

## 2.1.8

# Type III Hypersensitivity

Watch the video [Type III Hypersensitivity](#).

Type III hypersensitivity occurs when antibodies bound to soluble antigens deposit in body tissues and cause damage through complement activation. When soluble antigens like medications or insect/animal venom enter the bloodstream, IgG or IgM antibodies will bind to them forming antigen/antibody complexes or immune complexes. These immune complexes can attach to the endothelium of the blood vessel wall or other tissues. The antigen/antibody complexes activate the classical complement cascade beginning with C1. Activation of various complement proteins continues and C3a and C5a act as chemotactic factors for neutrophils. Neutrophils will utilize the Fc receptors of the antibodies and the C3b deposited on cells in the area. Upon binding, the neutrophils release granules containing reactive oxygen species that damage the body tissues. Complement fragments like C3a and C5a also cause local mast cell degranulation and the released histamine contributes to the overall inflammatory response.

Type III hypersensitivity reactions can be localized or systemic. Localized reactions can be called Arthus reactions, especially if the skin is involved. Localized reactions occur when antigens are injected, inhaled or ingested. An example of injected antigens are the tetanus and diphtheria vaccinations. The injected proteins of the vaccine bind to antibodies and form immune complexes at the site that result in localized inflammation. Forms of systemic reactions include serum sickness which involves a type III hypersensitivity to soluble antigens in a person's serum. The immune complexes that form will be carried through the circulation and deposit in various places throughout the body. This results in joint pain, fever, rashes, itching, and possible shock from extensive activation of the inflammatory response. Another systemic reaction autoimmune disease is rheumatoid arthritis. This hypersensitivity occurs when rheumatoid factor immune complexes are deposited in joints and elicit an immune response that causes joint damage and pain. A type of Raynaud phenomenon is another example of a systemic reaction. This occurs when cold temperatures cause the formation of antibody complexes that are less soluble (called cryoglobulins). These immune complexes will block blood flow in tiny capillaries, especially in the hands and feet. This leads to eventual cyanosis of the tissue.



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