Yellow Fever
By Georgia Roberts

Disease, Transmission, Reservoirs

- Yellow Fever is a viral infection (2).
- Yellow fever is a viral hemorrhagic fever, member of the Flavivirus family (group B arbovirus) (4).
- Yellow fever virus passed to humans via a bite from Aedes and Haemagogus mosquitoes (1).
- Yellow fever virus has three transmission cycles: jungle (sylvatic), intermediate (savannah), and urban (1).
- Flavivirus genus is a group of more than 70 arthropod-transmitted viruses, of which 30 are known to cause human disease. Other flaviviral infections include dengue, Japanese encephalitis, and tick-borne encephalitis (5).

Etiologic Agent, Characteristics

- An RNA virus of Flavivirus is the etiological agent of the yellow fever virus (4). This RNA virus is single stranded, linear and has a positive polarity. This polarity enables the nucleic acid to trigger an infection in host cells (3).
- Flavivirus virus enters the by receptor-mediated endocytosis; then synthesis of the RNA in the cytoplasm and protein in the endoplasmic reticulum. Virions are released from the cell membrane, causing the viral envelope of the lipid bilayer to infect cells (5).

Key Tests for Identification

- Laboratory studies: Complete blood count (CBC), Coagulation studies, Blood Chemistries, Liver function tests & Urinalysis (4).
- Chest radiography (4).
- ECG and cardiac monitoring (4).
- Specific tests for yellow fever: Rapid detection methods (polymerase chain reaction assay), Serologic tests (enzyme-linked immunosorbent assay), & Liver Biopsy - Immunohistochemical tissue staining (yellow fever antigen) (4).

Historical Information

- “Yellow fever” describes two of the symptoms of the disease, jaundice and fevers (11).
In Between 800 A.D. and 1000 A.D., Mayan records gave the first description of yellow fever (13).

In 1881, Carlos J. Finlay was first to propose that mosquitoes were the vectors of yellow fever but was never able to prove it (5).

In 1903, an Army Investigative Board concluded that yellow fever was in fact transmitted by mosquitoes based on investigations by Drs. Reed, Carrol, Agramonte and Lazear. Carrol and Lazear allowed mosquitoes that feasted on patients with yellow fever to bite them. The two men developed yellow fever (5).

Galvestonians experienced at least nine yellow fever epidemics between 1839 and 1867 (11).

In 1867, the "Yellow Fever Scourge" befell the small town of La Grange - losing one-fifth of the town (9).


**Signs and Symptoms**

- Symptoms may include: arrhythmias; hemorrhage; coma; decreased urination; delirium, fever; headache; jaundice; myalgia; red eyes, face, and tongue; seizures; and vomiting – possibly blood (2).

- Yellow fever has three stages:

  Stage 1 (infection): Headache, muscle and joint aches, fever, flushing, loss of appetite, vomiting, and jaundice are common. Symptoms often go away briefly after about 3 - 4 days (2).

  Stage 2 (remission): Fever and other symptoms go away. Most people will recover at this stage, but others may get worse within 24 hours (2).

  Stage 3 (intoxication): Problems with many organs may occur, including the heart, liver, and kidney. Bleeding disorders, seizures, coma, and delirium may also occur (2).

**Virulence Mechanisms**

- Capsid protein C - Facilitates viral binding (5)

- Membrane protein M - A minor glycoprotein (5)

- E proteins - Initiate infection and mediate viral entry (5)
- Nonstructural protein 1 (NS1) - May play a role in RNA replication (5)
- NS2A protein - Involved in RNA replication and packaging (5)
- NS2B and NS3 - Form a complex and are involved in polyprotein processing and replication of RNA (5)
- NS5 - Has a major role in RNA replication (5)

Control, Treatment, and Prevention

- At this time, no specific curative treatment for yellow fever; except for the symptomatic treatment is supportive and aimed at relieving the symptoms of the disease, including the pain and fever (5).
- Preventions include getting the yellow fever vaccine, using insect repellants, being aware of peak mosquito hours, and proper clothing such as long sleeves and pants (1).
- The currently available yellow fever vaccine confers near lifelong immunity in 95% of patients. For travel certification, however, revaccination is recommended every 10 years (4).

Local and Global Outbreaks

- Galvestonians experienced at least nine yellow fever epidemics between 1839 and 1867 (11).
- La Grange, Galveston, Calvert, Brownsville, Laredo, and San Antonio -1867 (9) (11)
- Brazil has confirmed 48 cases of yellow fever in February, 2008 (14).
- As of April 25, 2008, there are two confirmed cases of yellow fever with one death in Liberia (6).

References


