Anti-allergic effect of a Korean traditional medicine, Biyeom-Tang on mast cells and allergic rhinitis

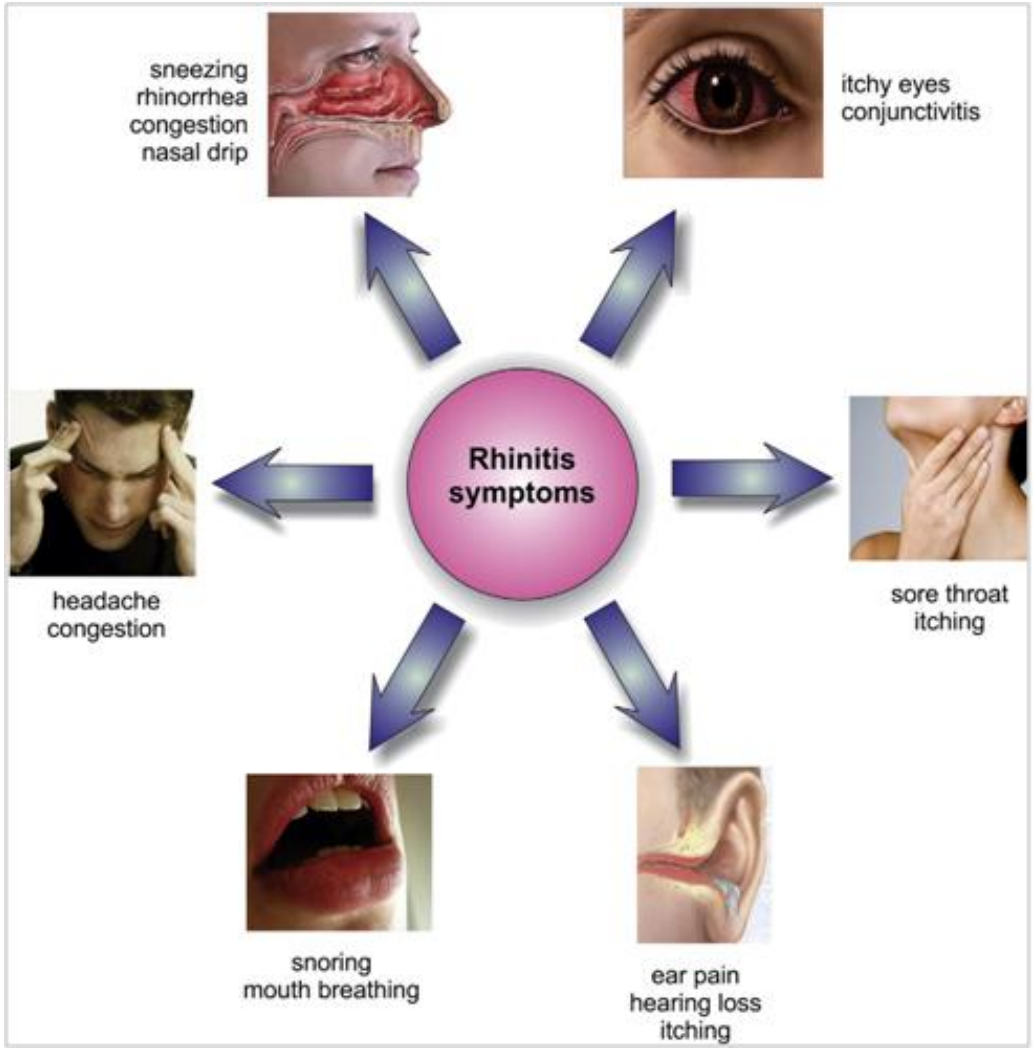
Korea Promotion Institute for Traditional Medicine Industry

Dr. Eunkyng Lee

What is Allergic rhinitis?

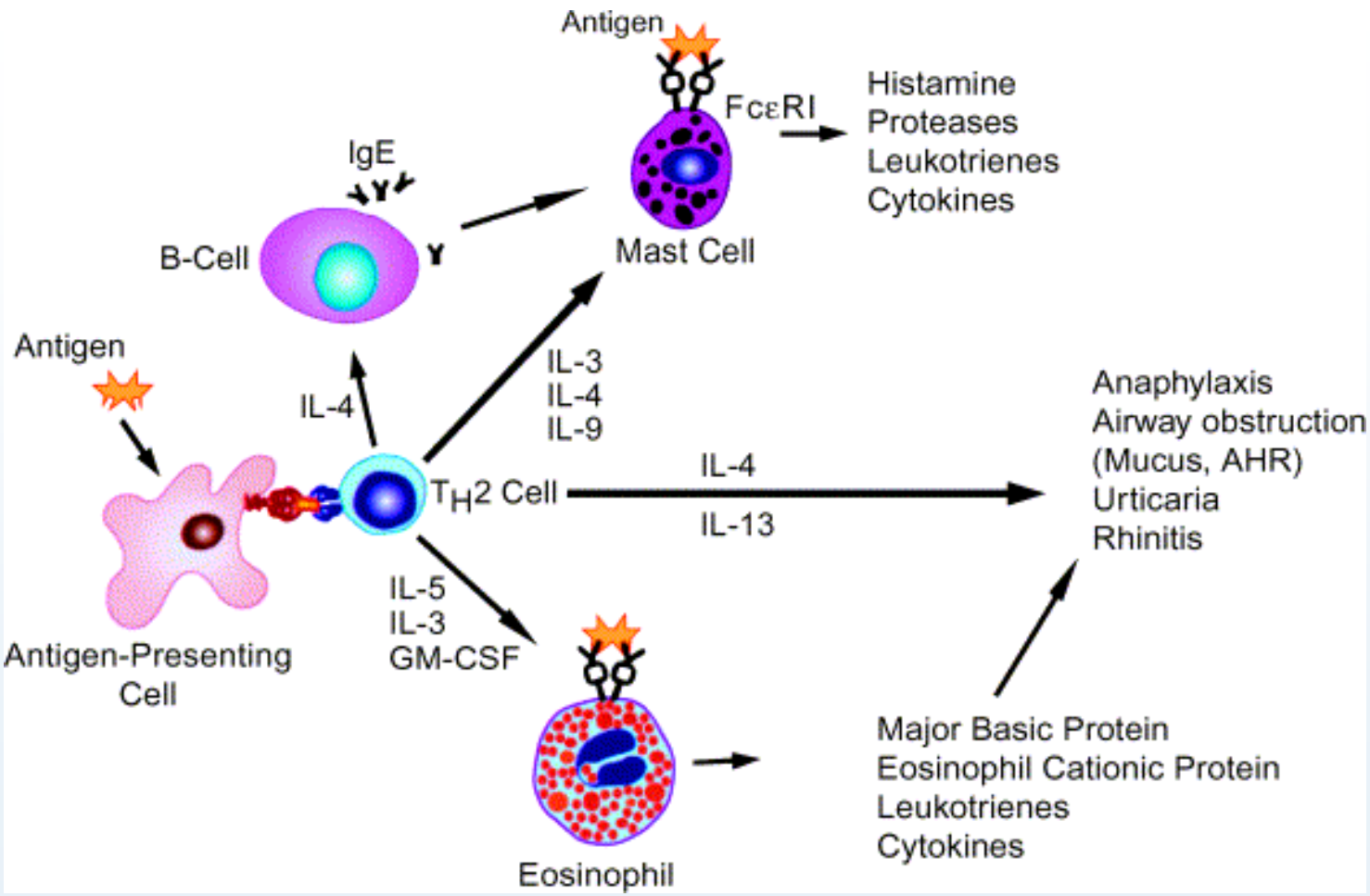
- ✓ Chronic disease of nasal mucosa characterized by IgE-mediated inflammation
- ✓ Clinical symptoms of sneezing, rhinorrhea, itching, and nasal congestion
- ✓ Multifactor involving genetic predisposition and environmental exposure





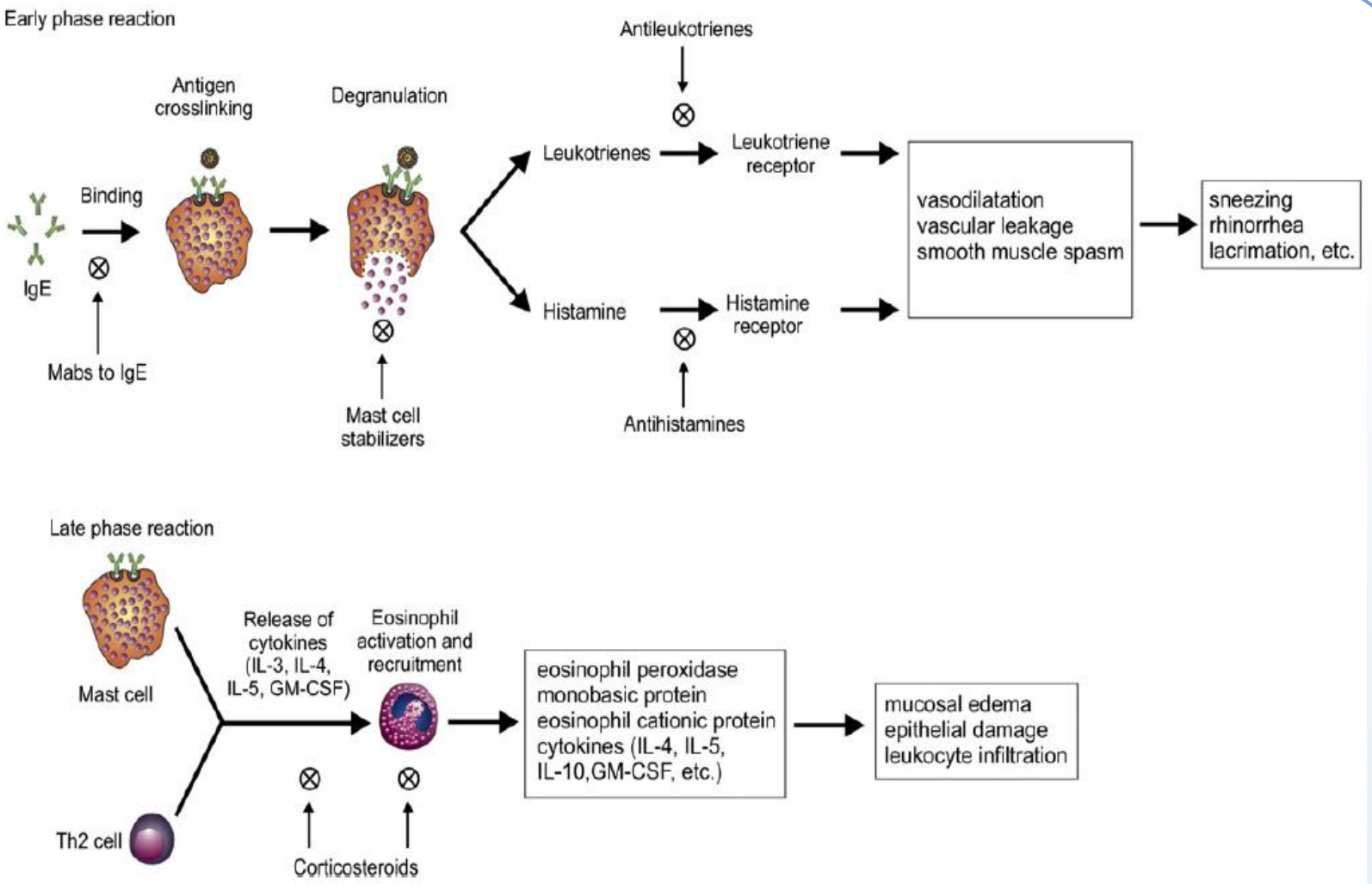
Int Immunopharmacol, 2011(11):1646-1662

Allergic inflammation



Pharmacol Therapeut, 2002:94:253

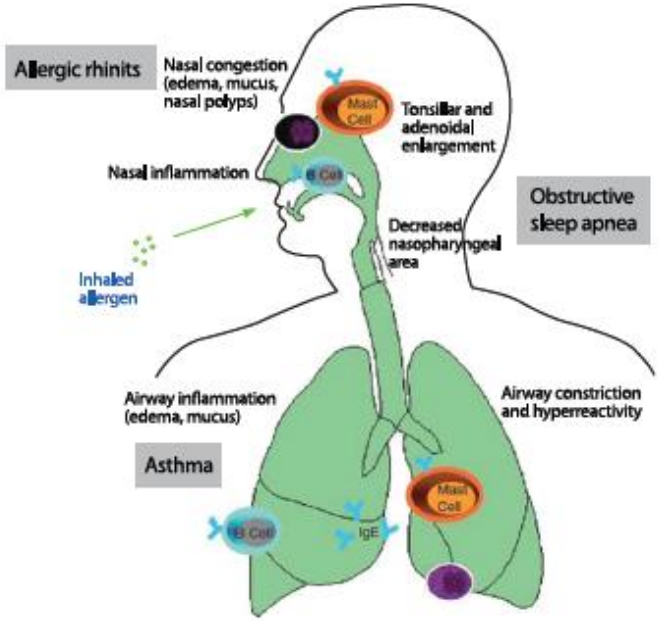
Allergic inflammation



Int Immunopharmacol, 2011(11):1646-1662

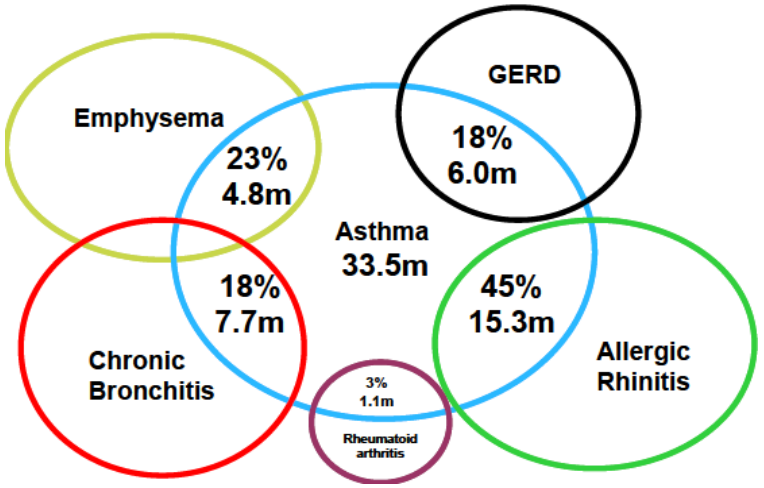
Allergic rhinitis

- ✓ Affects 1.4 billion of the global population and its prevalence appears to be increasing
  - In Korea, about 10% of population is suffering from AR
  - 18% and 10-30% of population in the European countries and USA, respectively
- ✓ Coexists with asthma in the same individual
  - Up to 40% of patients with AR have asthma
  - One airway, one disease hypothesis ; AR and asthma as a single inflammatory process



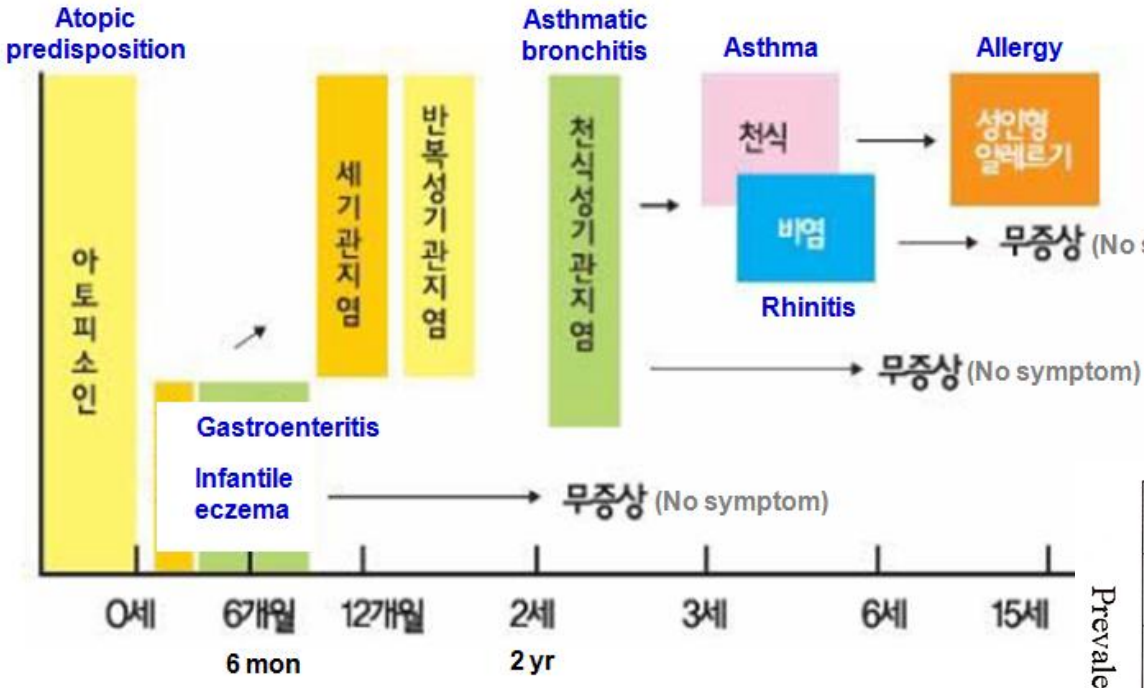
Asia Pac Allergy, 2011:1:157

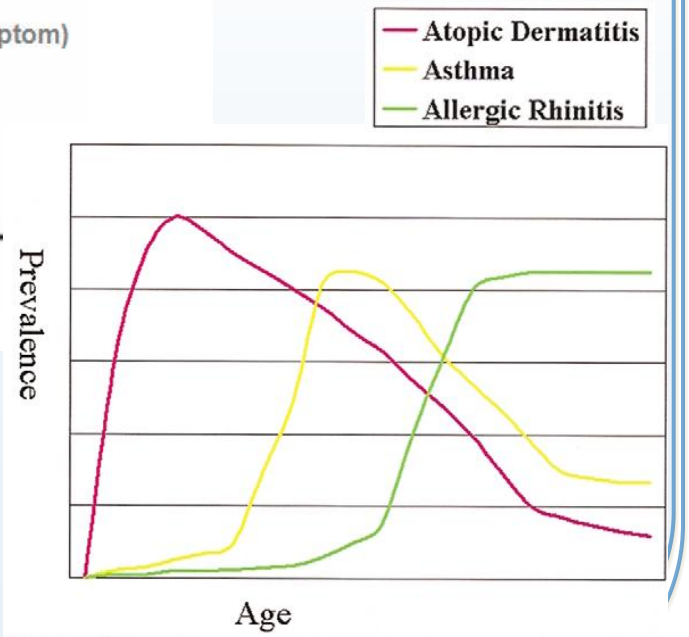
<Co-morbidities>



Source : Datamonitor, 2005

Allergic March





J Allergy Clin Immunol, 2003(112):S118-127

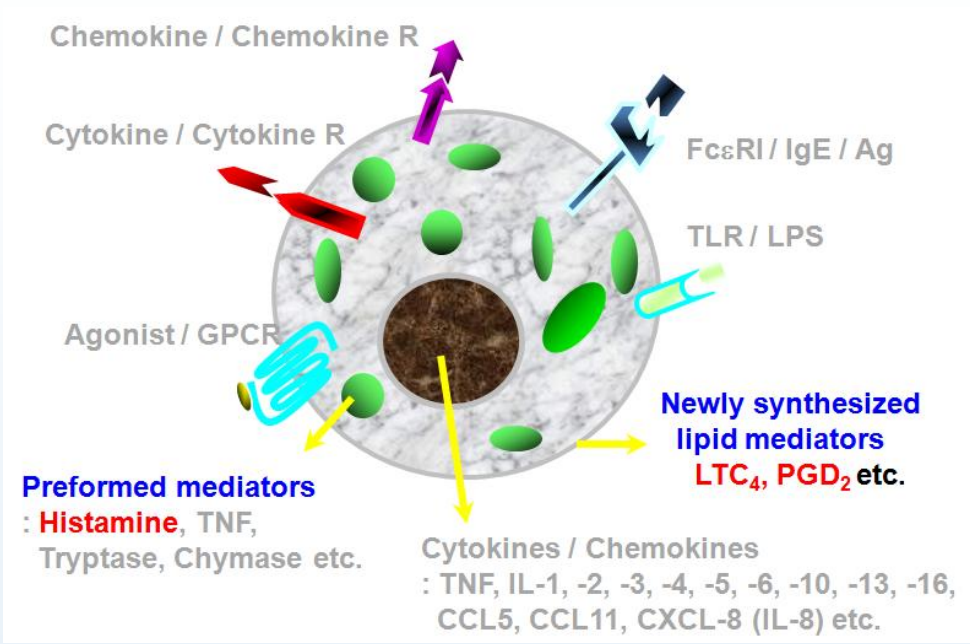
Components and ratio of EBT

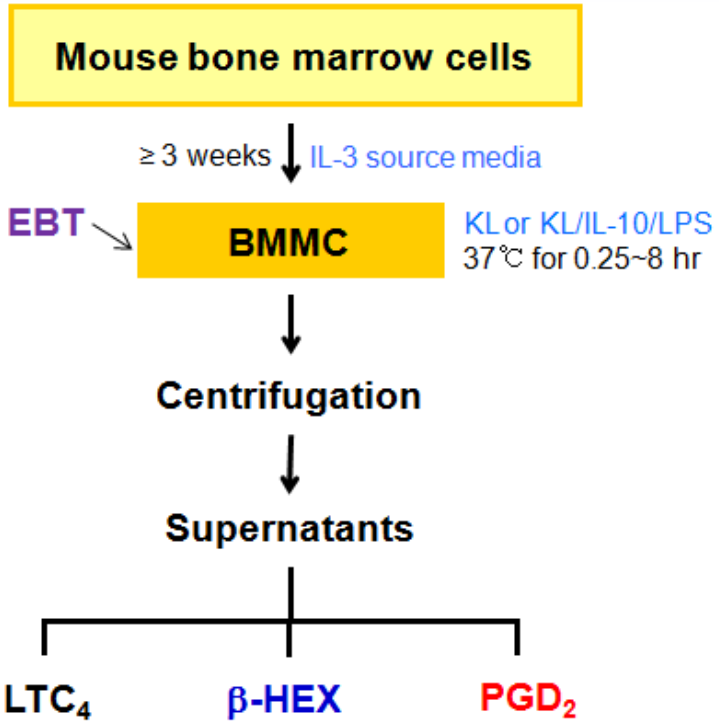
❒ Verification for anti-allergic properties on BMMC and *in vivo* models

- ✓ Herbal formulae used in an oriental clinic for the AR treatment
- ✓ Composed of four herbs
- ✓ Alternative treatment for avoiding adverse effects of western medicine

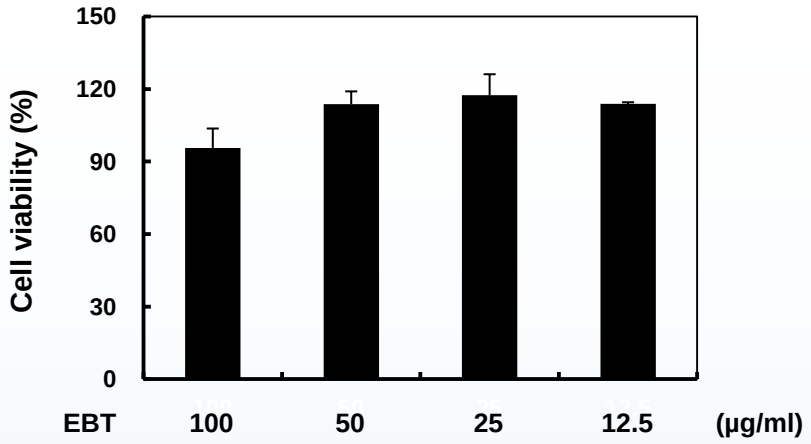
Herbal name (species)		Ratio
Xanthium strumarium L.		3
Trichosanthes kirilowii Maxim.		3
Angelicae Dahurica (FISCH.) BENTH. et Hook. f.		3
Mentha arvensis L. var. *piperascens* MALINV.		1.2

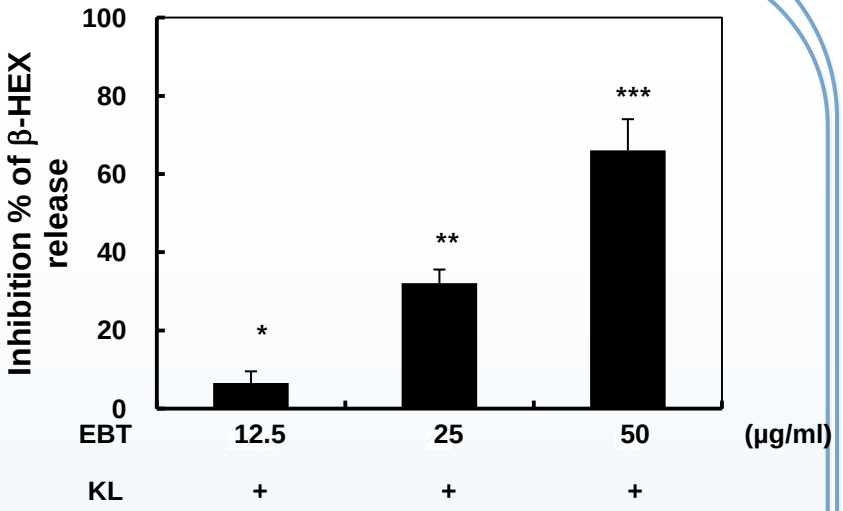
Mast cell as a major effector cell in allergy

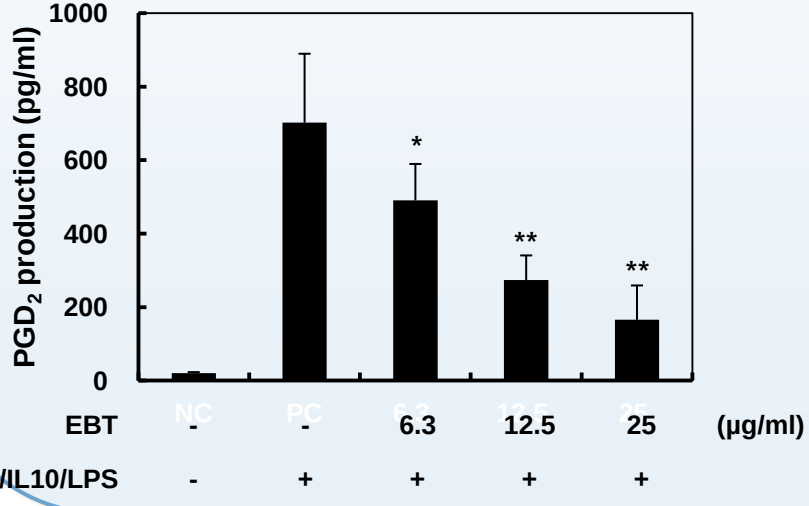


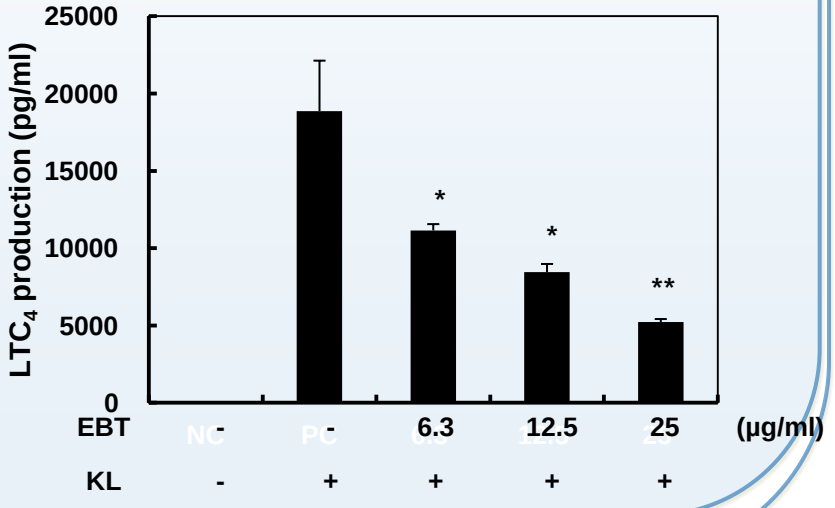


Effect of EBT on β-Hex release, LTC_4 and PGD_2 productions









Anaphylaxis

Systemic

EBT (*oral*)

↓

ICR mice

1hr ↓

Compound 48/80 (*i.p.*)

↓

Monitored for 1 hr

Passive cutaneous

Monoclonal Anti-dinitrophenyl (DNP) IgE (*i.d.* : ear)

↓

ICR mice

24 hr ↓

EBT or fexo (*oral*)

1hr ↓

DNP-HSA, Evans blue (*i.v.*)

1hr ↓

Ear ← Formamide

O/N ↓

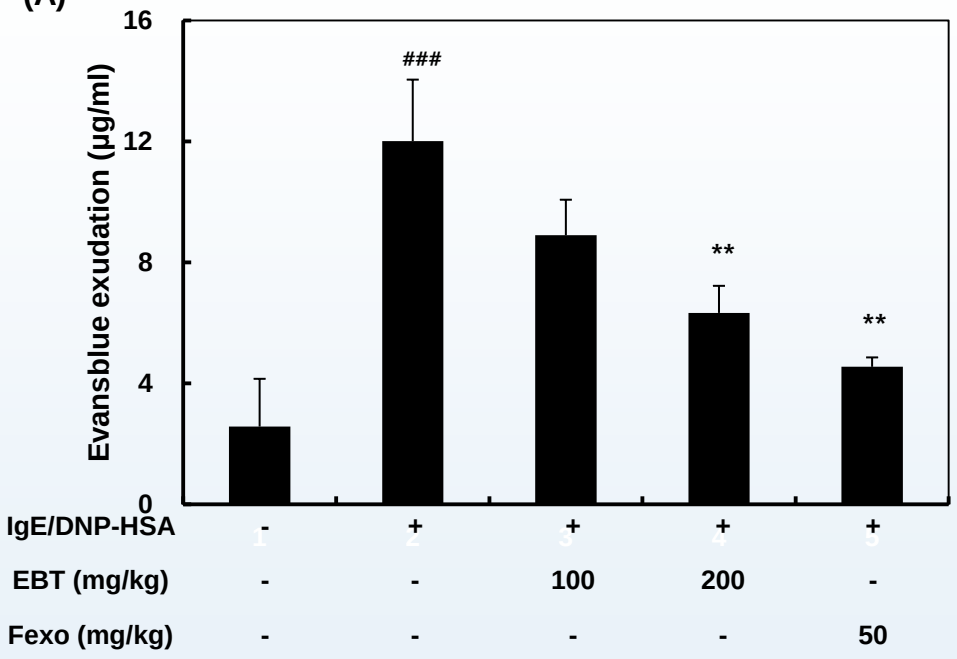
Evans blue exudation

Effect of EBT on systemic anaphylaxis

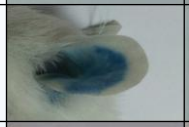
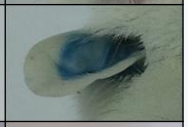
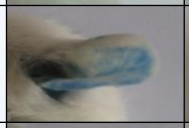
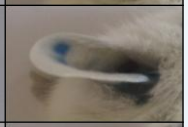
EBT (mg/kg)	Compound 48/80	Mortality (%) at 60 min
None	+	100
100	+	60
200	+	60
400	+	-

Effect of EBT passive cutaneous anaphylaxis reaction

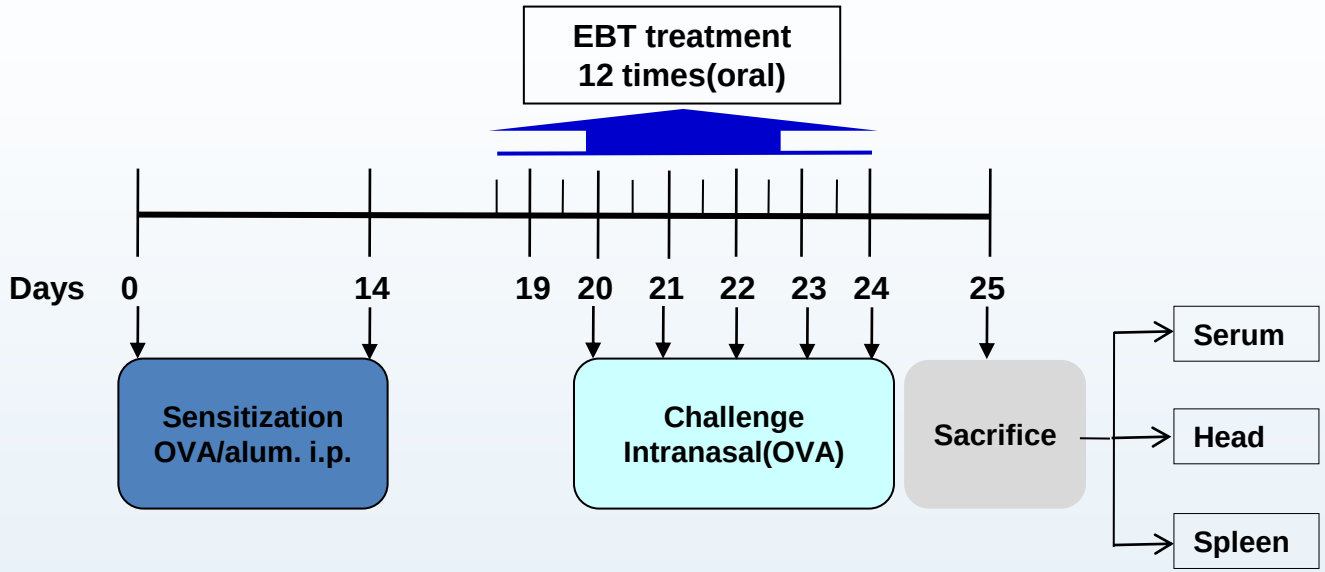
(A)



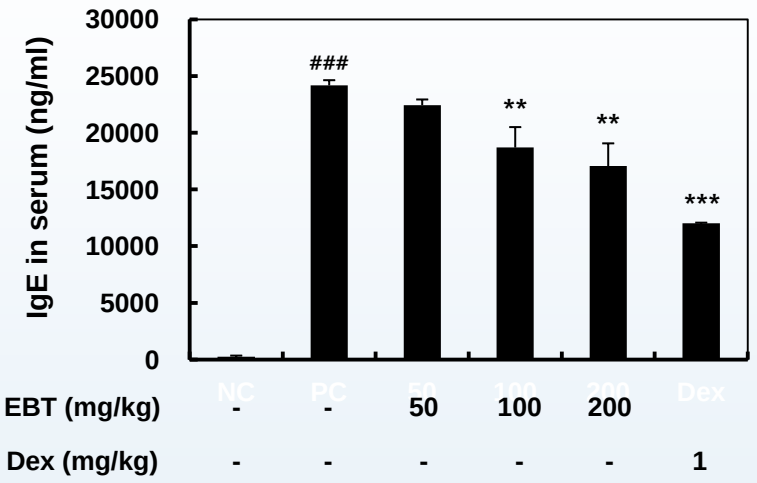
(B)

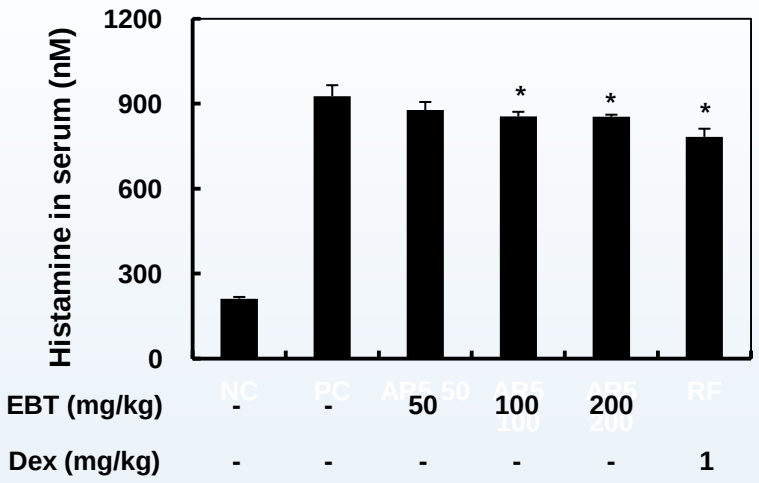
Group	Left ear	Right ear
Normal		
Control		
EBT (100)		
EBT (200)		
Fexo		

Sensitization and challenge protocol for the experimental murine AR model

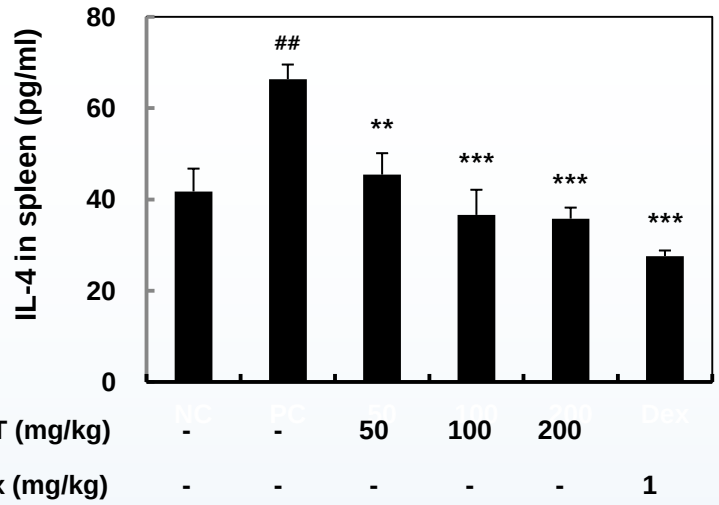


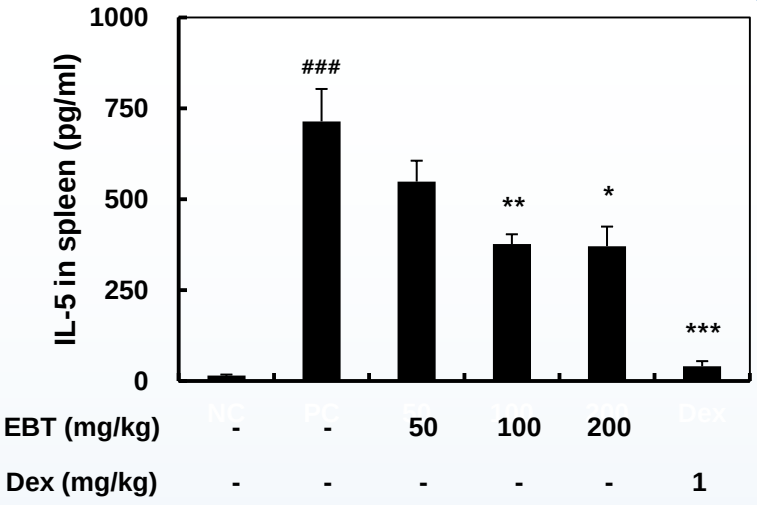
Effect of EBT on the serum IgE and histamine levels

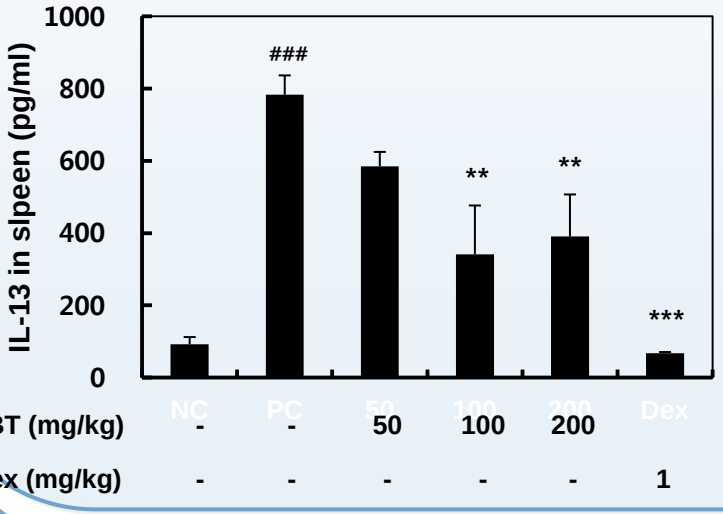


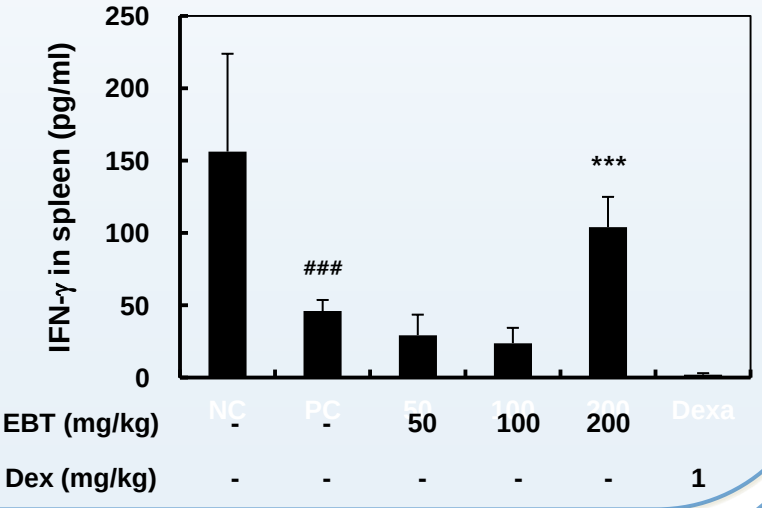


Effect of EBT on the cytokine response of splenocytes

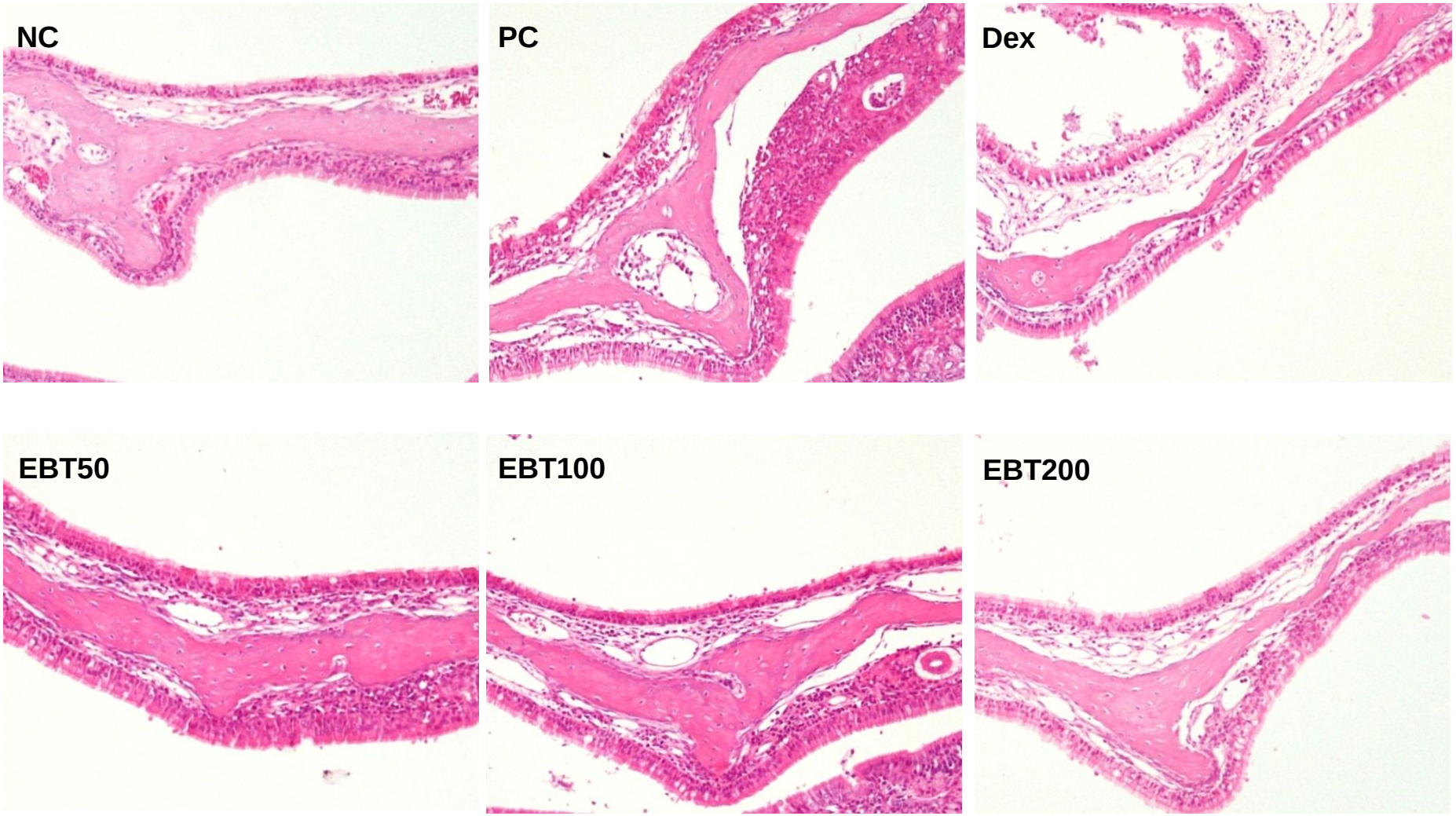




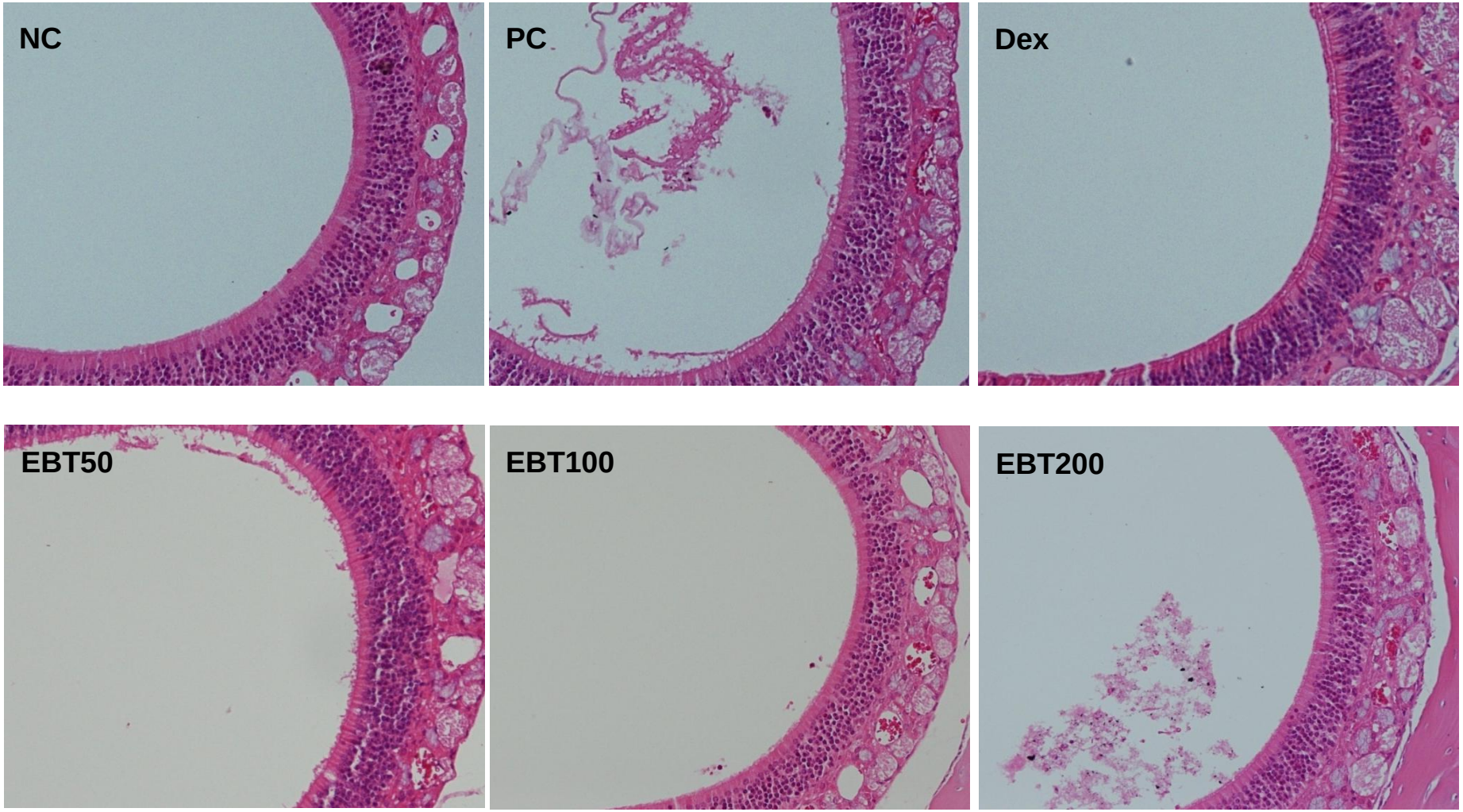




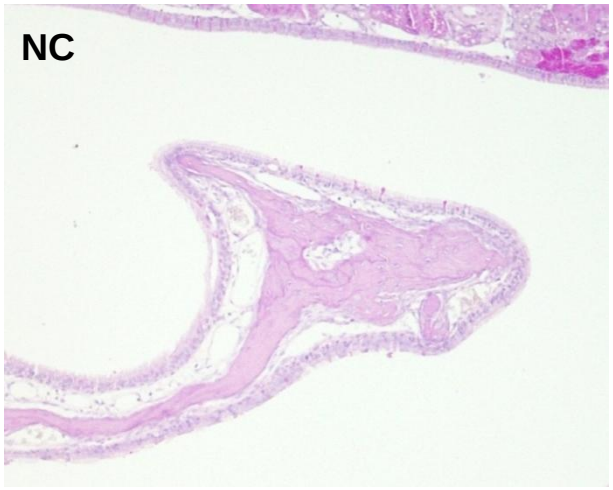
Histological analysis of nasal mucosa tissue

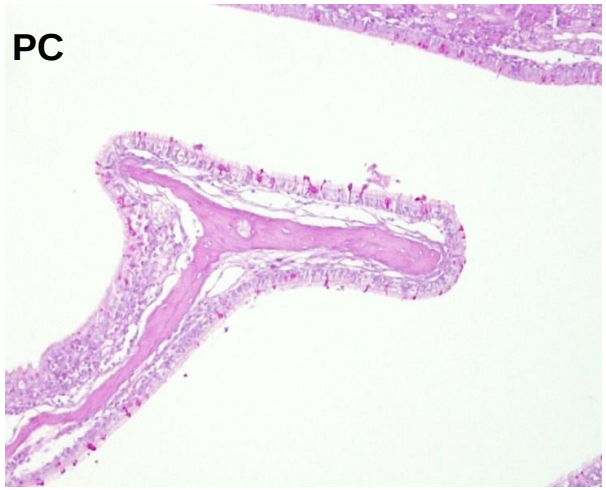


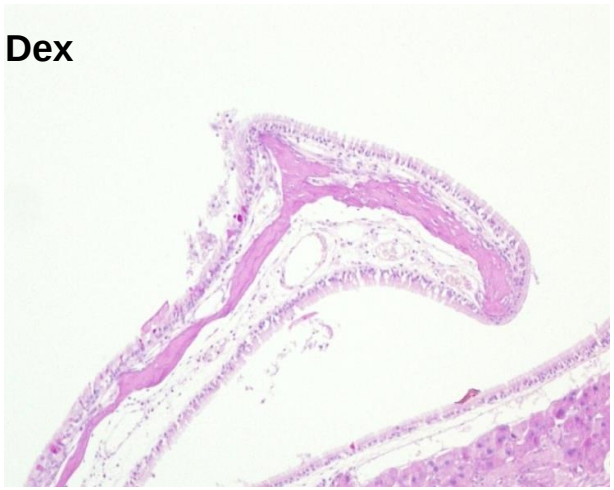
Histological analysis of nasal mucosa tissue

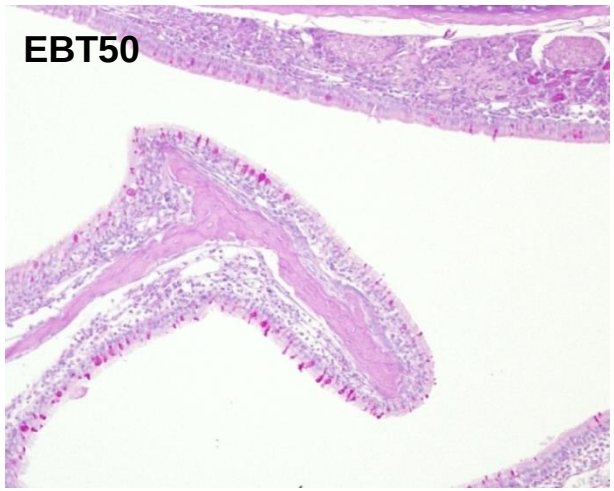


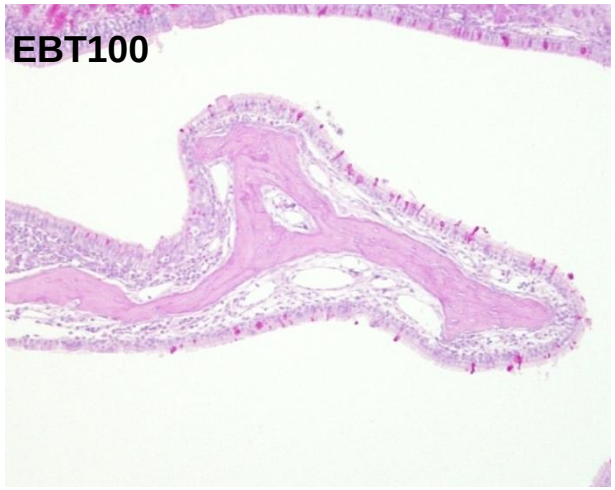
Histological analysis of nasal mucosa tissue

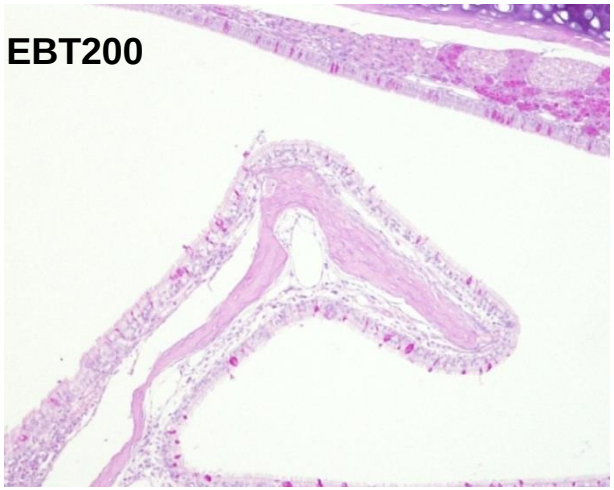




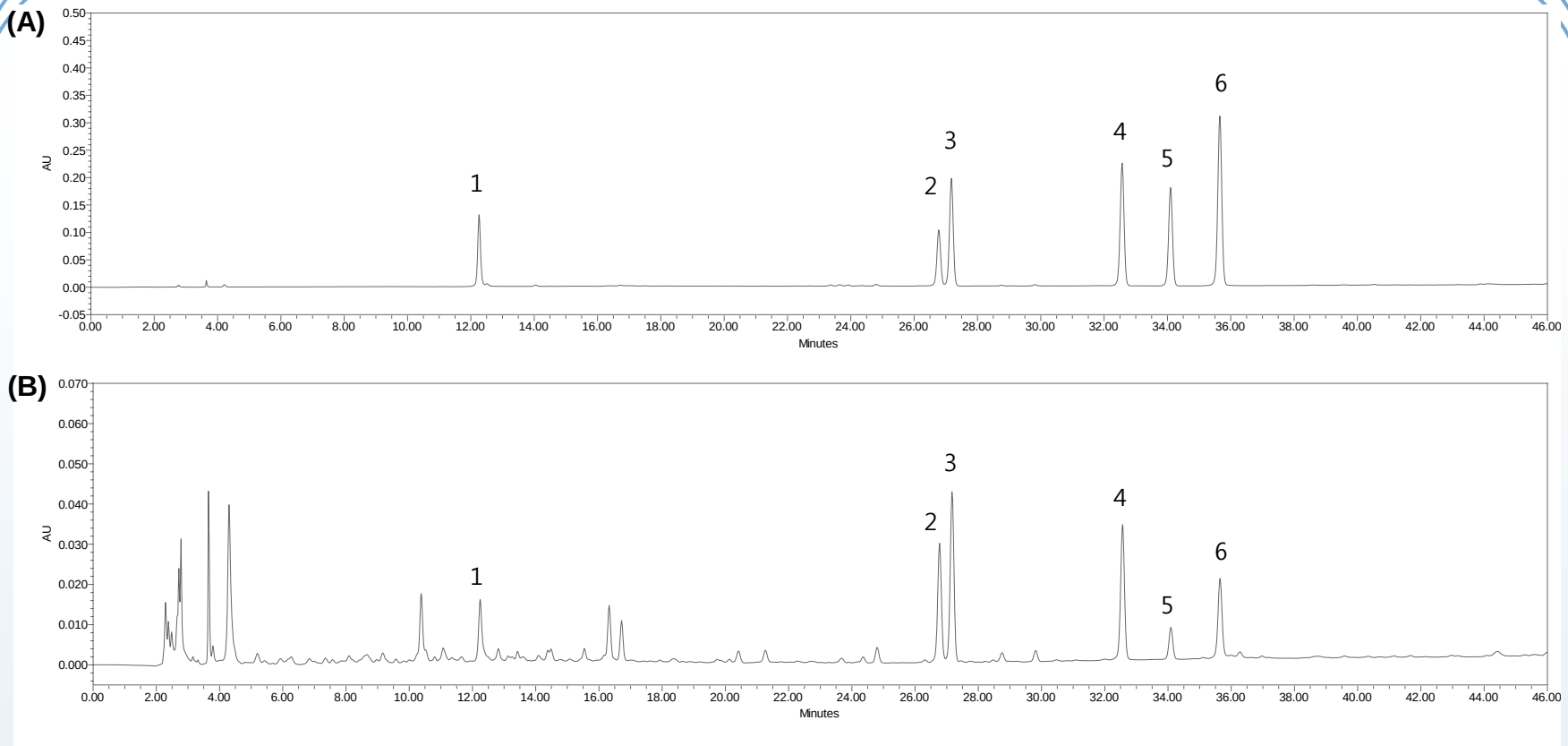








HPLC chromatograms



(A) The pattern of standard compounds.
(B) The pattern of EBT (1, Rosmarinic acid; 2, Byakangelicol; 3, Oxypeucedanin; 4, Imperatorin; 5, Phellopterin; 6, Isoimperatorin).

Conclusion

- EBT inhibits the degranulation reaction and the generation of PGD_2 /LTC_4 in a dose-dependent manner in BMMC.
- EBT ameliorates compound 48/80-induced anaphylaxis and mast cell-mediated PCA reaction.
- EBT alleviates AR by suppression of Th2 cytokines, the serum IgE level & histamine, decreased infiltration of inflammatory cells, and mucous secretion in the nasal mucosa.

Further studies

- Purification of other active compounds
- Detailed molecular mechanisms involved and clarification of the active compounds
- Other compounds included in EBT

Thank you