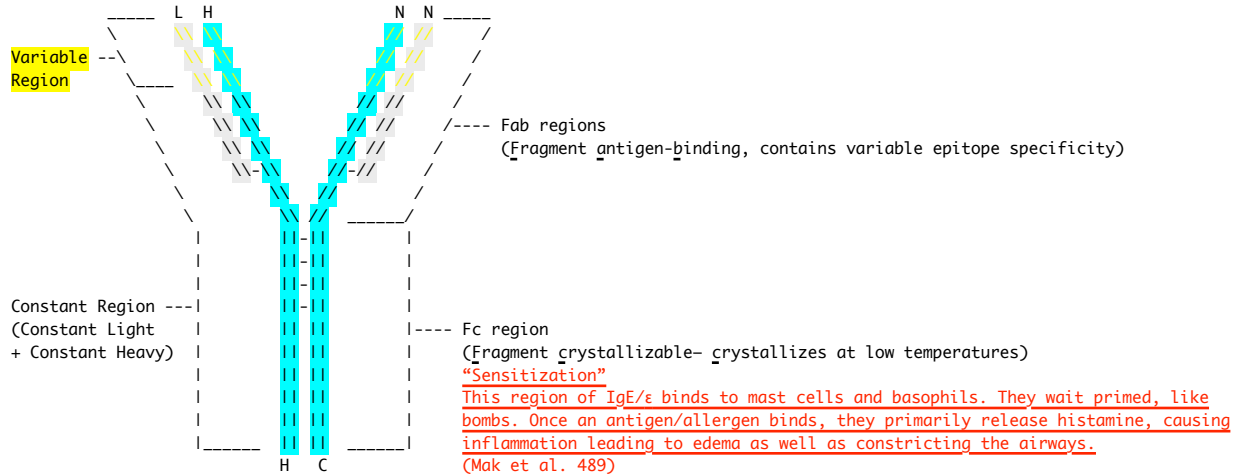


Allergies are a type of Hypersensitivity (HS) - too strong/long of a response, where inflammation causes tissue damage. Immunoglobulins (Ig) / Antibodies (Ab) are involved in Allergies. They are large glycoproteins with the same basic core structure: **two heavy chains** and two light chains that come together to form a Y-shaped molecule. (Mak et al. 86)

Legend: **H = Heavy chain** L = Light chain N = Amine/N-Terminus C = Carboxylic Acid/C-terminus



Heavy Chain Isotypes

"...five different types of Constant Heavy regions are distinguished by subtle amino acid differences and allow [Immunoglobulins] Igs to engage in different antigen clearance mechanisms. The five Heavy chain isotypes are defined by polypeptides called α , δ , ϵ , γ and μ that determine whether an Ig is an IgA, IgD, IgE, IgG or IgM molecule, respectively." (Mak et al. 89)

- * α /IgA = dimer, secretions
- * δ /IgD = BCR with μ /M
- * ϵ /IgE = allergy
- * γ /IgG = crosses placenta
- * μ /IgM = pentameric Ab, also monomeric BCR

Atopy is "a genetic disposition to develop an allergic reaction (such as allergic rhinitis or asthma) and produce elevated levels of IgE upon exposure to an environmental antigen and especially one inhaled or ingested." ("Atopy")

Localized Atopy: Allergic Angioedema, Allergic Rhinitis, Atopic Asthma, Atopic Urticaria (Hives), Atopic Dermatitis (Eczema)
Systemic Atopy: Anaphylaxis

4 Types of Hypersensitivity, these are Type I Hypersensitivity Therapies (Mak et al. 501-503)

Antihistamines - bind to histamine receptors (antagonism)

Lipoxygenase Antagonists - prevents Leukotriene building. "Compared to histamine, which causes constriction of airways and edema formation, the Leukotrienes are three to four orders of magnitude more potent and the effects have longer duration." (Hammarström Abstract)

Bronchodilators - block mast cell degranulation, smooth muscle relaxation

Corticosteroids - natural immunosuppressant, steroid hormones enter the nucleus where they have transcription pathways

Cromones - affect mast cell function

Epinephrine - for anaphylaxis, epinephrine, before being quickly broken down, acts as a vasoconstrictor, and bronchodilator

Immunotherapies

- Anti-IgE - i.e. Xolair: monoclonal Ab binds to Constant Heavy 3 domain of IgE
- Allergen-Specific - complex, the idea is to increasingly dose patient with antigen to "desensitize" and stimulate IgG production

Newer Immunotherapies

- ✓ Hypoallergenic allergen derivatives
- ✓ Fusion Proteins
- ✓ B cell epitopes
- ✓ Toll-like Receptor ligands

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