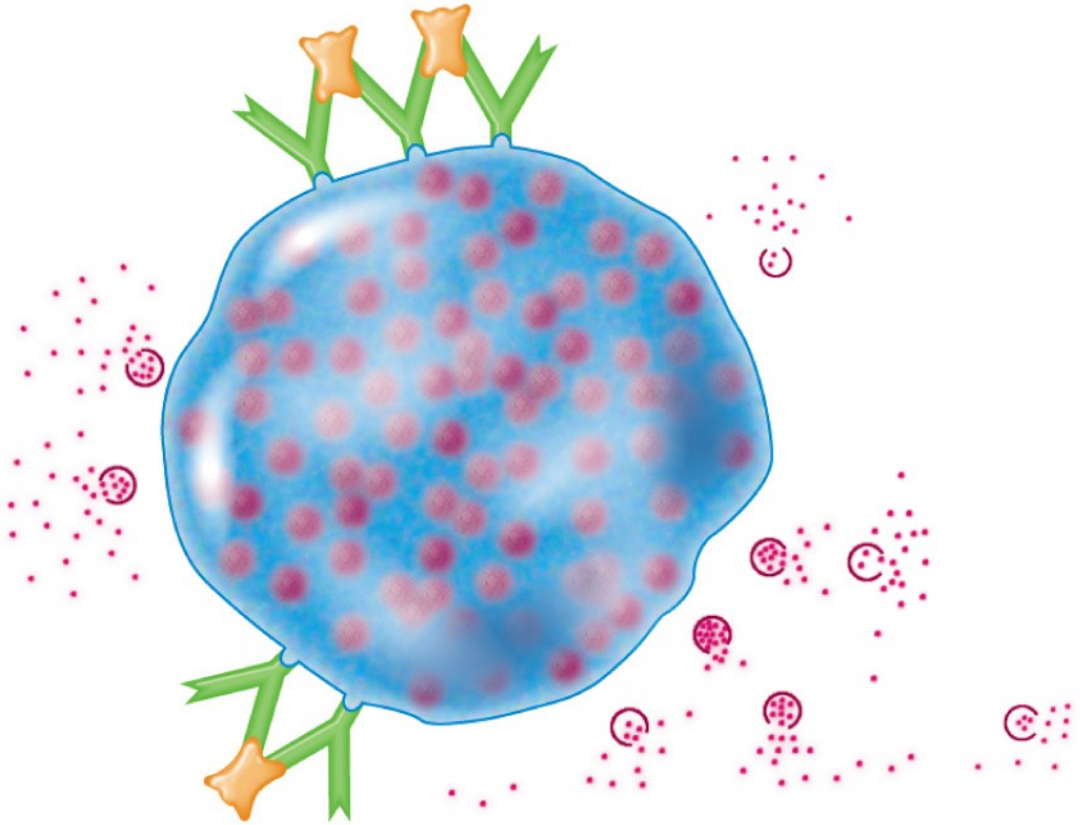
Hypersensitivity



Four Different Types of Hypersensitivity

- Hypersensitivity reactions are inappropriate exteme immunologic responses that occur in response to an antigen or allergen.

- Type I, II and III hypersensitivity reactions are known as immediate hypersensitivity reactions because they occur within 24 hours of exposure to the antigen or allergen. /// These are caused by antibodies.

- *Type IV hypersensitivity is caused by T cells and is delayed hypersensitivity*

Four Different Types of Hypersensitivity

Four kinds of hypersensitivity based on the type of immunity (antibodies or T cells) and response time to antigen

Type I acute hypersensitivity

- very rapid response // within seconds resolves in 30 mi
- antigen binds to E class antibody receptors on mast cells
- mast cells release histamine (and heparin)
- maybe local vs systemic
- local = Food allergies and asthma
- systemic = Anaphylactic shock / potentially deadly!

Type II - antibody dependent cytotoxic

- Sub-acute
- slower onset // 1 – 3 hours after exposure
- last longer – 10 to 15 hrs
- G and M class antibodies bind to antigen on cell
- Antibodies activate complement

Four Different Types of Hypersensitivity

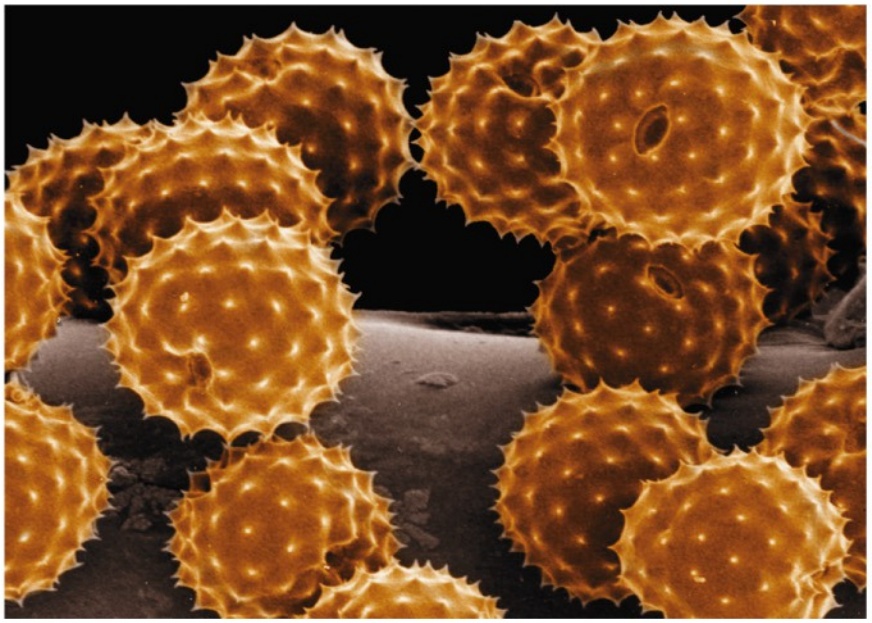
Type III - immune complex hypersensitivity

- sub-acute /// slower onset // 1 – 3 hours after exposure
- last longer – 10 to 15 hrs
- Form antibody-antigen complex under endothelium and other tissues
- Stimulate intense inflammation
- Autoimmune diseases like systemic lupus and glomerulonephritis

Type IV - delayed hypersensitivity

- T-Cell mediated response
- Response time 12-72 hours
- Examples = Graft rejections and poison ivy

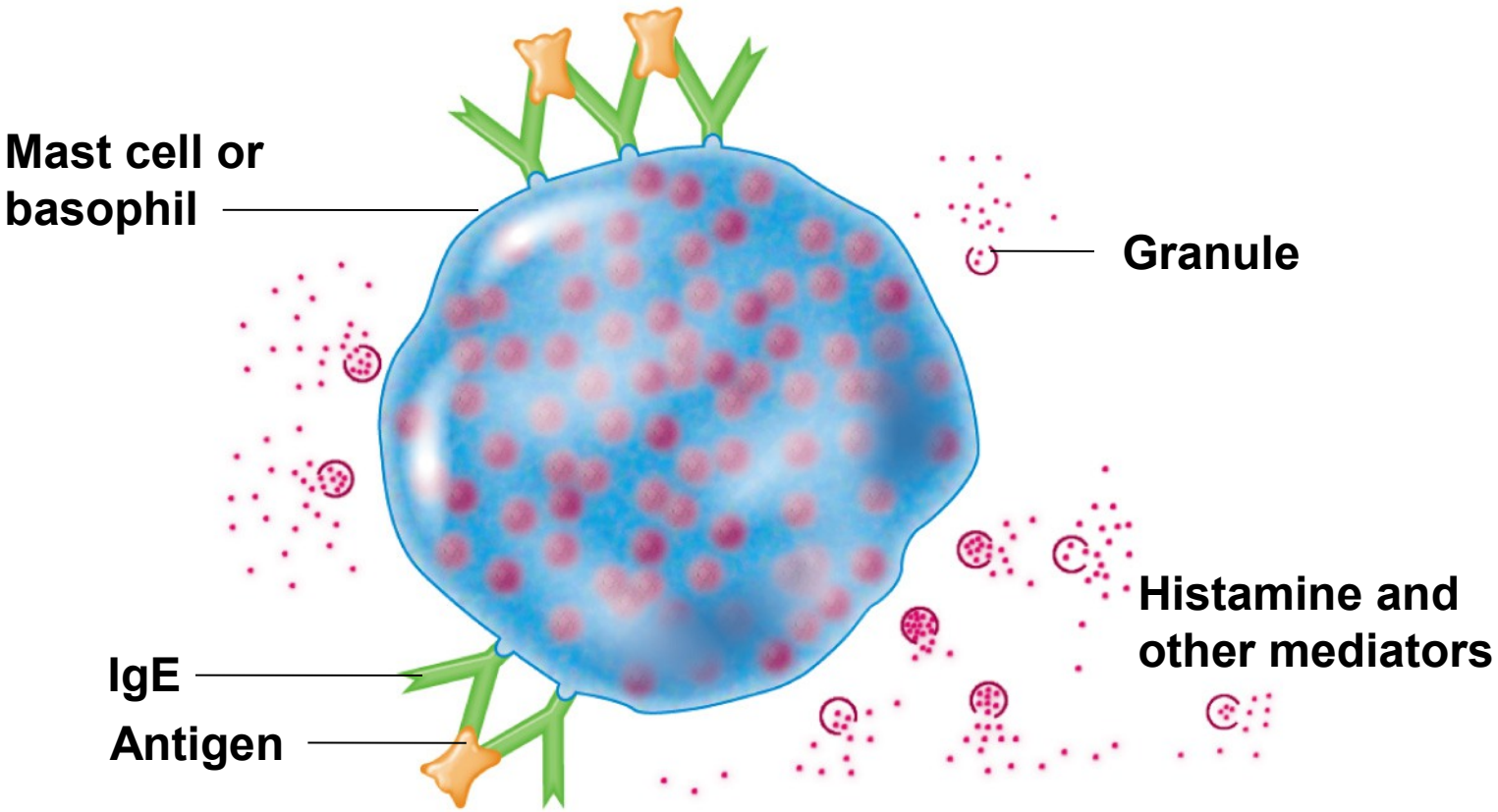
Type I - Localized Anaphylaxis



(a) A micrograph of pollen grains

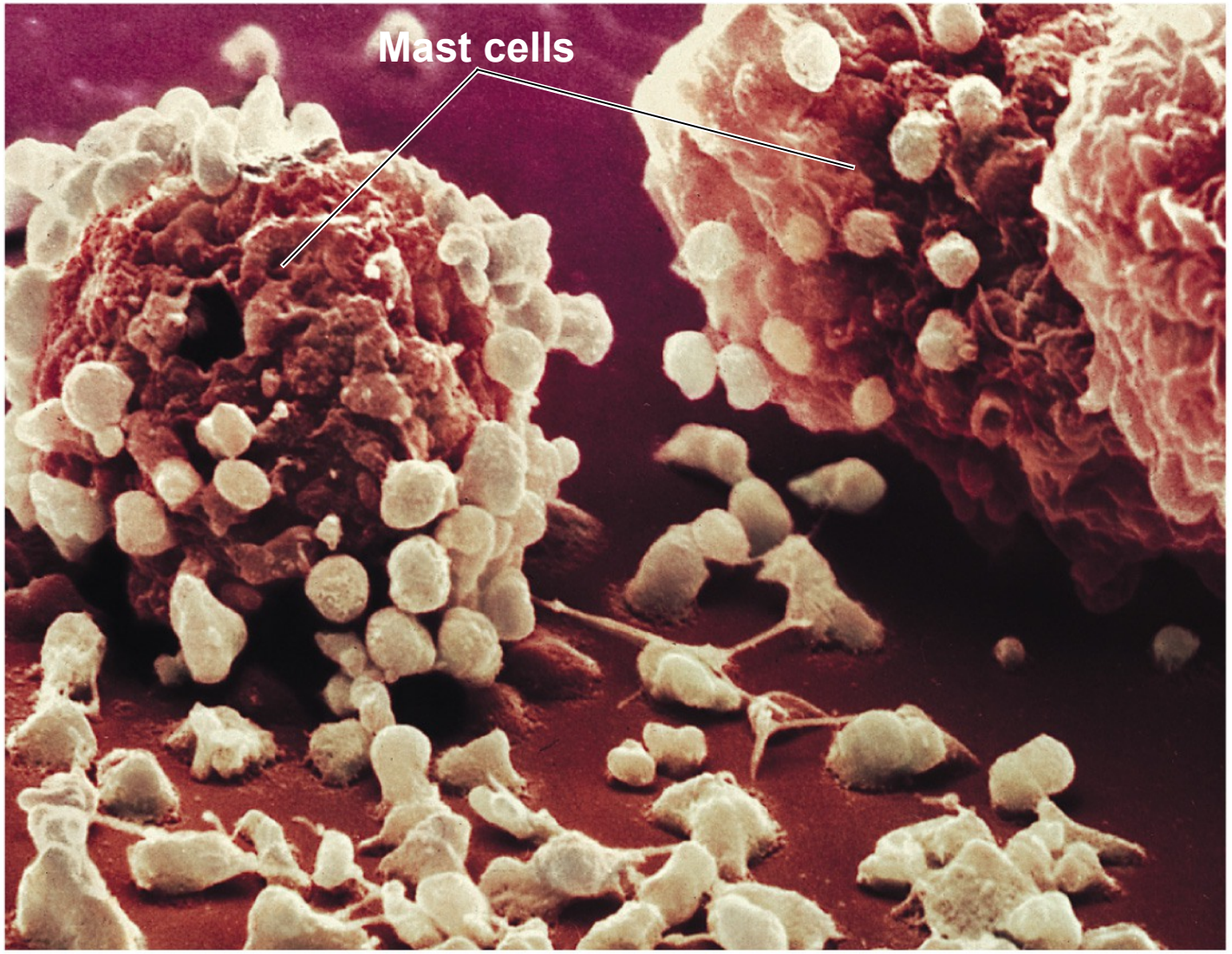
(b) A micrograph of a house mite on fabric

Type I // The Mechanism of Anaphylaxis



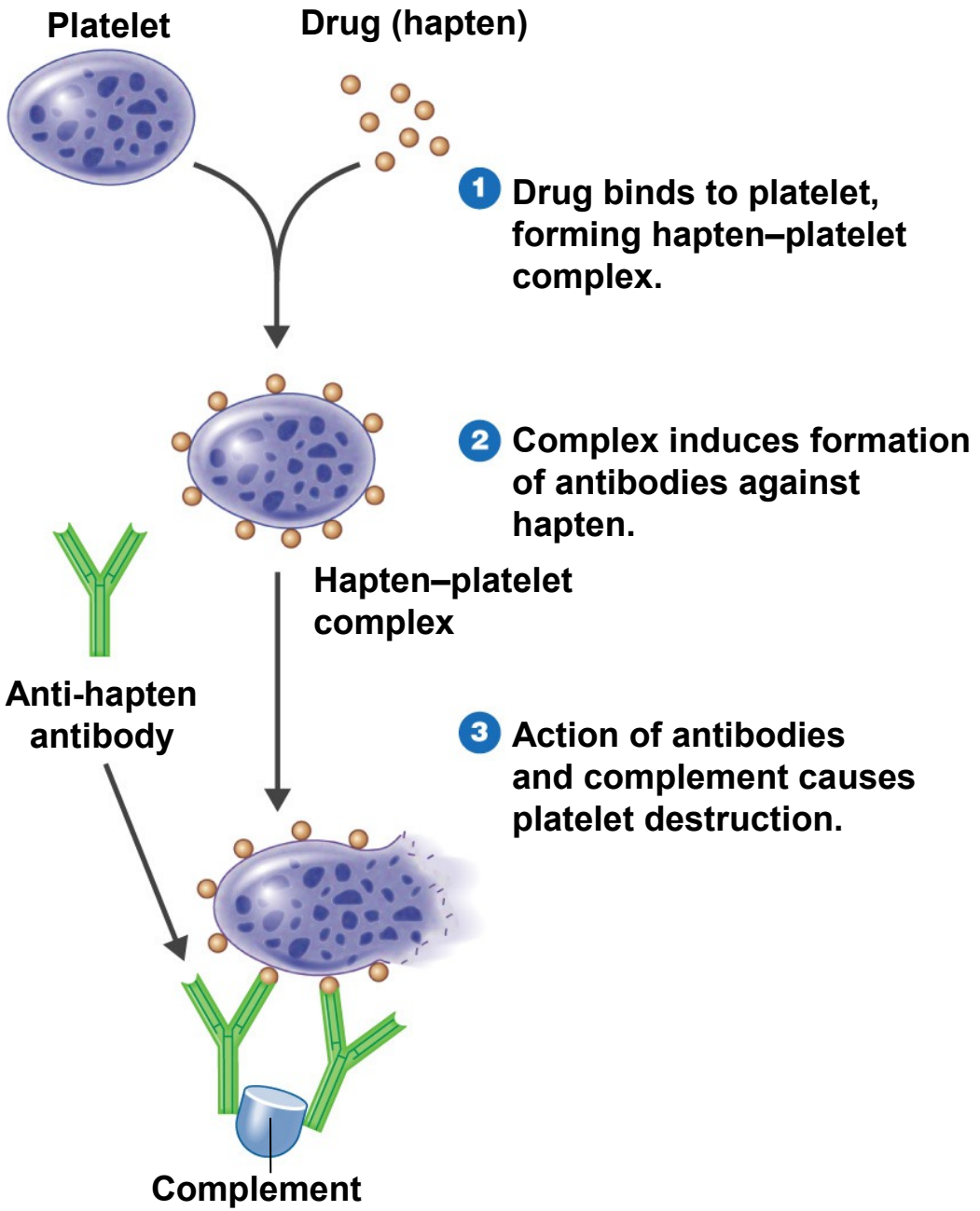
(a) IgE antibodies, produced in response to an antigen, coat mast cells and basophils. When an antigen bridges the gap between two adjacent antibody molecules of the same specificity, the cell undergoes degranulation and releases histamine and other mediators.

Type I - The mechanism of anaphylaxis.

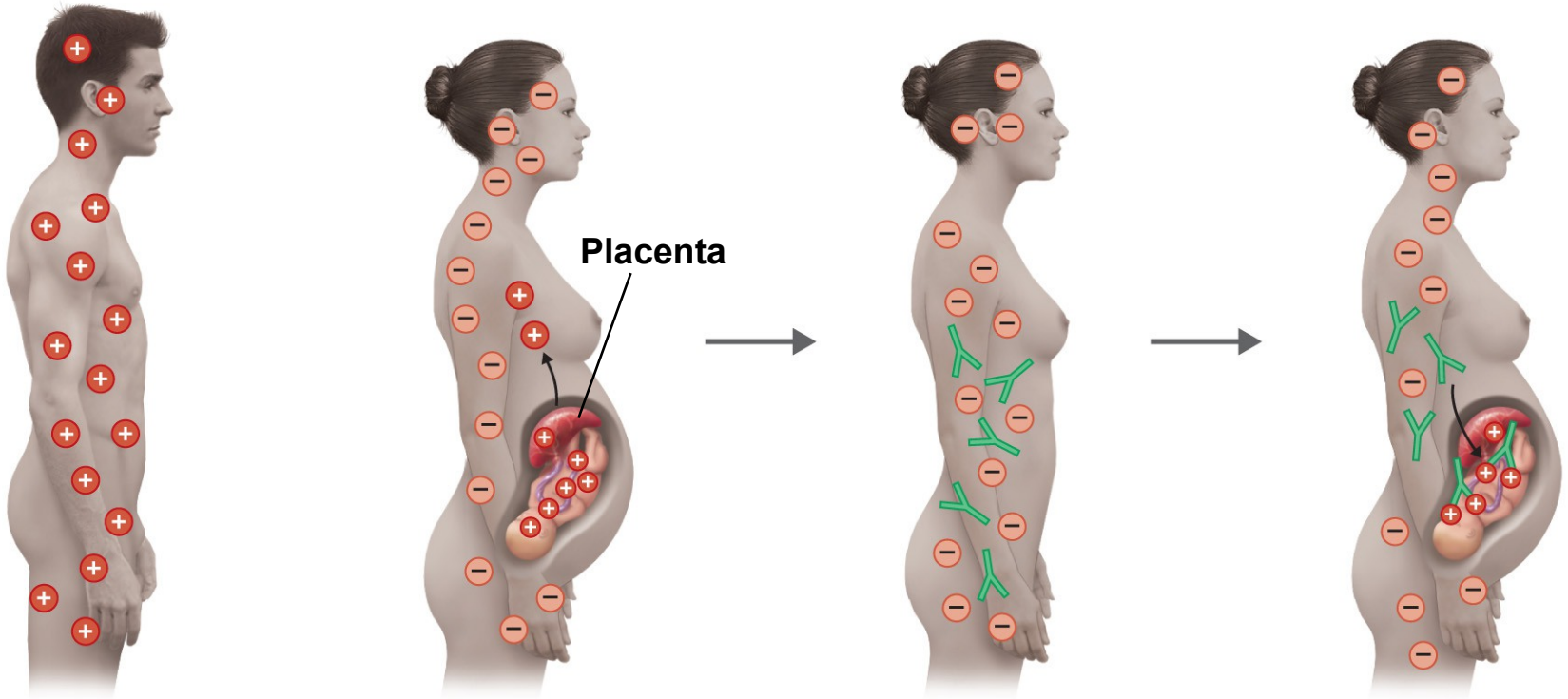


A degranulated mast cell that has reacted with an antigen and released granules of histamine and other reactive mediators

Type II - Drug-induced thrombocytopenic purpura.

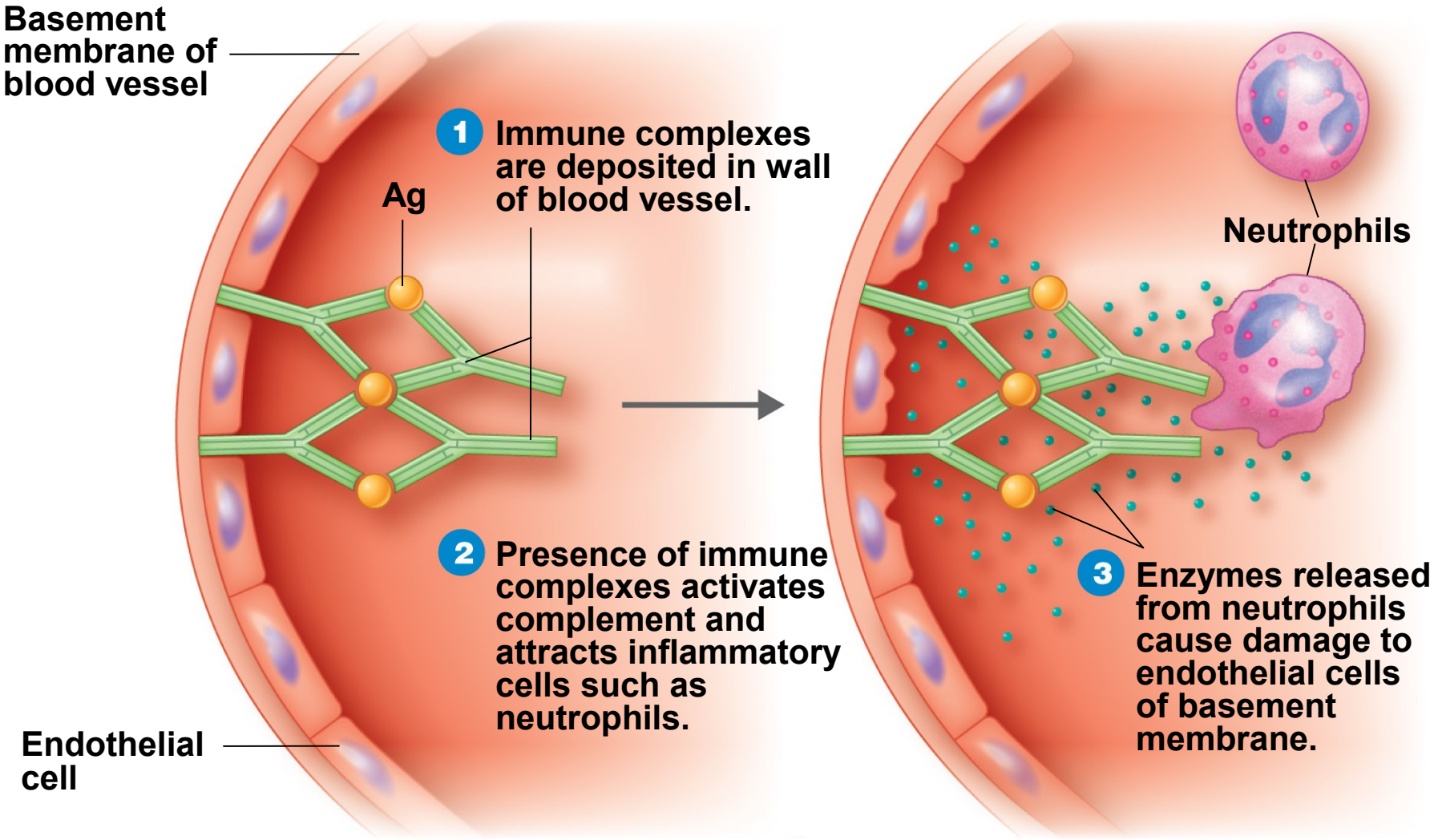


Type II - Hemolytic disease of the newborn.

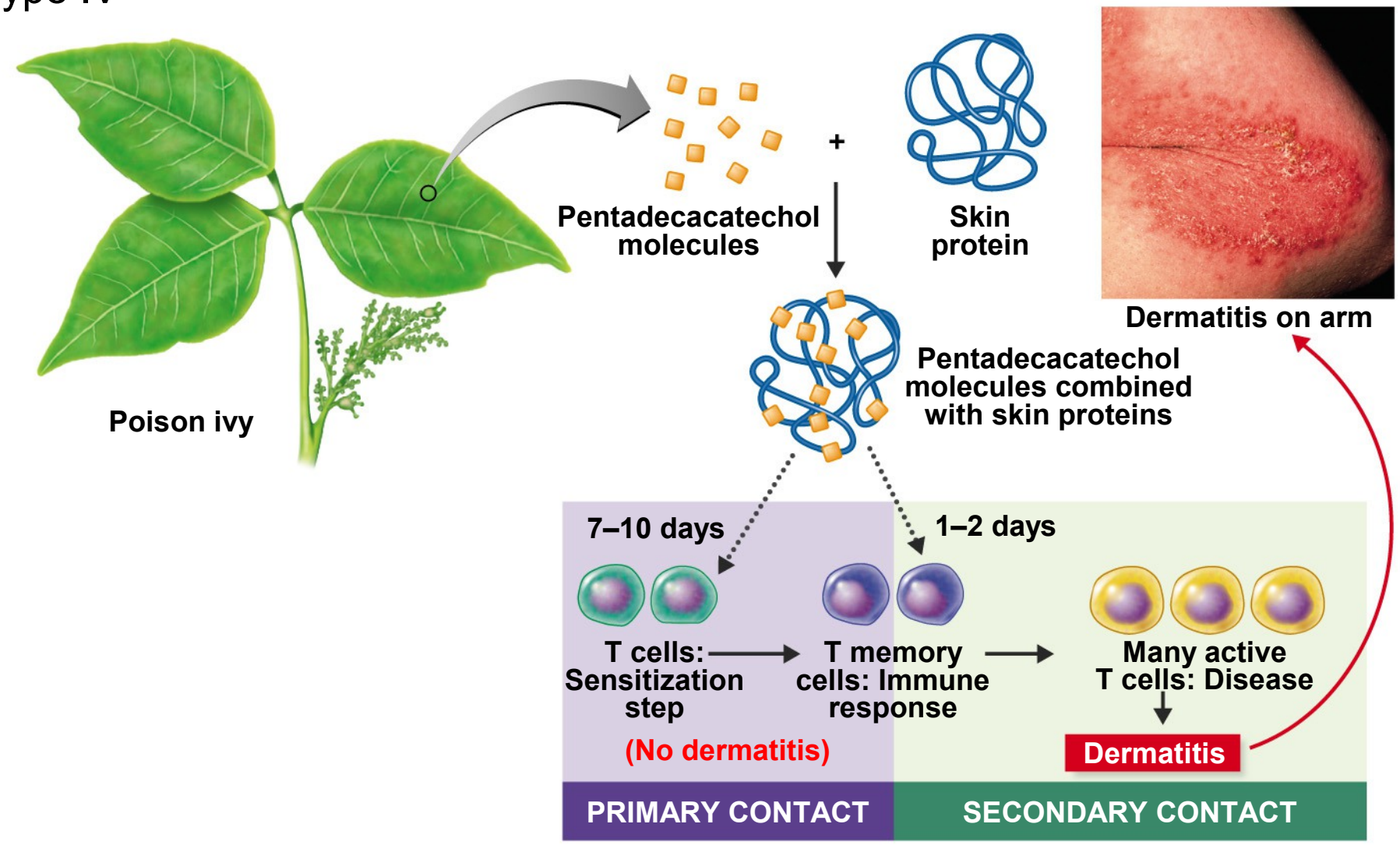


1. Rh^+ father.
2. Rh^- mother carrying her first Rh^+ fetus. Rh antigens from the developing fetus can enter the mother's blood during delivery.
3. In response to the fetal Rh antigens, the mother will produce anti-Rh antibodies.
4. If the woman becomes pregnant with another Rh^+ fetus, her anti-Rh antibodies will cross the placenta and damage fetal red blood cells.

Type IV - Immune complex–mediated hypersensitivity.



Type IV



The development of an allergy (allergic contact dermatitis) to catechols from the poison ivy plant.

Type IV – Allergic Contact Dermatitis