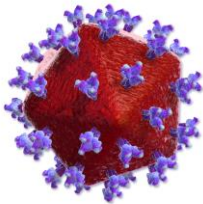


Diseases and Ecosystem Disruption

Diseases, cont.

- Prions
 - Misfolded proteins that are infectious
 - Examples
 - Mad cow disease
 - Creutzfeldt-Jakob Disease
 - Kuru
 - Cannibalism background in New Guinea!
- Dinoflagellates
 - Pfiesteria
- Fungus
 - Athlete's foot in humans
 - Dutch elm disease in trees

What HIV looks like



Human Immunodeficiency Virus (HIV)

Diseases

- Viruses
 - Nonliving, small infectious agent that are replicated inside the living cells of other organisms
 - Vaccinations for prevention
 - Anti-viral drugs for treatment (though no cure!)
- Bacteria
 - Microscopic prokaryotes (no nucleus in cell)
 - Most are beneficial or neutral
 - Some are infectious (cause disease and are transmittable)
 - Some may be treated through antibiotics
 - Problem: antibiotic resistance
 - MRSA, tuberculosis

AIDS

- Caused by the Human Immunodeficiency Virus (HIV)
- Attacks the body's immune system
- If left untreated, a person's immune system will eventually be completely destroyed
- HIV is often transmitted through unsafe sex or sharing needles through drug use
- Antiretroviral drugs are now available so people with HIV can live a normal, healthy life

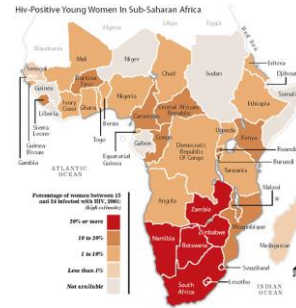
Interesting tidbit about HIV

- Receptors attach to helper T cells which are part of the immune system
- 10% of European populations are resistant to HIV
 - WHY?
 - A genetic mutation prevents the virus from entering the cells of the mutation
 - HOW?
 - This mutation became more common approximately 700 years ago during the same time the Black Death swept into Europe
 - WHAT?
 - Black death was the result of *Y. pestis* infections which spread throughout Europe and caused a significant decline in European populations

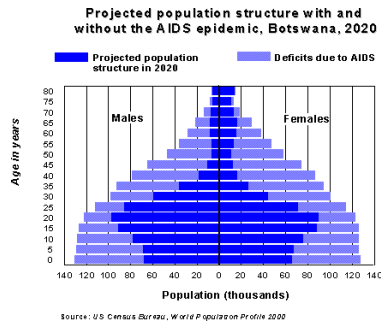
AIDS and Human Populations

- Approximately 36.7 million people worldwide living with HIV/AIDS
- 69% of those infected worldwide live in sub-Saharan Africa
- 91% of the world's HIV-positive children live in Africa
- Lack of access to prevention, care, and treatment in poorer countries

AIDS and Human Population



AIDS and Human Population



Influenza

- Viral infection
- Mutates into different strains frequently
- Vaccinations are available, but not always effective
- Spanish flu
 - 1918 influenza pandemic
 - H1N1 virus (also caused a pandemic in 2009)
 - Infected over 500 million people during World War I
 - 50 to 100 million people died
 - Life expectancy in the US dropped by about 12 years in the first year of the pandemic

Influenza: Think-Pair-Share

- Why was the 1918 Spanish flu pandemic more severe than the 2009 H1N1 pandemic?

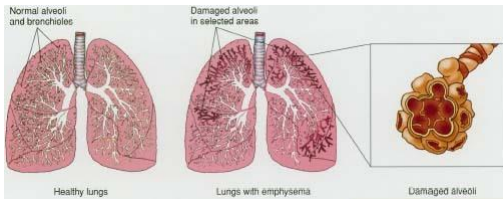
(both were caused by the same variant of the flu virus – H1N1)

What's different????

Tuberculosis

- Infectious disease caused by a bacterium
- Generally affects the lungs
- Also known as consumption
- Spread through coughing, spitting, speaking, or sneezing
- One-third of the world's population is infected with tuberculosis
- Most deaths occur in poorer countries
- More common in close living situations
 - Prisons

Tuberculosis and Lung Tissue

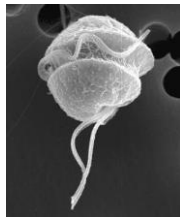


Tuberculosis Treatment

- Treatment through antibiotics
 - Problem: antibiotic resistance
 - Reason: people who are prescribed antibiotics do not finish the full treatment
 - Outcome: weaker bacteria die while strong tuberculosis bacteria survive and reproduce → then go on to infect other individuals

Problem in the sea

- Pfiesteria
 - Also called the red tide
 - Heterotrophic dinoflagellates “bloom”
 - Toxin released by dinoflagellate paralyzes the respiratory system of fish
 - Pfiesteria then feed on tissue of its dead prey
 - Discovered off the coast of North Carolina



Pfiesteria and Red Tide



Plant problems

- Dutch elm disease
 - Caused by fungus
 - Affects elm trees and is spread by the elm bark beetle
 - Disease originated from Asia
 - Native populations of elm trees were not resistant to the disease and died
 - Branch death of infected trees

