



Allergy: When the immune system backfires

Coombs and Gell classification

	Type I	Type II	Type III	Type IV
Synonyms	Immediate or anaphylactic type	Cytotoxic type	Immune complex type	Cellular or delayed type
Allergens	Pollen, food allergens, more rarely drugs	Drugs, infectious agents or in autoimmune reactions	Inhaled molds (lung), infused foreign proteins (serum sickness), tetanus vaccine (Arthus reaction)	Contact allergens: nickel in jewelry, black hair dyes, fragrances, preservatives, drugs
Latencies	Seconds to minutes	Several minutes to hours	Approx. 3 to 12 hours	Approx. 12 hours to 2 days
Immune reactant	IgE	IgG/IgM	IgG/IgM	T cells
Effector mechanisms	Once sensitized, free antigens cross-link the antibodies expressed on mast cells or basophils, which causes the release of immune mediators.	Antibody binds to antigen on a target cell, which is actually a host cell that the immune system considers as foreign, leading to cellular destruction via complement.	Antibody binds to soluble antigen, forming a circulating immune complex. Elimination of circulating infectious agents by immune complexing and elimination by phagocytosis.	T effector cells are activated by an antigen presenting cell. When the antigen is presented again in the future, the memory T cells will activate macrophages and cause an inflammatory response.
Clinical signs	Urticaria, angioedema, conjunctivitis, rhinitis, bronchial asthma, colic, vomiting, diarrhea, anaphylaxis	Secondary symptoms corresponding to the affected cell types, e.g. purpura in thrombocytopenia, or severe bacterial infections in granulocytopenia.	Cutaneous vasculitis, allergic alveolitis in the lungs (farmer's lung), serum sickness, Arthus reaction	Allergic contact eczema, photocontact allergy, drug exanthems

Table 1: Coombs and Gell classification.

Table showing the classification of allergic reactions according to Coombs and Gell.