STEVENS-JOHNSON SYNDROME

TOXIC EPIDERMAL NECROLYSIS (TEN)
What Makes us Sick?

- “Enemies” in the environment like microbes and chemicals are constantly attacking our bodies, disrupting **homeostasis**.
- Sometimes immune system **homeostasis** is disrupted on its own.

- it may **over-react** to antigens such as with allergies
- it may **under-react** as with human immunodeficiency virus infection (HIV)
- it may **react to self proteins** as with autoimmune disease
Auto-Immune Diseases

The immune system sees “self” antigens as “non-self”.

- The autoimmune response results in tissue damage;
  - Some damage occurs in only one or a few organs;
  - In other cases it may be body-wide (systemic).

- ~ 3.5 % of people have autoimmune diseases;
  On average, women are 2.7 times more likely to develop these diseases than men.

- The cause may be due to genetic factors, infectious agents, gender, and age.
  Most auto-immune diseases have no known cause or cure - treatment is aimed at controlling symptoms.
Why Does the Immune System Attack What it’s Supposed to Protect?

• Failure to recognize some cells as “self”
  – In rheumatic fever, the streptococcus antigen is very similar to a protein in heart tissue, so the body mistakenly identifies heart tissues as foreign.

• Cells seen as foreign are attacked and destroyed
  – May be organ-specific, targeting a few select cells or organs;
  – May be systemic.
Auto-Immune Diseases

- **Organ-Specific**
  - Multiple Sclerosis
  - Juvenile Diabetes

- **Systemic**
  - Systemic Lupus Erythematosus
  - Rheumatoid Arthritis

© Fleshandbones.com Roitt et al: Immunology 6E
Systemic Lupus Erythematosus (SLE)

- A chronic systemic autoimmune disease.
  - Complexes of anti-self antibodies and antigen deposit in, and cause tissue damage.
- 1 million sufferers in the U.S.
  - SLE strikes women nine times more often than men.
- Symptoms may include a butterfly-shaped rash on face, fatigue, and headaches.
- Triggered by environmental effects in persons who are genetically susceptible.

Lupus “butterfly” rash

Damaged kidney (left) caused by immunoglobulin deposits (right)
Rheumatoid Arthritis (RA)

- A chronic systemic autoimmune disease.
  - Anti-self antibodies that react with the constant regions of other antibodies (rheumatoid factor).
- Disease onset occurs most often between the ages of 25 – 55.
  - Women are 3 times more likely to develop this than men.
- Symptoms include weakness, fatigue, and joint pain.
- Infections, hormones and genetic factors may be involved.

X-ray shows severe arthritis affecting the joints and limiting mobility
Multiple Sclerosis (MS)

• A chronic organ-specific disease - may be mild or severe.
  – MS involves the destruction of the myelin sheath that covers cells of the spinal cord and brain.

• Affects ~ 1 in 1,600 people.
  – 60% of the cases occur in women.

• Symptoms include weakness, tremors or paralysis of one or more extremities, numbness, decreased memory and attention span and may disappear and recur over time.

• Infections, hormones and genetic factors may be involved.

Magnetic resonance image of brain of patient with chronic form of multiple sclerosis, showing characteristic lesions of MS (white spots)
Juvenile Diabetes

- Also known as Type - I diabetes or insulin-dependent.
  - Beta-cells in the pancreas produce little or no insulin.
- Usually occurs before the age of 30.
  - Occurs in 1 in 7,000 children each year.
  - The incidence decreases after the age of 20.
- Symptoms include increased thirst and urination, weight loss, nausea, and fatigue.
- Cause is linked to genetic, viral, and autoimmune factors.

Normal pancreas

Diabetic pancreas
I am only half my mom!

How does mom’s immune system tolerate me?
TH1 and TH2 Balance

A model to illustrate the complex balance between T helper 1 (Th1) and Th2 cells.
Mechanisms of immunotherapy through the ages

- Non-reaginic antibodies bind to allergen and block allergic response
- Blocking antibodies increase mast cell/basophil stability and decrease histamine release
- Reduced degranulation associated with decreased recruitment of effector cells
- Immunotherapy shifts Th2 responses towards Th1
- Induction of Treg cells that produce IL-10 and inhibit Th2 proliferation

- 1910: Noon publishes first IT paper
- 1920: P-K reaction described
- 1930: "Blocking antibody" found to be IgG4
- 1940:  
- 1950:  
- 1960:  
- 1970: IgE discovered
- 1980:  
- 1990:  
- 2000:  
- 2010:  

IL-10

Treg

Th2
WHERE IS THE WORST?

This map shows the four cities with the highest measured one-day readings for seasonal allergens (plus Louisville’s highest readings) in the year 2000, as reported by the National Allergy Board.

For comparative readings from other cities, see the chart on Page 2. (Note: Readings are not taken in all cities, and monitoring methods vary.)

Source: National Allergy Board of the American Academy of Allergy, Asthma and Immunology (aaaai.org).

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BY JOANNE MEISHAW AND KIM KOLARCK, THE C-J

WHAT POLLEN COUNTS MEAN

Numbers are grains of pollen or mold spores per cubic meter

<table>
<thead>
<tr>
<th></th>
<th>Weeds</th>
<th>Grasses</th>
<th>Trees</th>
<th>Molds</th>
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<tr>
<td>Low</td>
<td>0-10</td>
<td>0-5</td>
<td>0-15</td>
<td>0-6,500</td>
</tr>
<tr>
<td>Moderate</td>
<td>10-50</td>
<td>5-20</td>
<td>15-90</td>
<td>6,500-13,000</td>
</tr>
<tr>
<td>High</td>
<td>50-600</td>
<td>20-200</td>
<td>90-1,500</td>
<td>13,000-60,000</td>
</tr>
<tr>
<td>Very high</td>
<td>500+</td>
<td>200+</td>
<td>1,500+</td>
<td>50,000+</td>
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Symptoms

<p>| | |</p>
<table>
<thead>
<tr>
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<tr>
<td>Low</td>
<td>Only individuals extremely sensitive to these pollens and molds will experience symptoms.</td>
</tr>
<tr>
<td>Moderate</td>
<td>Many individuals sensitive to these pollens and molds will experience symptoms.</td>
</tr>
<tr>
<td>High</td>
<td>Most individuals with any sensitivity to these pollens and molds will experience symptoms.</td>
</tr>
<tr>
<td>Very high</td>
<td>Almost all individuals with any sensitivity to these pollens and molds will experience symptoms.</td>
</tr>
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What is in the Air Now?

Tree Pollen
Corylus=Hazelnut
Alnus = Alder
Betula = Birch
Ambrosia=Ragweed
Gramineae / Poaceae = Grass
Ulmus americana (Ulmaceae) 30um
American Elm
Quercus spp. (Fagaceae) 27-45um
Oak
Acer saccharum (Aceraceae) 28-38um
Sugar Maple
Fraxinus spp. (Oleaceae) 19-34um Ash
Morus alba (Moraceae) 20-22ug
White Mulberry
Pinus strobus (Pinaceae) 68-81um
White Pine
What Makes The Willamette Valley Unique?