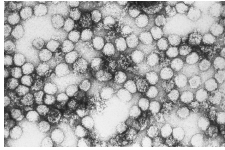


Yellow fever

The pathogen:

Flavivirus (an + ssRNA virus)



Reservoir:

Infects humans and monkeys;
Spread by mosquito
Aedes (Stegomyia)

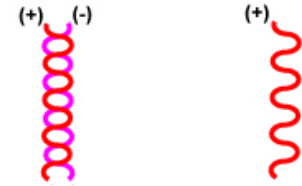


http://www.historyofvaccines.org/sites/default/files/uploaded-timeline-overview-images/000425_265.jpg
http://hardinmd.lib.uiowa.edu/pictures22/cdc/PHIL_21176_lores.jpg

1

Viruses have many different types of genomes

- double-stranded DNA
- single-stranded DNA
- double-stranded RNA
- single-stranded RNA



2

Yellow fever

Symptoms:

- First phase:
 - Fever
 - Backache & headache
 - Nausea
 - Vomiting
- Second phase:
 - Hepatitis with jaundice
 - Bleeding
 - Kidney dysfunction



<http://www.personal.psu.edu/uwg3/blogs/googleearthquest/earth100sp10/studentimages/yellowfevercuba1.jpg>

3

Yellow fever

Mechanism of toxicity:

- Up to 200,000 cases per year
- Viruses infect blood cells and endothelial cells
- The virus only has ~10 genes, but one of them blocks a host protein that is part of the host's anti-viral response

What are options for treatment and prevention?

4

Yellow fever

Current treatments and preventions:

- Treatment is only symptomatic (supportive care)
- Spraying to control mosquitos
- Vaccination of travelers to Africa, where 90% of cases occur



<http://www.storybench.org/parallax/images/spray.jpg>

5

Three views (probably each true for some pathogens):

From your reading on bacteria:

- Disease-causing bacteria evolved to cause disease
- Bacteria are trying to achieve equilibrium with humans, and disease results when equilibrium is not met
- Humans are accidental hosts (when bacteria are trying to occupy another niche) but our body reacts to produce symptoms

Which treatment would work better?

“Doctors also disagreed about treatment, with some advocating bleeding and purging while others proposed milder remedies such as teas and cold baths.”

Which postulate is this?

“That conclusion and microscopic slides of tissue from yellow fever victims led Finlay to focus on the blood vessels and the biting insect that accesses them.”

Which postulate is this?

"[Lazear] began growing mosquito larvae from the laboratory of Dr. Carlos Finlay, who had long argued that mosquitoes transmitted yellow fever."

"He took the insects to Las Animas Hospital in Havana to 'load' them with the infected blood of yellow fever patients... The insect that transmitted the disease had fed on a yellow fever patient at least 12 days before and had been incubating her deadly cargo."

Which postulate is this?

"In November [1900], Reed sought further proof in an isolated spot outside Havana he called Camp Lazear. Paid volunteers were isolated in separate buildings. One contained 'fomites' from yellow fever patients... The other building was sterilized, but contained infected mosquitos that bit volunteers."

Why did this treatment work, back in 1878?

"In New Orleans, the city's Medical and Surgical Association argued for improved drainage and sanitary measures to quell future yellow fever outbreaks."

Which postulate is this?

"Subsequent efforts to eliminate mosquitos in Havana resulted in the near immediate cessation of the disease that had long plagued the city."