Topics

- Type III hypersensitivity
- Type IV hypersensitivity

Type III hypersensitivity

- Immune complex – mediated
- Activates complement
- Inflammation
Figure 18.5 Immune complex - mediated

TABLE 18.3 Pathogenesis of Immune Complex Disease

1. Antibody combines with excess soluble antigen.
2. The antibody-antigen combination reacts with complement.
3. Complexes are deposited in sites such as skin, kidney, and joints.
4. Fragments of complement cause release of histamine and other mediator substances from mast cells or basophils and also attract neutrophils.
5. Release of the mediators causes increased permeability of blood vessel walls.
6. Immune complexes penetrate or form in blood vessel walls.
7. Neutrophils enter the vessel walls chemotactically.
8. Neutrophils release lysosomal enzymes, especially proteases, that induce tissue injury.
Type IV hypersensitivity

- Delayed cell – mediated
- Tuberculin skin test
- Contact hypersensitivities
- Infectious diseases

Delayed cell - mediated

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

Figure 18.7 Contact hypersensitivities
Infectious disease

- Protective function cause tissue damage
- Ex. Leprosy, tuberculosis, leishmaniasis, herpes simplex
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Type I hypersensitivity (Immediate; IgE-mediated)</th>
<th>Type II hypersensitivity (Cytotoxic)</th>
<th>Type III hypersensitivity (Immune complex-mediated)</th>
<th>Type IV hypersensitivity (Delayed cell-mediated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell type responsible</td>
<td>B cells</td>
<td>B cells</td>
<td>B cells</td>
<td>T cells</td>
</tr>
<tr>
<td>Type of antigen</td>
<td>Soluble</td>
<td>Cell-bound</td>
<td>Soluble</td>
<td>Soluble or cell-bound</td>
</tr>
<tr>
<td>Type of antibody</td>
<td>IgE</td>
<td>IgG, IgM</td>
<td>IgG</td>
<td>None</td>
</tr>
<tr>
<td>Other cells involved</td>
<td>Basophils, mast cells</td>
<td>Red blood cells, white blood cells, platelets</td>
<td>Various host cells</td>
<td>Various host cells</td>
</tr>
<tr>
<td>Mediators</td>
<td>Histamines, serotonin, leukotrienes</td>
<td>Complement, ADCC</td>
<td>Complement, neutrophil proteases</td>
<td>Complement</td>
</tr>
<tr>
<td>Transfer of hypersensitivity</td>
<td>By serum</td>
<td>By serum</td>
<td>By serum</td>
<td>By T cells</td>
</tr>
<tr>
<td>Time of reaction after challenge with antigen</td>
<td>Immediate, up to 30 minutes</td>
<td>Hours to days</td>
<td>Hours to days</td>
<td>Peaks at 48 to 72 hours</td>
</tr>
<tr>
<td>Skin reaction</td>
<td>Urticaria and rashes</td>
<td>Not applicable</td>
<td>Arthus</td>
<td>Induration, necrosis</td>
</tr>
<tr>
<td>Examples</td>
<td>Anaphylactic shock, hay fever, hives</td>
<td>Transfusion reaction, hemolytic disease of newborns</td>
<td>Serum sickness, farmer's lung, malarial kidney damage</td>
<td>Tuberculin reaction, contact dermatitis, tissue transplant rejection</td>
</tr>
</tbody>
</table>