Chapter 22: Diseases of the nervous system

**Lecture**
- NS overview
- Bacterial diseases
- Viral diseases
- Fungal diseases

**Lab**
- Major Unknown
- Dental Microbiology
The nervous system

2 components:
- **CNS**: brain and spinal cord
- **PNS**: nerves extending from CNS

**Meningitis** - infection of the meninges

**Encephalitis** - infection of the brain

Protection via **blood-brain barrier**
Meninges and cerebrospinal fluid
### Etiologies of bacterial meningitis

<table>
<thead>
<tr>
<th>Bacterium</th>
<th>Percentage of Cases</th>
<th>Fatality Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Streptococcus pneumoniae</em></td>
<td>30–50</td>
<td>19–46</td>
</tr>
<tr>
<td><em>Neisseria meningitidis</em></td>
<td>15–40</td>
<td>3–17</td>
</tr>
<tr>
<td><em>Haemophilus influenzae</em></td>
<td>2–7*</td>
<td>3–11</td>
</tr>
</tbody>
</table>

*Other bacteria causing meningitis account for 6–8% of cases.*

*Before introduction of Hib vaccine, *H. influenzae* accounted for about 45% of cases of bacterial meningitis; about 70% of these cases occurred in children under age 5.*

*Neisseria meningitidis*, Meningococcal meningitis

**Symptoms**

Due to endotoxin
Rash that doesn’t fade when pressed
Throat infection- bacteriemia- meningitis
*Clostridium tetani*- tetanus

**Symptoms**

Due to tetanospasmin toxin
Spastic paralysis
**Symptoms**

Due to exotoxin (Types A, B, and C)
- Flaccid paralysis
- Blurred vision
- Nausea, no fever

**Clostridium botulinum** - botulism

- Flaccid paralysis
- Blurred vision
- Nausea, no fever

Legend:
- Outbreak caused by Jalapeño peppers, MI
- Outbreak caused by sauteed onions, IL
- Outbreak caused by fermented fish/sea products, AL & AK
- Outbreak caused by baked potatoes, TX
- Outbreak caused by chili sauce (Texas)

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Mycobacterium leprae - Hansen’s Disease or leprosy

**Symptoms**

**Tuberculoid**
- PNS infected
- Skin shows immune reactions

**Lepromatous**
- Skin cells infected
- Disfiguring nodules
- Less immune response
- Tissue necrosis
Polio virus-
Poliomyelitis
Rhabdoviridae - rabies

Symptoms

First stage
Mild and varied

CNS infected
Hydrophobia
Mouth/pharyngeal spasms
Meningitis/encephalitis

1. Virus enters tissue from saliva of biting animal
2. Virus replicates in muscle near bite
3. Virus moves up peripheral nervous system to CNS in spinal cord
4. Virus ascends spinal cord
5. Virus reaches brain and causes fatal encephalitis
6. Virus enters salivary glands and other organs of victim
Transmissible spongiform encephalopathies - Creutzfeldt-Jakob Disease

**Symptoms**

- Prion disease
- Loss of motor control
- Death
Transmissible spongiform encephalopathies-
kuru