Important terms:

- **Hypersensitivity** – immune responses that causes tissue damage
- **Autoimmune disease** – immune responses to self-antigens
- **Immunodeficiency** – insufficient immune response

**Transplantation immunity**

- Allografts
- Xenografts
- Genetically non-identical grafts cause rejections
- Type IV reaction – delayed cell-mediated
  - Immunological rejection of transplant
    - Killing of graft by sensitized cytotoxic T cells
    - Natural killer cells (ADCC)
    - MHC antigens major cause of rejection
  - Requires immunosuppression for successful transplants
    - Cyclosporin A, tacrolimus
    - Interfere with cell signaling
    - Inhibit clonal expansion of T cells
Autoimmune disease

Negative selection eliminates self reactive lymphocytes
Autoimmune diseases caused by body responding
to self antigens
MHC genes involved; genetically based

Autoimmune disease

- Spectrum of autoimmune reactions
- Treatment of autoimmune diseases
# Treatment of autoimmune diseases

- Immunosuppressants (e.g., cyclosporins)
- Anti-inflammatory drugs (e.g., steroids)
- Replacement therapy (e.g., insulin, thyroid hormone)
- Feeding or oral tolerance (induce tolerance to antigen)
  - Feed insulin for diabetes
  - Collagen for rheumatoid arthritis
  - Cause local intestinal immune response, down regulation of antigen receptors, deletion of immune cells

# Immunodeficiency disorders

- Primary immunodeficiencies (genetic, inborn)
- Secondary immunodeficiencies (acquired, disease)

# Primary immunodeficiencies

- Lack of B-cell function
- Lack of the different T-cell functions
- Lack of both T and B cell functions
- Defective phagocytes
Table 18.6 Some Primary Immunodeficiency Diseases for Which Genetic Defects Are Known

<table>
<thead>
<tr>
<th>Primary Immunodeficiency Disease</th>
<th>Associated Defects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe combined immunodeficiency (SCID)</td>
<td>X-linked hyper-IgM syndrome, X-linked agammaglobulinemia no Ig</td>
</tr>
<tr>
<td>X-linked SCID</td>
<td>Wisott-Aldrich syndrome</td>
</tr>
<tr>
<td>MHC class II deficiency *</td>
<td>Ataxia telangiectasia</td>
</tr>
<tr>
<td>CD3 deficiency</td>
<td>Chronic granulomatous disease</td>
</tr>
<tr>
<td>CD8 deficiency</td>
<td>Leukocyte adhesion deficiency</td>
</tr>
<tr>
<td>X-linked agammaglobulinemia no Ig</td>
<td>Many complement deficiencies</td>
</tr>
</tbody>
</table>

Secondary immunodeficiencies

- Malnutrition
- Immunosuppressive agents
- Infections (measles, AIDS, SARS, promote secondary infections)
- Malignancies (multiple myeloma – from one B cell) consumes immune resources can’t mount normal responses