

# Hypersensitivity Reactions

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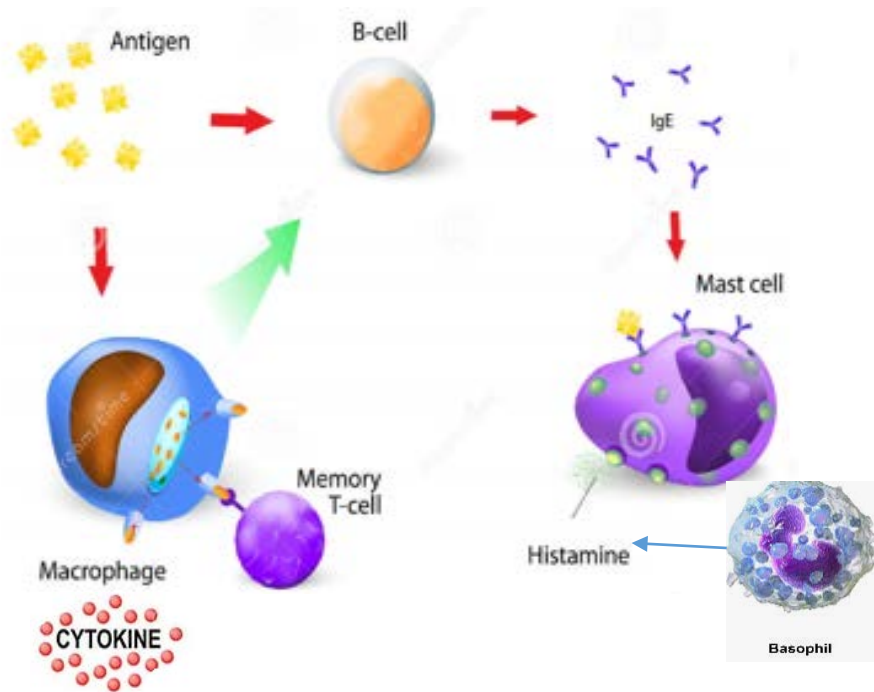


# Objectives:

- Describe types I through IV hypersensitivity reactions including definition, examples and cells involved
- Given examples MLS students will be able to recognize and identify the type of hypersensitivity with 100% certainty
- Summarize testing done for each type of hypersensitivity



# Type I Reaction



# Anaphylactic

Cells involved: Mast cells, basophils

Cytokines: Yes

Antibody: IgE

Complement: No

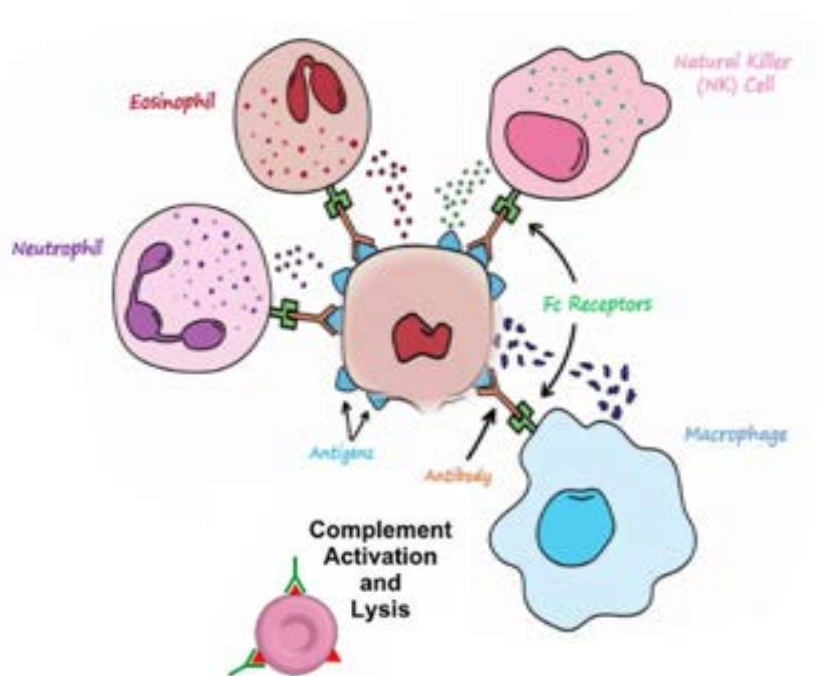
Description: Antibody mediated

Examples: Hay fever  
Asthma  
Food allergy



# Type II Reaction

# Cytotoxic



Cells involved: Macrophages  
Polymorphonuclear cells  
Cytokines: No  
Antibody: IgM and IgG  
Complement: Yes

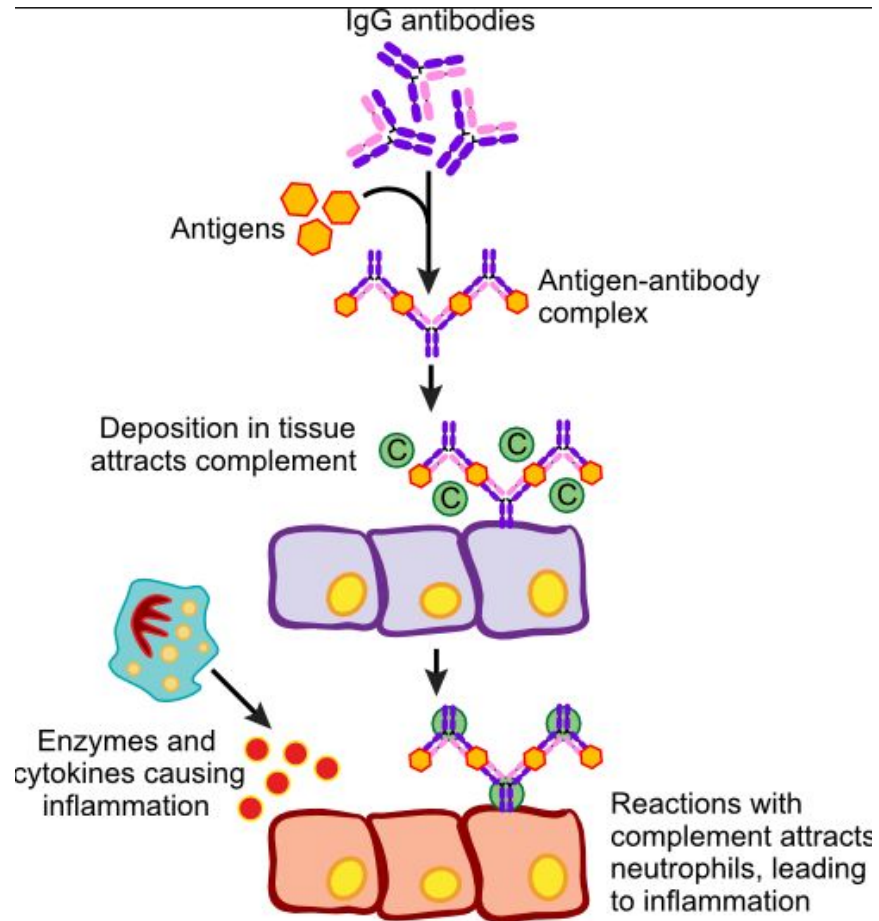
Description: Antibody depended  
Complement or cell  
Mediated

Examples: Transfusion Reaction  
Hemolytic  
Disease of newborn  
Goodpasture syndrome



# Type III Reaction

# Immune Complex



Cells involved: Macrophages  
Leukocytes  
Cytokines: Yes  
Antibody: IgG and IgM  
Complement: Yes

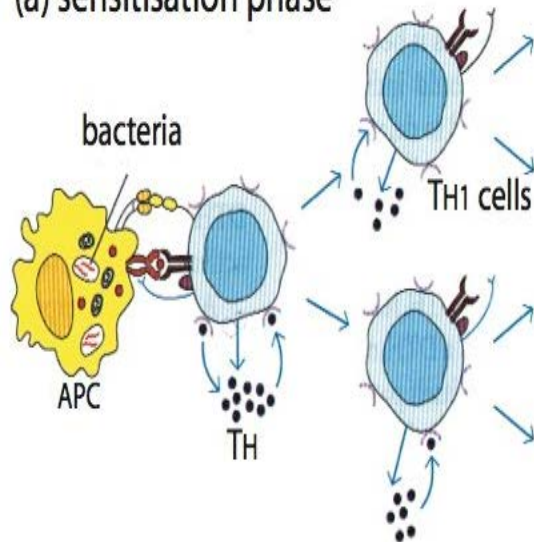
Description: Immune Complex Mediated

Examples: SLE  
Poststreptococcal glomerulonephritis  
Rheumatoid arthritis

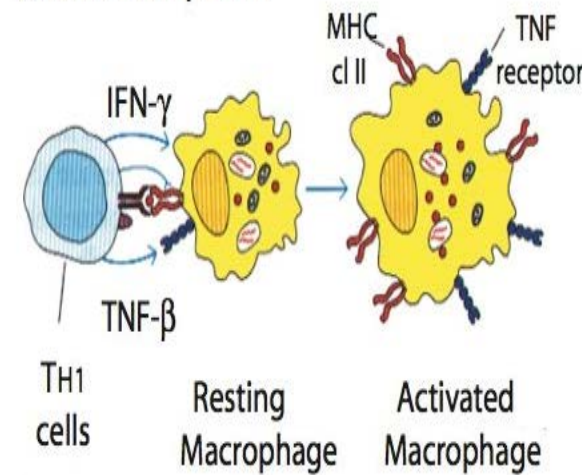


# Type IV Reaction      Delayed (T-cell dependent)

(a) sensitisation phase



(b) effector phase



Cells involved: antigen specific T-cells

Cytokines: Yes (T-cell cytokines)

Antibody: None

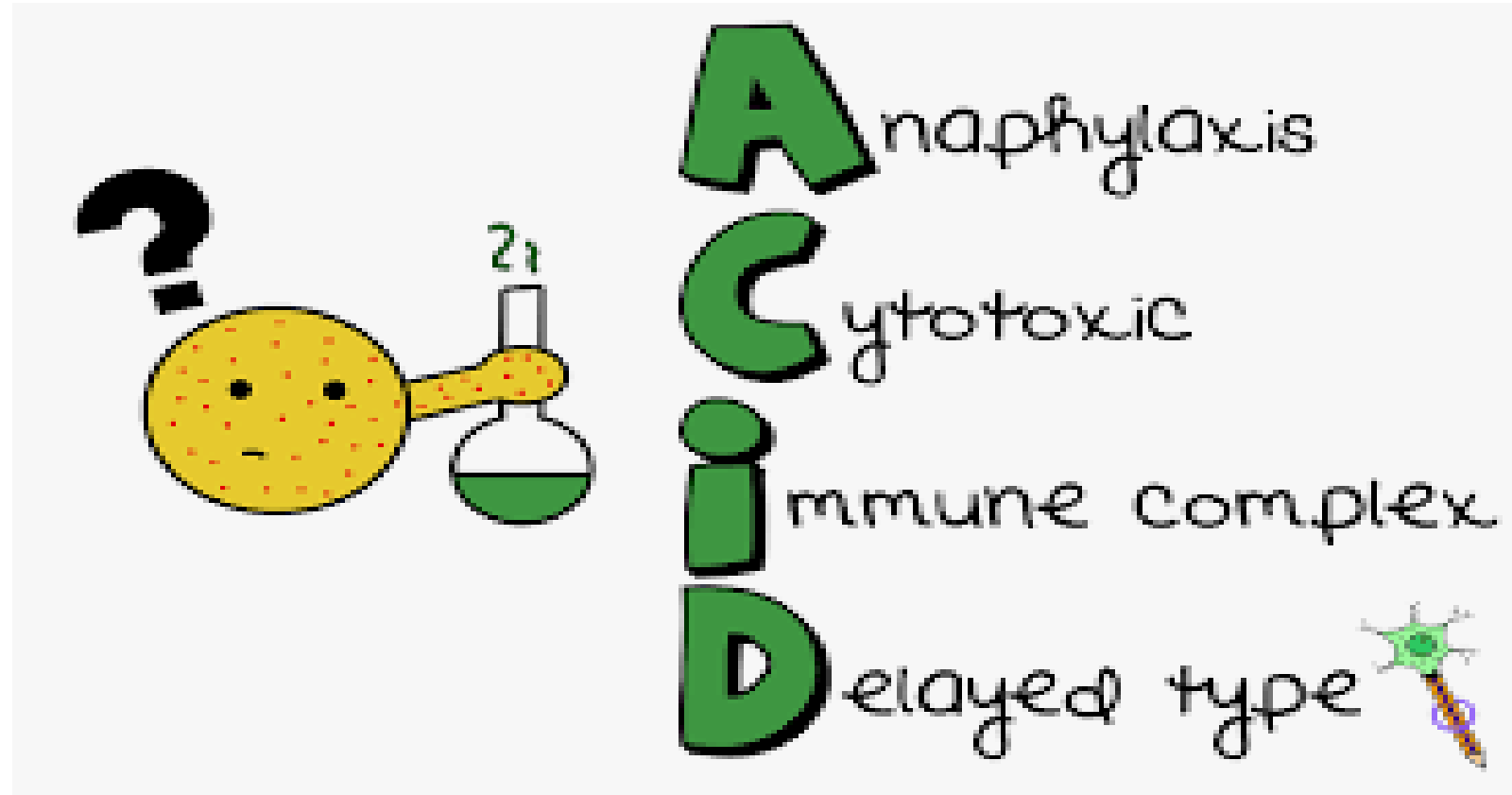
Complement: No

Description: T-cell mediated

Examples: Contact dermatitis  
Latex sensitivity



# Mnemonic



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# Laboratory testing for Type I

## Phadia 1000 ICAP



## Measures fluorescence

- Total IgE
- Specific IgE
- Tryptase





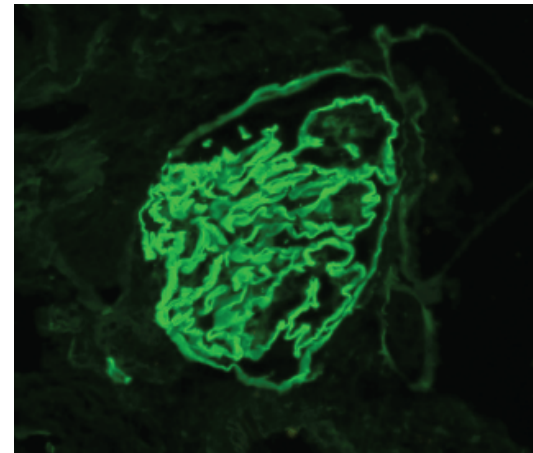
# Laboratory testing for Type II

## Transfusion Reactions

- DAT (direct antiglobulin test)
- AHG (Indirect antihuman globulin)

## Autoimmune Hypersensitivity

- Antibodies to glomerular basement membrane



# Laboratory testing for Type III

- Specific Autoimmune disorders:
  - SLE – EIA test for ANA  
IFA test for ANA  
dsDNA and BioPlex testing for specific autoantibodies
  - RA - RF  
CCP
- Quantitation of complement C3 and C4 components



# Laboratory testing for Type IV

- Skin testing antigens by injection

- TB
- Diphtheria
- Tetanus
- Fungal antigens



- Skin testing by adhesive patch



- Latex testing by IgE



# Test your knowledge

- A 19 month old infant presents with marked leg swelling, pain and inability to walk within 6 hours of receiving booster vaccinations  
At the visit to the clinic she received a booster dose of diphtheria, pertussis and tetanus in her right thigh
- No prior adverse reactions had been noted
- Differential diagnosis is hypersensitivity reaction
- Investigations: Repeat ultrasound examination after 48 hours showed considerable resolution of muscle swelling, compared with subcutaneous tissue swelling.
- Treatment: A dose of acetaminophen was given every 4 hours for 24 hours for pain and the child was observed at home. No further interventions were required.
- Final outcome: Limb edema and tenderness resolved gradually over the following two days, and the child resumed increasingly full use of the affected limb as the other clinical signs resolved. Within a week she had made a full recovery.
- What is the diagnosis in this case?

