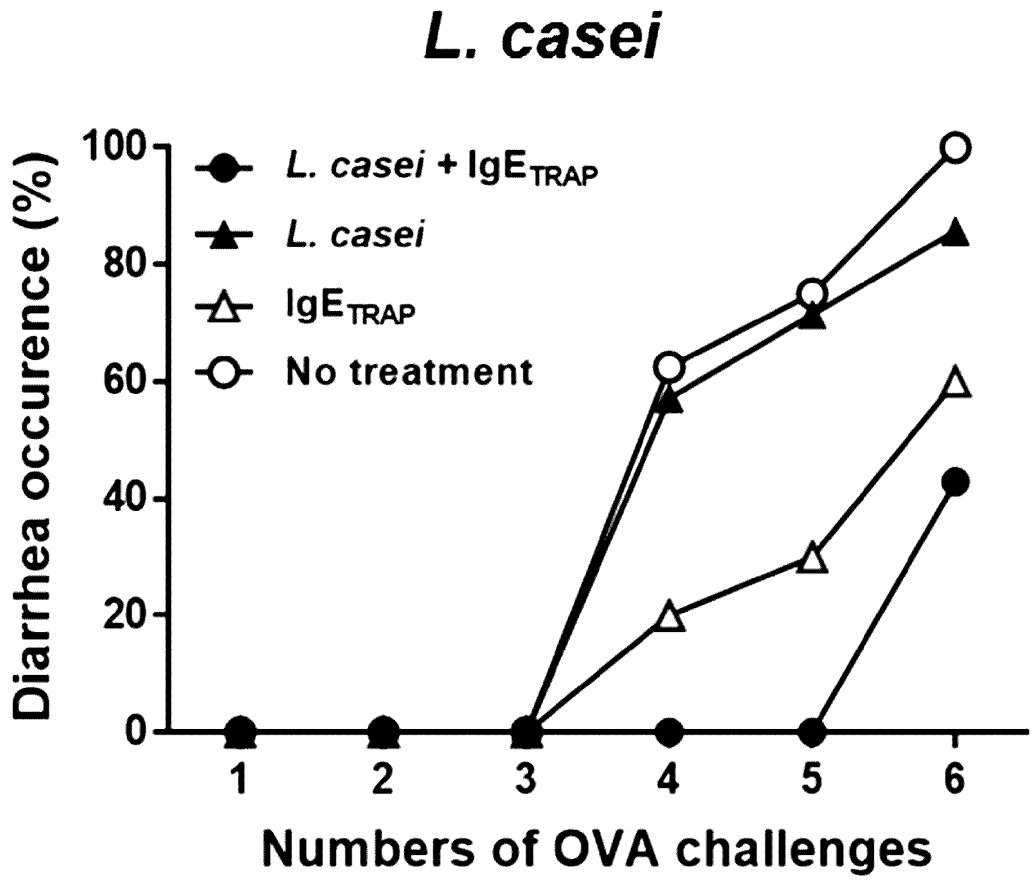
[도27]


Food allergen
Goblet cell
Mast cell number ↑
Degranulation ↑
Exaggeration of food allergy
B. longum
EV
Apoptosis
Mast cell number ↓
Degranulation ↓
Alleviation of food allergy
: IgE
: IgE$_{TRAP}$ (FcεRIα-Fc)
: Allergen
: IgE receptor (FcεRI)

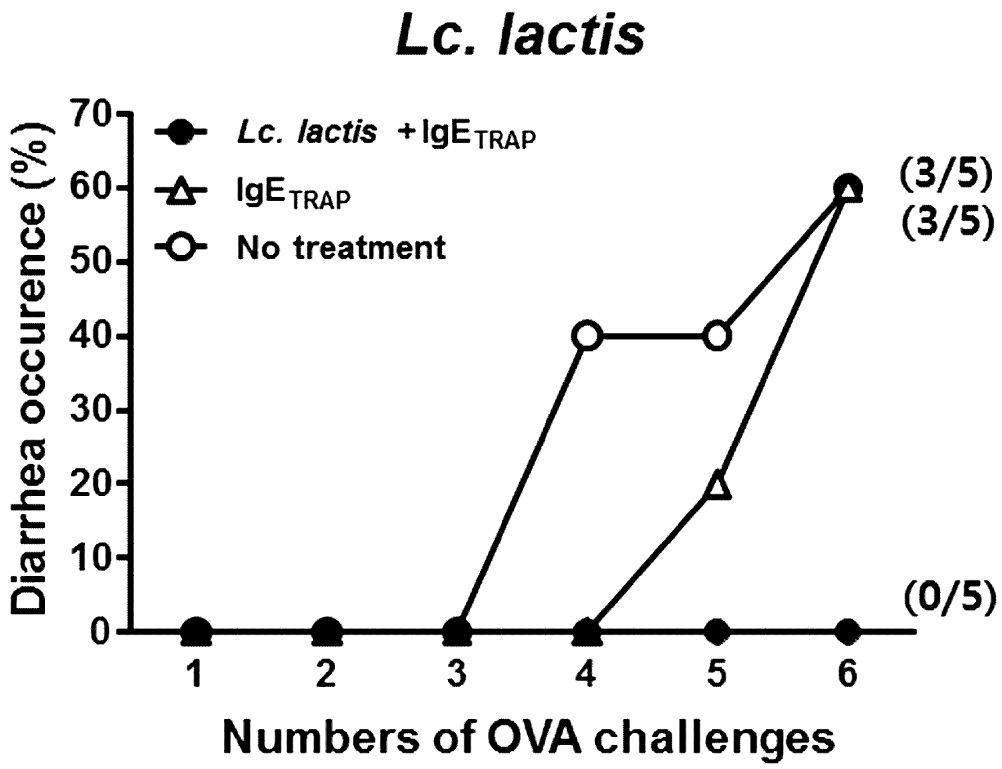
[도28]



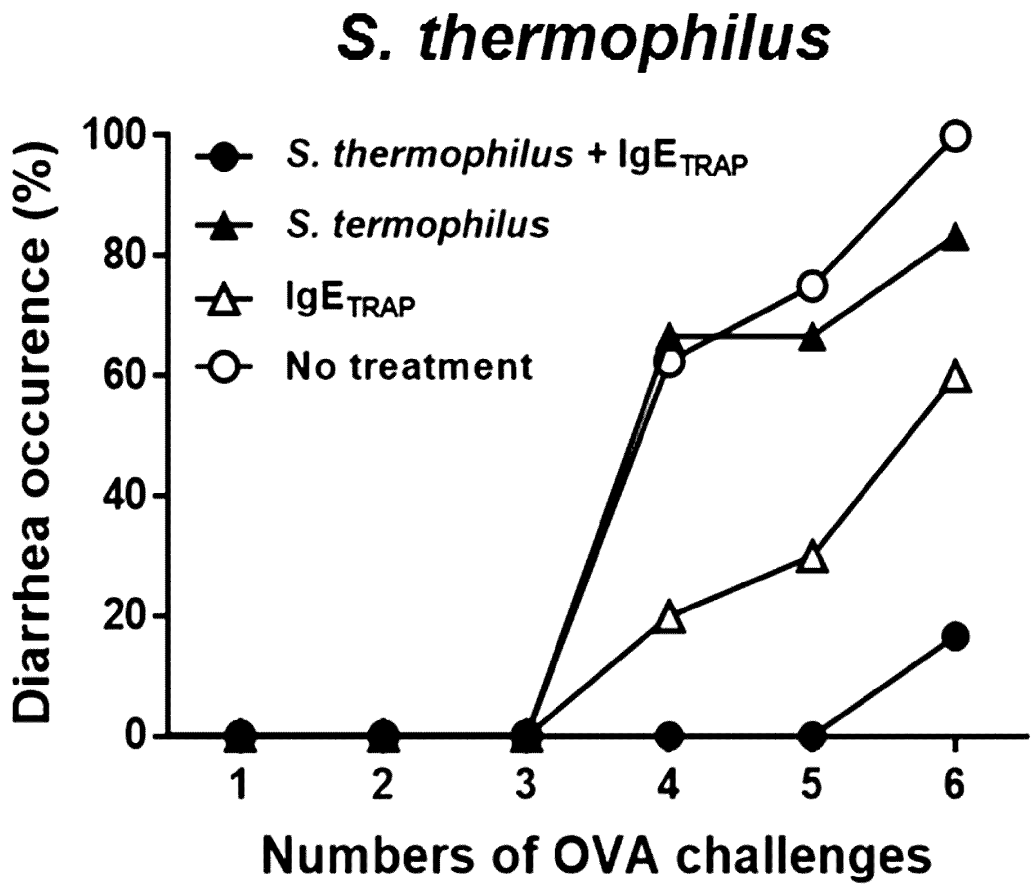
[도29]


L. casei
Diarrhea occurence (%)
100
80
60
40
20
0
L. casei + IgE TRAP
L. casei
IgE TRAP
No treatment
1
2
3
4
5
6
Numbers of OVA challenges

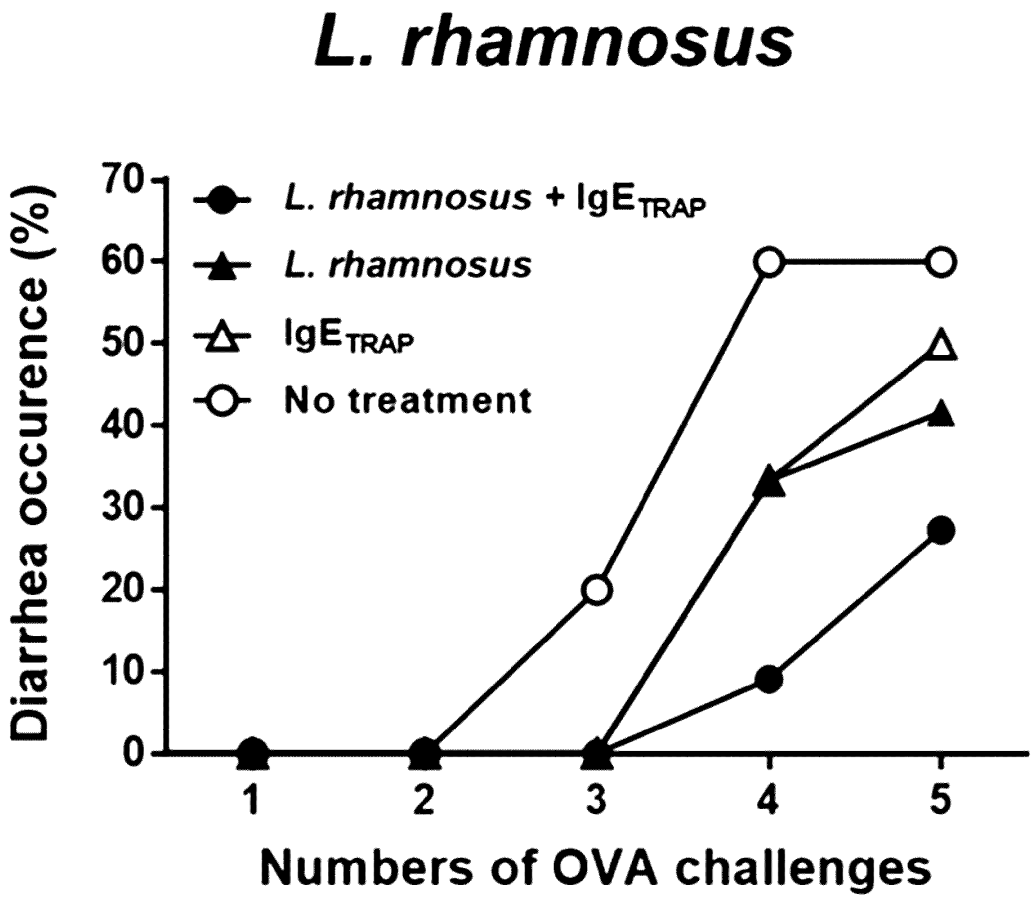
[도30]


Lc. lactis
Lc. lactis +IgE TRAP
IgE TRAP
No treatment
Diarrhea occurence (%)
70
60
50
40
30
20
10
0
1
2
3
4
5
6
Numbers of OVA challenges
(3/5)
(3/5)
(0/5)

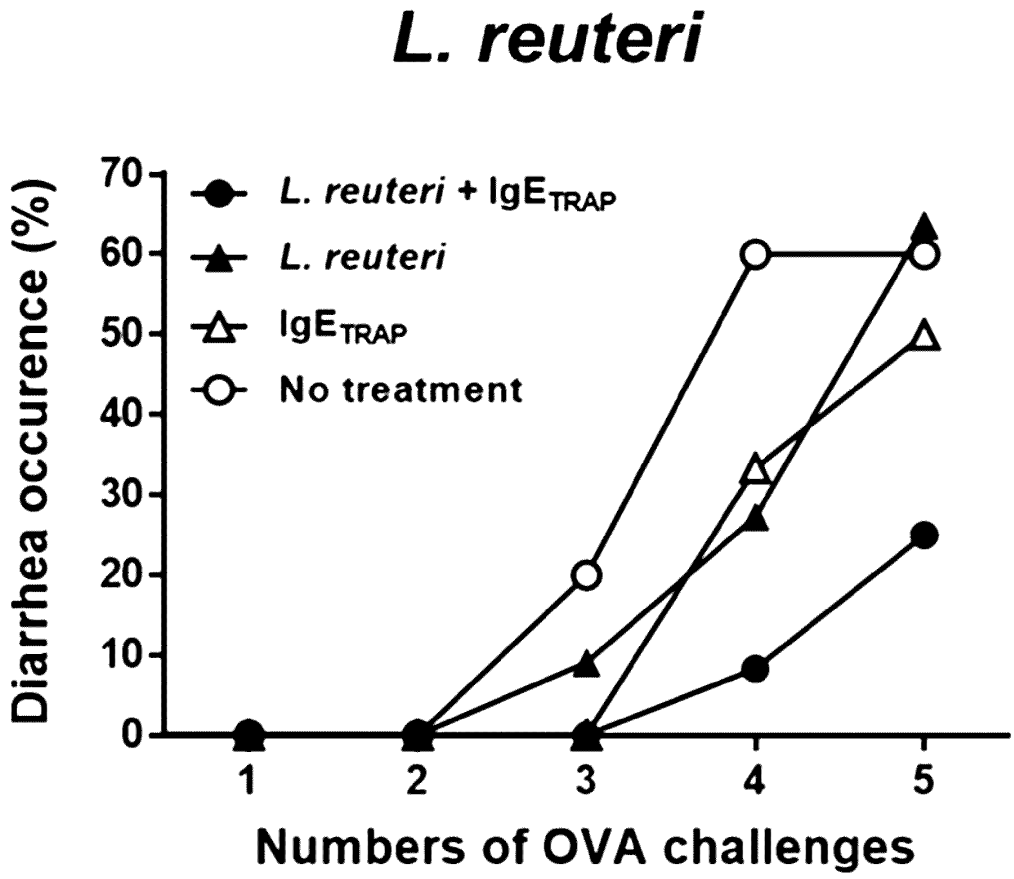
[도31]


S. thermophilus
Diarrhea occurence (%)
100
80
60
40
20
0
S. thermophilus + IgE TRAP
S. termophilus
IgE TRAP
No treatment
1
2
3
4
5
6
Numbers of OVA challenges

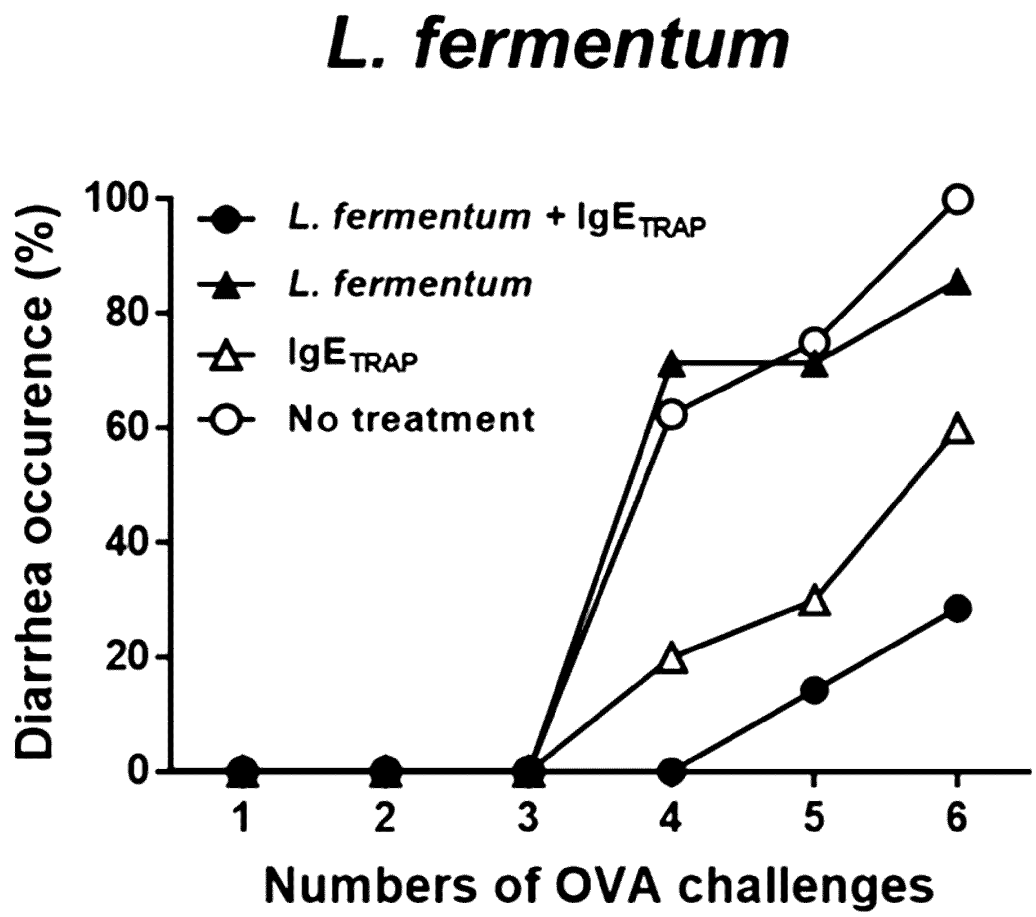
[도32]


L. rhamnosus
Diarrhea occurence (%)
70
60
50
40
30
20
10
0
L. rhamnosus + IgE TRAP
L. rhamnosus
IgE TRAP
No treatment
1
2
3
4
5
Numbers of OVA challenges

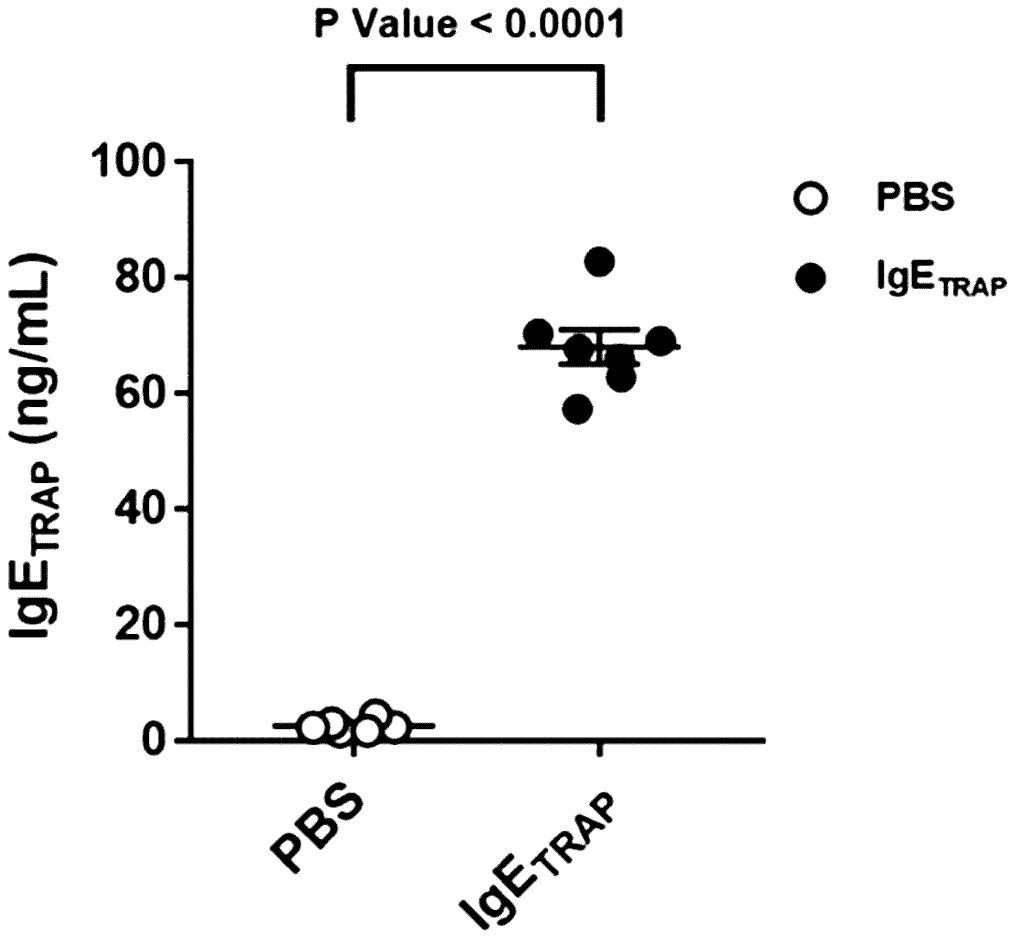
[도33]


L. reuteri
Diarrhea occurence (%)
70
60
50
40
30
20
10
0
L. reuteri + IgE TRAP
L. reuteri
IgE TRAP
No treatment
1
2
3
4
5
Numbers of OVA challenges

[도34]


L. fermentum
Diarrhea occurence (%)
100
80
60
40
20
0
L. fermentum + IgE TRAP
L. fermentum
IgE TRAP
No treatment
1
2
3
4
5
6
Numbers of OVA challenges

[도35]


P Value < 0.0001
100
80
60
40
20
0
IgE TRAP (ng/mL)
PBS
IgE TRAP
PBS
IgE TRAP