Topics

- Type III hypersensitivity
- Type IV hypersensitivity

Type III hypersensitivity

- Immune complex – mediated
- Activates complement
- Inflammation

Figure 18.5 Immune complex - mediated
Type III hypersensitivity and disease

**Excess antigen**
- farmer's lung
- bacterial endocarditis
- malaria

**Streptococcus pyogenes skin and throat infections**
- acute glomerulonephritis

**Rubella (German measles), early symptoms**
- rash, painful joints, fever

**Disseminated intravascular coagulation**
- clots form in small blood vessels; organ failure

**Arthus reaction** – local reaction in response to injected antigen

**Serum sickness** – passive immunization with animal serum
- antisera against diphtheria, tetanus
- Antigens in foreign serum induce immune response
Type IV hypersensitivity

- Delayed cell – mediated
- Tuberculin skin test
- Contact hypersensitivities (*contact dermatitis*)

- Infectious diseases

Delayed cell - mediated

- Delayed hypersensitivity
- Sensitized T lymphocytes
Figure 18.6 Tuberculin skin test

Redness, induration due to sensitized T cells reacting with antigen, followed by release of cytokines and influx of macrophages.

PPD – purified protein derivative

Figure 18.7 Contact hypersensitivities

Figure 18.8 Severe contact hypersensitivity
Common examples of contact hypersensitivity
- poison ivy, poison oak
- nickel in metal jewelry
- chromium salts in leather products
- cosmetics
- latex products (IgE-mediated Type 1 reactions also)
- plant protein induces sensitization
- use vinyl gloves
- potential allergens detected with patch test

Infectious disease
- Protective function cause tissue damage
- Ex. Leprosy (damaged sensory nerves; Mycobacterium leprae)
- Tuberculosis (granulomas form – tubercules; persistent Mycobacterium tuberculosis infection)
- Leishmaniasis (Leishmania species survive within macrophages)
- Herpes simplex (HSV-1, HSV-2 infects nerve cells emerges as cold sores, genital herpes)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Type I hypersensitivity</th>
<th>Type II hypersensitivity</th>
<th>Type III hypersensitivity</th>
<th>Type IV hypersensitivity</th>
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</thead>
<tbody>
<tr>
<td>Cell type involved</td>
<td>B cells</td>
<td>T cells</td>
<td>Mast cells</td>
<td>T cells</td>
</tr>
<tr>
<td>Type of antigen</td>
<td>Antibody-dependent</td>
<td>Cell-mediated</td>
<td>Antibody-dependent</td>
<td>Cell-mediated</td>
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<tr>
<td>Type of injury</td>
<td>Immune complex deposition</td>
<td>Antibody-dependent</td>
<td>Immune complex deposition</td>
<td>Antibody-dependent</td>
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<td>Erythema, warmth, tenderness</td>
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<td>Time of reaction after challenge with antigen</td>
<td>Immediate, up to 10 minutes</td>
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<td>Skin reaction</td>
<td>Excitation, papules</td>
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<tr>
<td>Examples</td>
<td>Anaphylaxis, shock, hives, angioedema</td>
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