Convergent View of Allergy and the Immune System

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How pollen makes us sneeze and wheeze

1. Pollen enters eyes, nose, lungs sensitizing the immune system.

2. Specific antibodies to the pollen are produced.

3. Antibodies attach to mast cells found in tissues.

4. Pollen enters the body again, attaches to antibodies causing histamine and other chemicals to be released from mast cells.

5. Allergic reaction is triggered resulting in runny eyes and nose, throat and nose itching, sneezing, nose and sinus congestion and asthma.

Source: American Academy of Allergy, Asthma and Immunology
The Immunological Orchestra at Work in Allergy

Epithelial Barrier

Allergen

Mast-cell stimulation

Mast cell

Release of mediators of acute and chronic inflammation

FceRI

IgE

IL-4, IL-5

and IL-10

Precursor T helper cell

Expansion of T_{H2}-type cells

MHC class II

TCR

Dendritic cell

T_{H1} cell

T_{H2} cell

B cell

Production of IgE
Environmental Factors Set the Stage for Allergic Responses
Genetic Predisposition for Development of Allergy?

Risk Alleles: TSLP, IL-33, IL1RL1........???
Genetic Predisposition... Can We Generalize from Autoimmunity?

Risk alleles that regulate antigen and FcεRI signaling

- Lyn
- CSK
- PTPN22
- SHIP-1 (miR155)
- PTEN (miR7)
- SHP-1
- BLK
- BANK1
- BANK1
- A20 (Tnfaip3)
Immediate Imperatives for Research Focused on the Immunology of Asthma and Allergy

Understand the molecular bases of genetic and environmental contributions to disease

Intervene!

Thank You!!