18 – Immune Disorders

Type I Hypersensitivity

B cells become plasma cells

c.

...

1. Describe the two-part mechanism by which type I hypersensitivity occurs.

a. Type I hypersensitivities are localized or whole body reactions that result from the release of inflammatory molecules in response to an antigen.

b. Sensitization Upon Initial Contact with an Allergen

- i. Typically, IgE is found in small numbers within the blood.
- ii. In people with allergies, cytokines from type 2 helper T cells stimulate B cells to release a higher than regular amount of IgE antibodies.
- iii. The hygiene hypothesis suggests carefree children are less likely to develop allergies than children who have been sheltered.
- iv. Following initial exposure to allergens, IgE, which binds very strongly with its stem to three types of defense cells (*mast cells, basophils,* and *eosinophils*) sensitizing these cells to respond to future exposures to the allergen.

The Degranulation of Sensitized Cells

- i. When the same allergen reenters the body, it binds to the active sites of IgE molecules on the surfaces of sensitized cells.
- ii. This binding triggers a cascade of reactions that causes the sensitized cells to release the inflammatory chemicals into the surrounding procession.

2. Describe the action of histamine and protease.

- a. **Histamine** stimulates strong contraction to the smooth muscles of the bronchi, ^{(a) Degravated} gastrointestinal tract, uteral, and bladder, and it also makes small blood vessels dilate and become leake.
 - Call stimulates nerve anding, causing itching and pain.
- Finally, historical venective stimulator of bronchial mucus secretion, tear formation, and salivation.
 - b. **Proteases** are enzymes that destroy nearby cells, activate the complement system, which in turn release more inflammatory chemicals.

3. Describe three disease conditions resulting from type I hypersensitivity mechanisms.

- a. **Hay fever (localized)** An allergic reaction marked by a runny nose, sneezing, itchy throat and eyes, and excessive tear production.
- b. Asthma (localized) Wheezing, coughing, excessive production of a thick sticky mucus, and constriction of the smooth muscles of the bronchi.
- c. **Anaphylactic shock (systemic)** Rapid suffocation, bronchial smooth muscle contracts violently.
 - i. Caused by a massive release of histamine mediators into the bloodstream.

Type II (Cytotoxic) Hypersensitivity

- 1. Discuss the mechanisms underlying transfusion reactions.
 - a. If a blood recipient has **preexisting** antibodies to foreign blood group antigens, then the donated blood cells will be destroyed immediately.
 - i. Either the foreign cells will be phagocytized or the antibodies will agglutinate the cells and complement will rupture them, called hemolysis.