SCBM341 General Pathology: Viral infection

Laboratory

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# Schedule for Laboratory

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>2.30 – 3.00 p.m.</td>
<td>Glass slide: Brain Rabies infection (1 slide per group)</td>
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<tr>
<td>3.00 – 3.30 p.m.</td>
<td>Case study for Group discussion</td>
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<td></td>
<td>1. Which choice is the best answer?</td>
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<td>2. What is (are) the key(s) for your answer?</td>
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<td>3. Why not, other choice? How to cut them off?</td>
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<tr>
<td>3.30 – 4.30 p.m.</td>
<td>Presentation &amp; Discussion (15 min per group)</td>
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Rabies Virus

Group: V (-)ssRNA
Order: Mononegavirales
Family: Rhabdoviridae
Genus: Lyssavirus
Species: Rabies virus

How it spreads

**ANIMAL BITE:** The farther away from brain, the longer virus takes to spread

**VIRUS:** Spreads through central nervous system

**Common carriers of rabies**

**Infected animals:** Show no fear for humans; act very agitated
- Bat
- Fox
- Cat
- Skunk

**Dog:** Another common rabies source

**Symptoms in humans**

- Fever, depression
- Agitation
- Painful spasms followed by excessive saliva
- Death within a week without vaccine

**Treatment:** Hospitalization, immune globulin injections, anti-rabies vaccine
**Foaming at mouth after drinking:** Produced by spasms in throat

**SOURCE:** The World Book Medical Encyclopedia

**Pathogenesis:** The virus is spread by a bite or by contamination with the saliva of a rabid domesticated or wild animal. The **virus initially multiplies in the tissue** at the point of entry, for example in **muscle cells**. From there it **migrates via the nerve fibers into the central nervous system**. The virus **replicates in the ganglion cells** (acetylcholine receptors are virus receptors). These newly formed viruses **spread back via autonomous nerves to peripheral organs** (primarily the salivary glands, leading to excretion of virus in saliva).
Rabies Virus Replication

Group: V (-)ssRNA
Order: Mononegavirales
Family: Rhabdoviridae
Genus: Lyssavirus
Species: Rabies virus

**Pathogen indication:** Negri bodies, inclusion bodies within the cytoplasm of the ganglion cells, especially in the cornuammonis.

Negri bodies are eosinophilic, sharply outlined, pathognomonic inclusion bodies (2–10 µm in diameter) found in the cytoplasm of certain nerve cells containing the virus of rabies, especially in Ammon's horn of the hippocampus. Often also found in the cerebellar cortex of postmortem brain samples of rabies victims. They consist of ribonuclear proteins produced by the virus.
A portion of the brain demonstrated edema surrounding neurons, and Negri body, a round reddish pink structure found commonly in cytoplasm of Purkinje cells (Purkinje neurons, are a class of γ-Aminobutyric acid (GABA) neurons) of the cerebellum and in the larger neurons of the hippocampus.
CASE STUDY

• 30 min for group discussion
  1. Which choice is the best answer?
  2. What is (are) the key(s) for your answer?
  3. Why not, other choice? How to cut them off?
A 59-year-old man with colon cancer is treated with chemotherapy. Two months later, he develops increasing cough and respiratory distress. A chest X-ray shows diffuse bilateral interstitial infiltrates. Sputum cultures are negative, and the patient does not respond to antibiotic therapy. A lung biopsy reveals acute and chronic interstitial pneumonitis. There are enlarged cells with prominent, dark-blue nuclear inclusions (shown in the image). Which of the following is most likely responsible for this patient’s pulmonary condition?

(A) Cytomegalovirus
(B) Epstein-Barr virus
(C) Herpes simplex virus
(D) Mycoplasma
(E) *Pneumocystis jiroveci*
Group 2

A 23-year-old woman presents with low-grade fever and multiple, painful, vesicular lesions on the vulva. A Pap smear shows multinucleated giant cells with intranuclear inclusions. Which of the following pathogens is the most likely cause of this patient’s genital lesions?

(A) *Calymmatobacterium granulomatis*
(B) Epstein-Barr virus
(C) Herpes simplex virus type 2
(D) Human papillomavirus
(E) *Treponema pallidum*
Group 3

A 65-year-old man with a history of Hodgkin lymphoma develops a painful erythematous rash with a band-like distribution over the left side of his chest, which becomes vesicular over the next several days. Biopsy of lesional skin is shown in the image. Which of the following is the most likely etiology of this patient’s rash?

(A) Cytomegalovirus  
(B) Epstein-Barr virus  
(C) Human herpesvirus-6  
(D) Human herpesvirus-8  
(E) Varicella-zoster virus
A 5-year-old boy dies of respiratory insufficiency and complications of pneumonia. Histologic examination of the lungs at autopsy shows giant cells with up to 100 nuclei (shown in the image). Which of the following viruses most likely caused this child’s fatal respiratory tract infection?

(A) Adenovirus
(B) Cytomegalovirus
(C) Measles virus
(D) Mumps virus
(E) Rubellavirus