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Superantigen in upper airway inflammation

Hae-Sim Park M.D., Professor

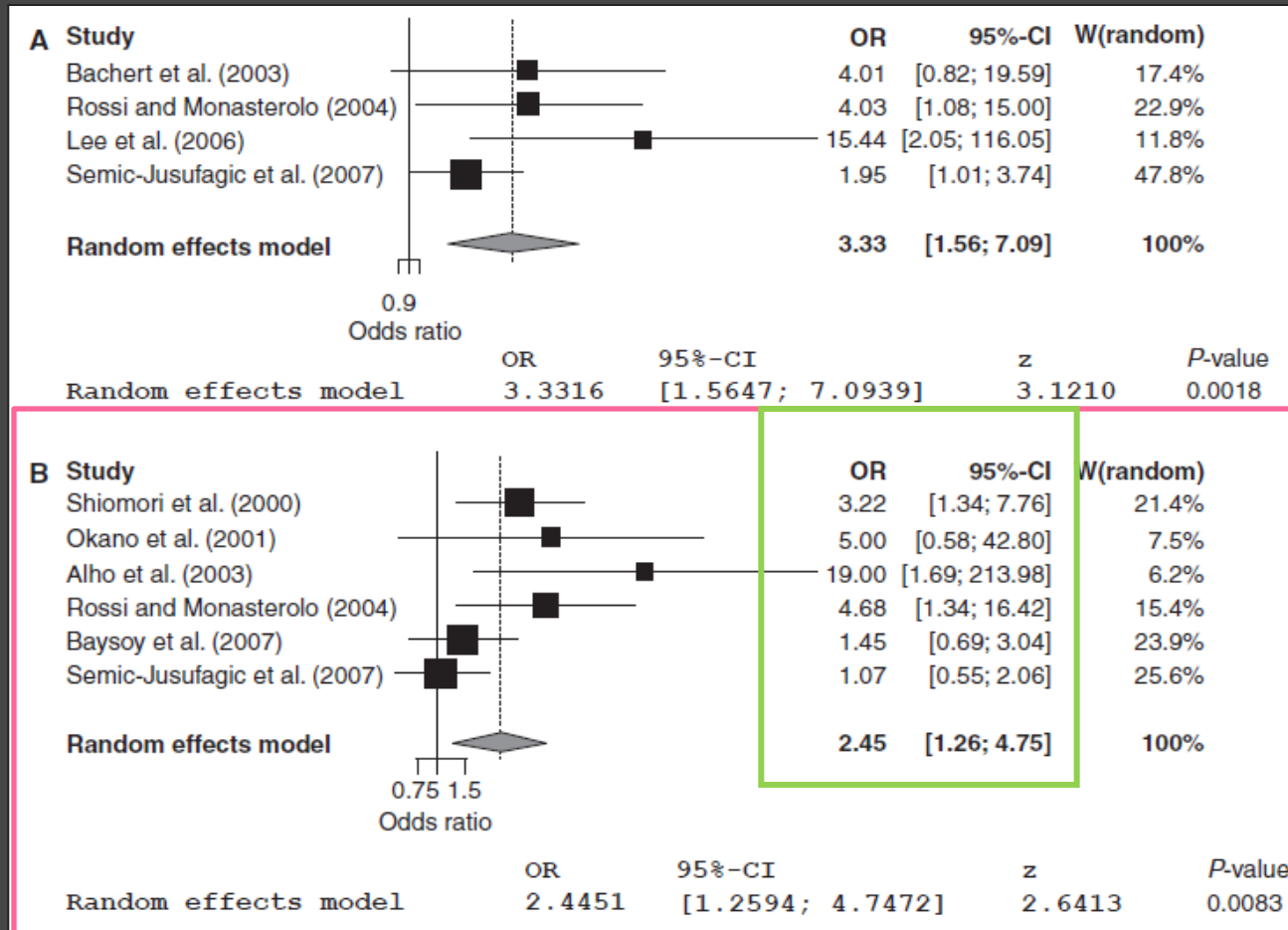
**Department of Allergy & Clinical Immunology
Ajou University School of Medicine
Suwon, Korea**

Today's topics are...

- 1 Superantigens and AR**
- 2 Superantigens and RS/nasal polyp in AERD**
- 3 The mechanism how sAg to activate allergic inflammation**
- 4 Therapeutic interventions**

Staphylococcal sAgs in asthma and rhinitis

A systematic review and meta-analysis



sAg and allergic rhinitis

- **Relationship of nasal carriage of *Staphylococcus aureus* to pathogenesis of perennial allergic rhinitis**

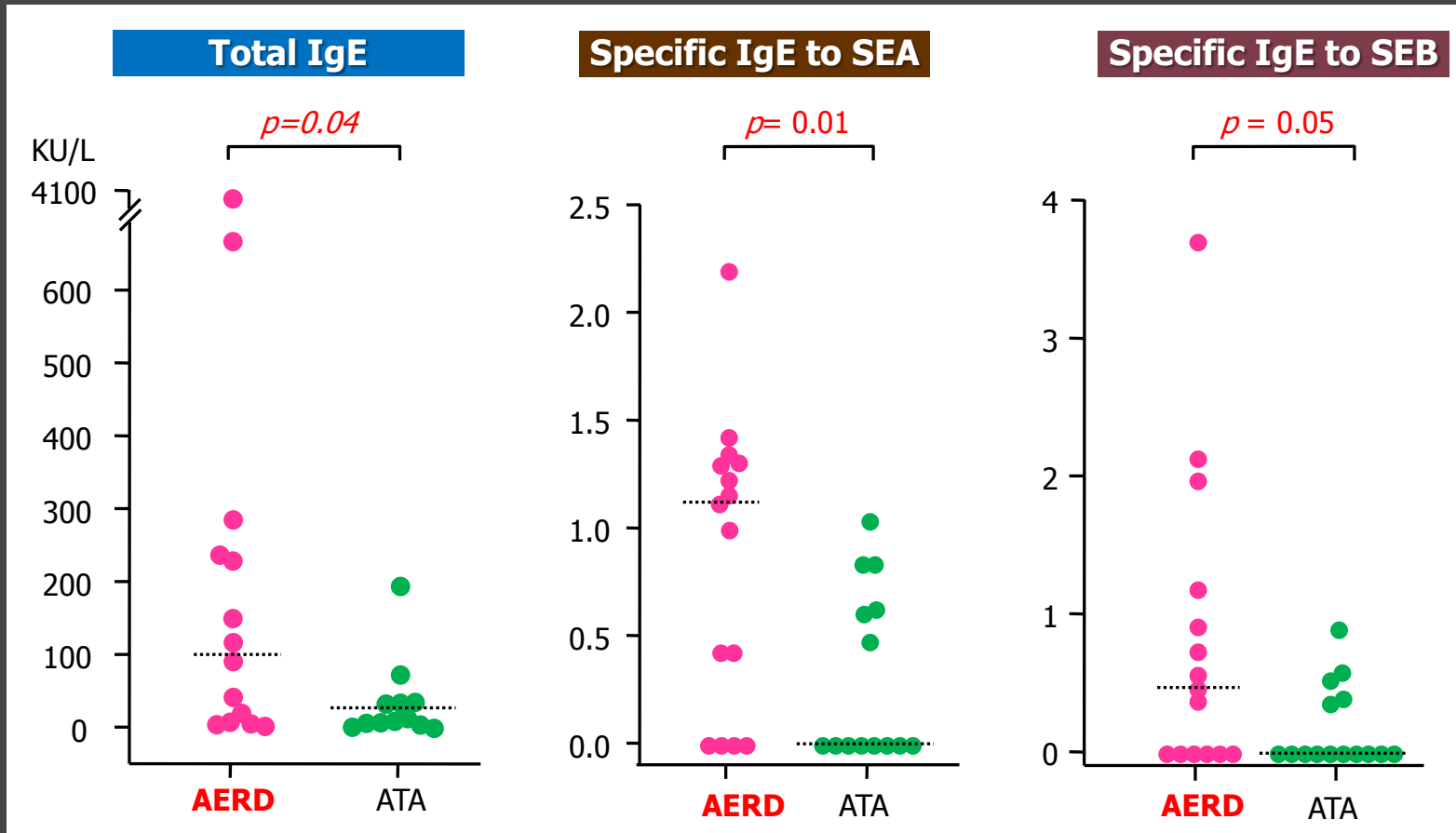
Teruo Shiomori, J Allergy Clin Immunol 2000

- **65 patients with PAR and 45 nonallergic control subjects**
- **The rate of nasal carriage of *S aureus* in the patients (44%) was significantly higher than that of the control subjects (20%, $P < 0.01$).**
- **Moreover, the rate of nasal carriage of superantigen-producing *S aureus* in the patients (22%) was significantly higher than that of the control subjects (6.7%, $P < .05$).**
- **PAR leads to a higher carriage rate of *S aureus*, and nasal carriage of *S aureus* may aggravate PAR.**

IgE response to staphylococcal enterotoxins in adenoid tissues from atopic children.

	SEA-positive (n = 11)	SEA-negative (n = 29)	P
Gender (M/F)	7/4	19/10	NS
Age (years)	8.1 ± 3.9	7.8 ± 3.3	NS
Atopy (positive/negative)*	11/0	7/22	0.001
Chronic rhinosinusitis (positive/negative)	5/6	11/18	NS
Serum total IgE (IU/L)*	476.4 ± 354.8	83.1 ± 106.2	.001
Total eosinophil count (/mm ³) in peripheral blood*	311.8 ± 134.5	183.7 ± 124.5	.016
Adenoid total IgE (kU/L)*	50.6 ± 26.	7.9 ± 7.4	.001
Tryptase (ng/mL)*	165.7 ± 199.0	90.3 ± 55.4	.45
ECP (ng/mL)*	397.6 ± 317.1	292.3 ± 375.0	.19
sCD23 (U/mL)*	1626.5 ± 850.9	1070.3 ± 1046.2	.047

Specific IgE to superantigens were found in nasal polyp tissue



Comparison of total IgE, superantigen A and superantigens B in the nasal polyp tissue homogenate between AIA and ATA..

Correlations between SEA and SEB with inflammatory indices

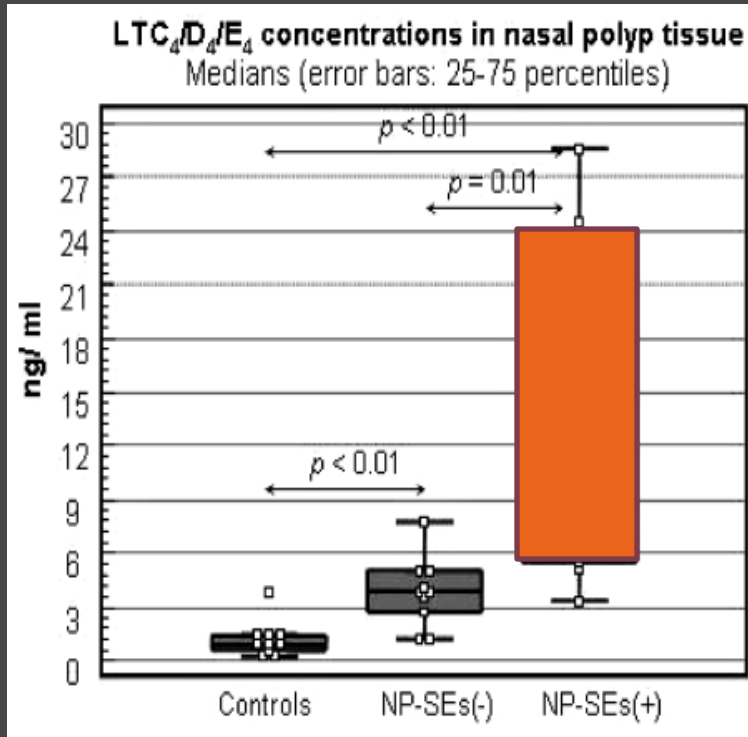
	sIgE to SEA		sIgE to SEB	
	r	p-value	r	p-value
ECP	0.562	0.001	0.407	0.349
Tryptase	0.115	0.300	-0.153	0.420
sIL-2R	0.348	0.060	0.219	0.240
IL-5	0.662	0.0001	0.588	0.002
Serum tIgE	0.629	0.003	0.645	0.002
Polyp tIgE	0.601	0.001	0.349	0.080

*SEA : staphylococcal enterotoxin A, *SEB : staphylococcal enterotoxin B

*ECP : eosinophil cationic protein, *sIL-2R : soluble IL-2 receptor

r: correlation coefficient

Eicosanoid metabolism and eosinophilic inflammation in nasal polyp



	LTC₄/D₄/E₄ (ng/mL)
IgE to SEs (kUA/L)	$r = 0.60; p = 0.01^*$
Total IgE (KU/L)	$r = 0.61; p = 0.01^*$
IL-5 (pg/mL)	$r = 0.59; p = 0.01^*$
ECP (g/L)	$r = 0.58; p = 0.02^*$
MPO (ng/ml)	$r = 0.14; p = 0.56$

Correlation between the **PG D₂/E₂** ratio in nasal polyps and the recalcitrant pathophysiology of chronic RS with BA

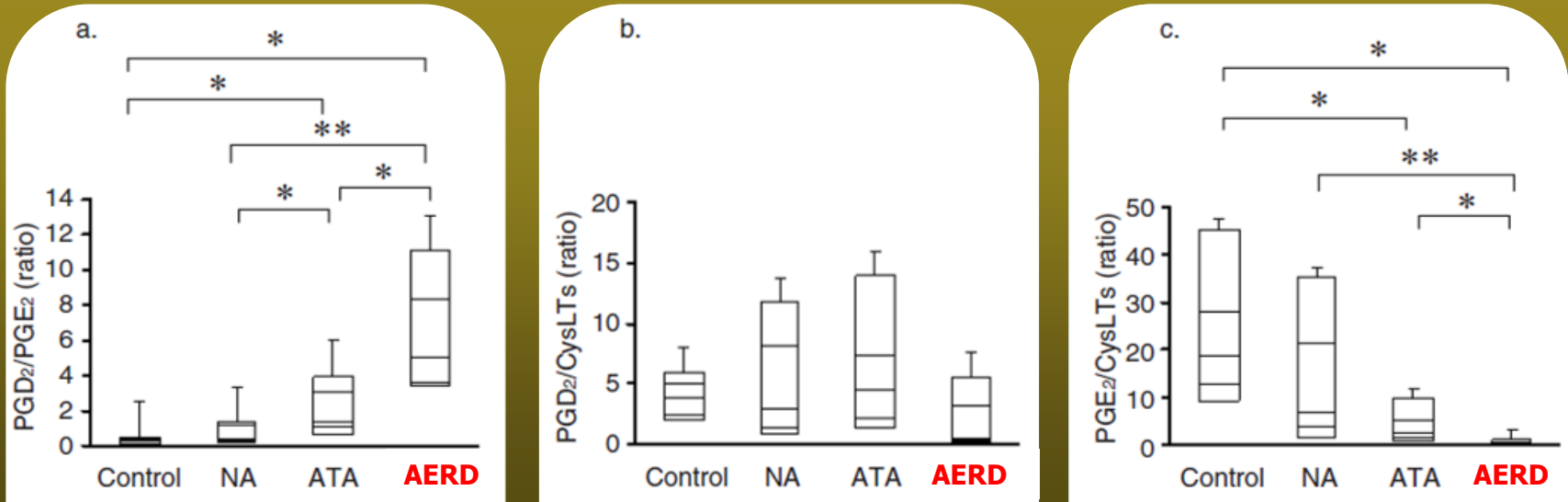
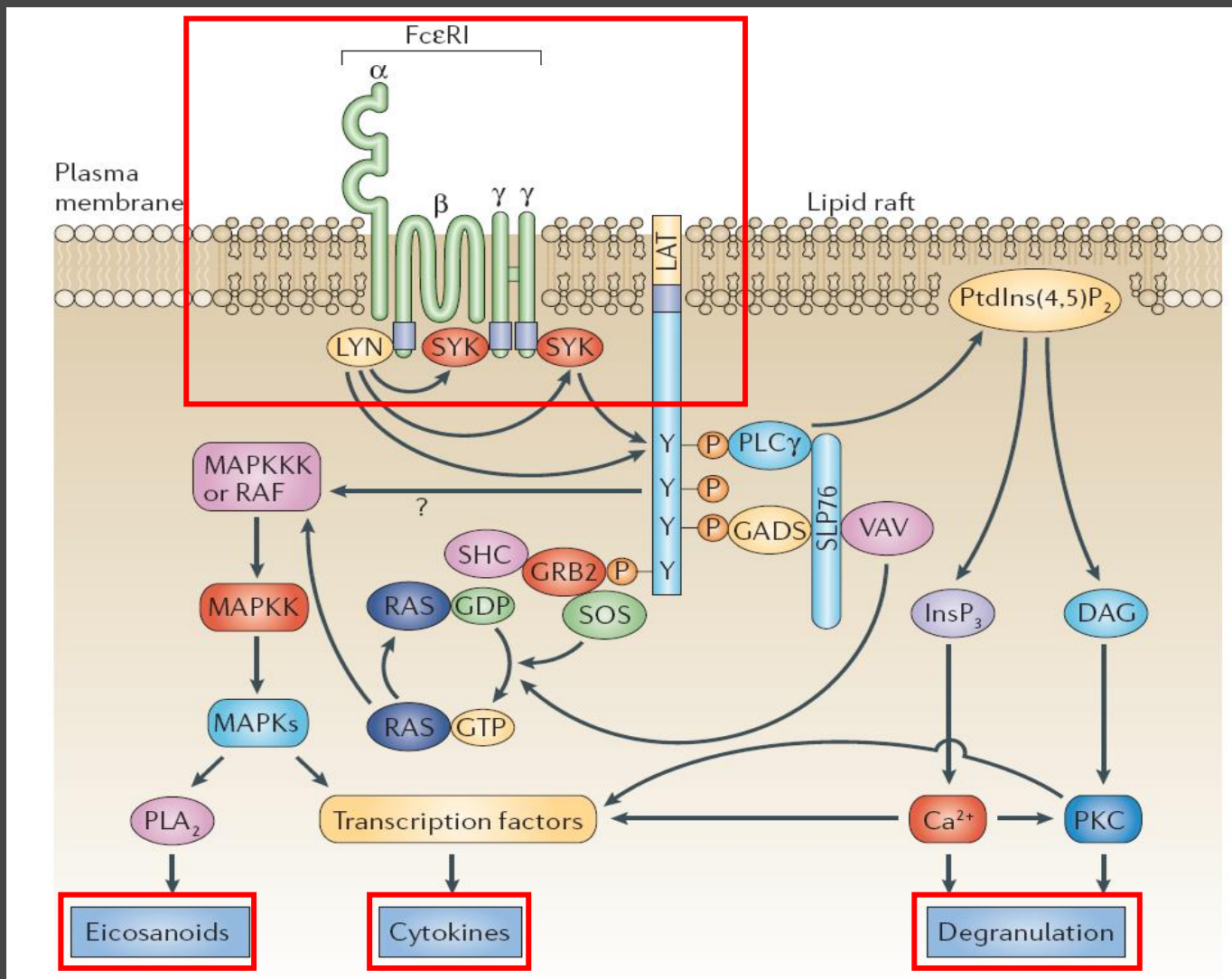


Fig. Balance among the PGD₂, PGE₂, CysLTs concentrations in the nasal polyps. PGD₂/PGE₂ ratio (a), PGD₂/CysLTs ratio (b) and PGE₂/CysLTs ratio (c).

High affinity IgE receptor on mast cell -> signalling cascade



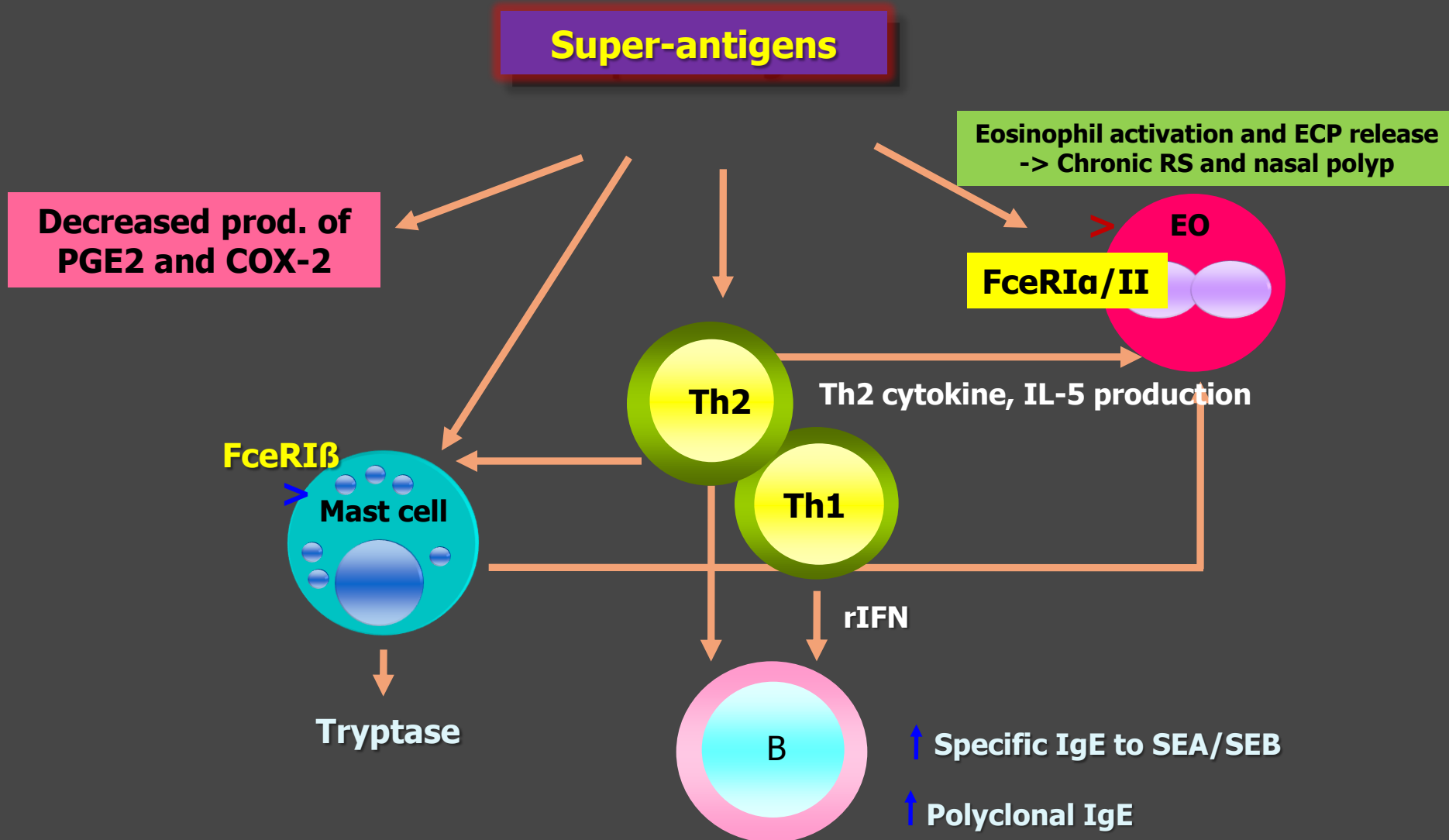
FcεR1β polymorphism in **AERD**

Interaction with IgE response to sAg

Loci	Genotype	AERD ⁺	ATA ⁺	NC ⁺	P value		
		(N=107)	(N=127)	(N=222)	AERD vs. ATA	AERD vs. NC	AERD vs. NC
-109T>C	TT	51 (48%)	63 (50.%)	101 (46%)	0.69	0.34	0.37
	CT	55 (51%)	57 (45.%)	103 (46%)	0.15	0.04	0.31
	CC	1 (1%)	6 (5%)	18 (8%)	0.93	0.99	0.56
	q.	0.266	0.274	0.313	0.73	0.38	0.39

-109T>C	Specific IgE to SEB	AERD	ATA	NC	AERD vs. ATA		AERD vs. NC	
					P value	OR	P value	OR
TT	Positive	10(47%)	2(11%)	2(13%)	0.01	7.273	0.02	6.364
	Negative	11(53%)	16(89%)	14(87%)				
		N=28	N=25	N=16				
CT or CC	Positive	4(17%)	2(13%)	1(4%)	0.74	1.368	4.842	4.842
	Negative	19(83%)	13(87%)	23(96%)				
		N=15	N=8	N=24				

Role of superantigens in upper airway inflammation



Therapeutic interventions

- 1** Antibiotics treatment ?
- 2** INS or OCS- overcome steroid resistance
- 3** Anti IgE antibody
- 4** Anti-IL5 antibody or anti IL5 R antibody

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Thank You !

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**Department of Allergy & Clinical Immunology
Ajou University School of Medicine
Suwon, Korea
hspark@ajou.ac.kr**