Hypersensitivity Type I

This is an immediate reaction that occurs after an individual has been previously exposed to an antigen. Upon reexposure to the same antigen, IgE cross-linking on presensitized mast cells occurs resulting in release of vasoactive amines (histamine) which results in vasodilation. The reaction can be systemic resulting in anaphylaxis or local resulting in allergies. Systemic anaphylaxis is treated with epinephrine.



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Previous Antigen Exposure
Ant-gem Photo-exposure
Once a patient has been exposed to an antigen (i.e. peanuts, bee venom) the antigen is presented to CD4+ helper cells which become T_H2 cells. These T_H2 secrete IL-4 which promotes B cell production of IgE antibody that goes on to bind to mast cells.

Immediate Reaction
Immediate-emergency Sirens
This reaction takes minutes to occur. There is also a late phase reaction that occurs due to recruitment of inflammatory cells.

IgE Cross-linking
Electric Globulin-goblins Cross-linked
Upon antigen reexposure, the IgE already bound to mast cells cross-links and activates signal transduction pathways.

Presensitized Mast Cells
Mast-Sail with Single-tear
Activated signal transduction pathways in presensitized mast cells (and basophils) lead to mast cell degranulation.

Histamine Release
History-men Released
Mast cell degranulation leads to release of vasoactive amines, particularly histamine.

Vasodilation
Vase-dyed
Histamine release results in vasodilation and rubor (redness), calor (heat) and tumor (swelling).

Anaphylaxis
Anvil-axes
This is a systemic reaction that affects many organ systems and can result in distributive (vasodilatory) shock, shortness of breath and death.

Allergies
Allergy-alligator
Local allergic reactions are Immediate (Type 1) Hypersensitivity reactions. These are the type of reactions you experience to pollen and various animals.

Treatment

Epinephrine
Epi-pen
An Epi Pen must be administered to a patient that experiences systemic anaphylaxis immediately to prevent sequelae such as laryngeal edema, which can lead to airway blockage and death.

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