Influenza

Name(s)

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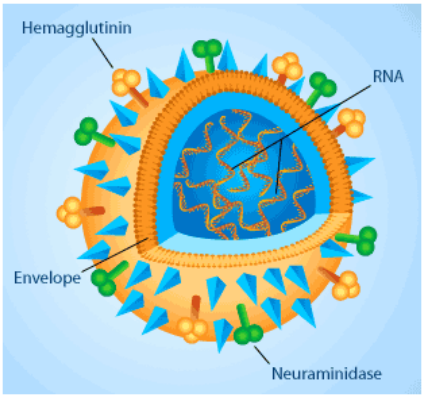

Type of Virus

- helical and sometimes filamentous virus (Orthomyxovirudae family)

- lipid membrane envelope with protein spikes

Description/Statistics

- in USA, thousands die every year from influenza

- deaths range from ~3,000-49,000 ( )

- three type of influenza ( )

- strains are typed based on two outer membrane proteins
  - Hemagglutinin (functions in attachment to host cells)
  - Neuraminidase ( )

  - example: H1N1 (2009-2010 and 1918 Spanish Flu epidemics)

Outbreaks/Epidemics

- seasonal epidemics every year around the world (typically during cold months) in temperate climates

- flu can be year round in tropical regions

- severe worldwide epidemics = _____

- four major pandemics in 20th century

	Estimated Deaths
- Spanish Flu (1918–1920)	20 -100 million
- Asian Flu (1957–1958)	> 1 million
- Hong Kong Flu (1968–1969)	~ 1 million
- H1N1 Flu Pandemic (2009–2010)	~18,000 -280,000

- typically those most at risk of death are the very young ( ), older adults ( ), and those with preexisting medical conditions (e.g. asthma, heart disease, diabetes, HIV)

Transmission

- airborne transmission (sneezing, coughing produces droplets travel up to 6 feet!)

- cover cough/sneeze (use tissue or shirt sleeve)

- touching contaminated objects ( ) then touching face ( )

Symptoms

- symptoms develop 1 to 3 days after infection

- rapid onset of symptoms is typical (~30% of infected people are asymptomatic!)

- infectious up to 7 days after symptoms appear

- Fever* or feeling feverish/chills
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- Sore throat
- Runny or stuffy nose
- Muscle or body aches
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- Fatigue (tiredness)
- Some people may have vomiting and diarrhea, though this is more common in children than adults.

** It's important to note that not everyone with flu will have a fever.*

- (CDC website)

Prevention/Treatment

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- disinfectants are effective (alcohol sanitizers, bleach, detergents etc.)

- vaccines commonly used; generally very effective

- vaccines contain 3-4 types of flu viruses (the strains that are predicted for that season)

- injected vaccine made from inactivated viruses or pieces of viruses

- nasal vaccine is made from live, weakened viruses ( )

- antiviral drugs specific for influenza are effective but should not be used like antibiotics WHY?

- let your immune system deal with it ( )

Controversy/Problems

- flu vaccines are very safe despite what anti-vaccine groups say

- stomach flu is not influenza; it is some type of food poisoning ( )

Spanish Flu: 1918 (and 1919) Influenza Epidemic

- despite name, it did not originate in Spain or have to do with Hispanics

- during WWI, information in Great Britain, France, Germany, and US was limited due to wartime censorship

- Spain freely reported information about the illness so people believed Spain was hit hardest by this influenza

- actual origin may have been France!

- ~500 million infected)

- 50-100 million died! ( )

- in this epidemic, the children and older adults ( ) were **more likely to survive** infection

- young adults ( ) were more likely to die!
    - average life span in 1918 in US was 53 years for men and 54 years for women

- a stronger immune system and immune response appear to have been what killed people

- apparently this particular strain ( ) caused a severe immune response (over reaction) in healthy people ( )
    - cytokines are chemicals produced by the body to enhance the immune response

- the severe immune response caused damage to the lungs; they filled with fluid and people suffocated and drowned!

- viruses mutate at a regular rate is called: _____
    - this is why flu shots are needed regularly

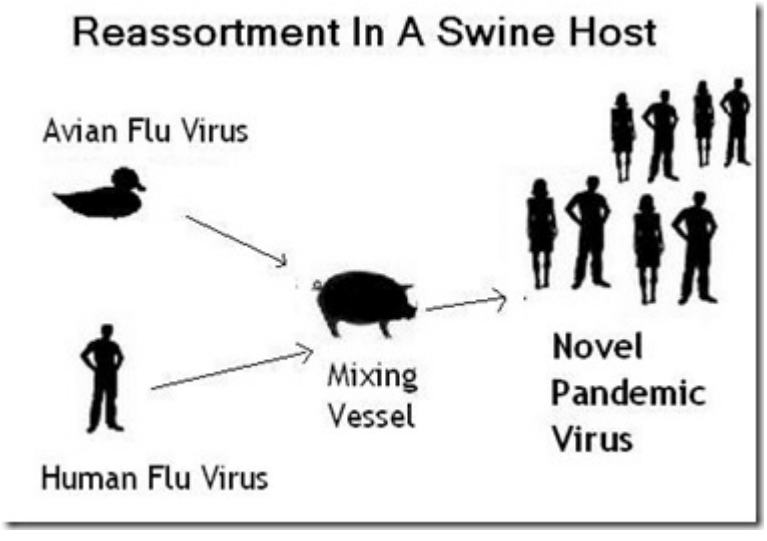
- a radical rearrangement of the viral genome is called: _____

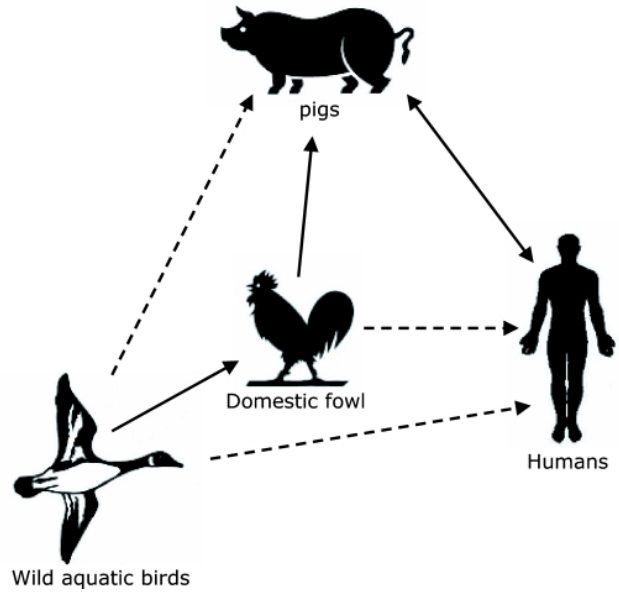
- influenza viruses are somewhat “promiscuous”; they can infect different animal hosts ( )

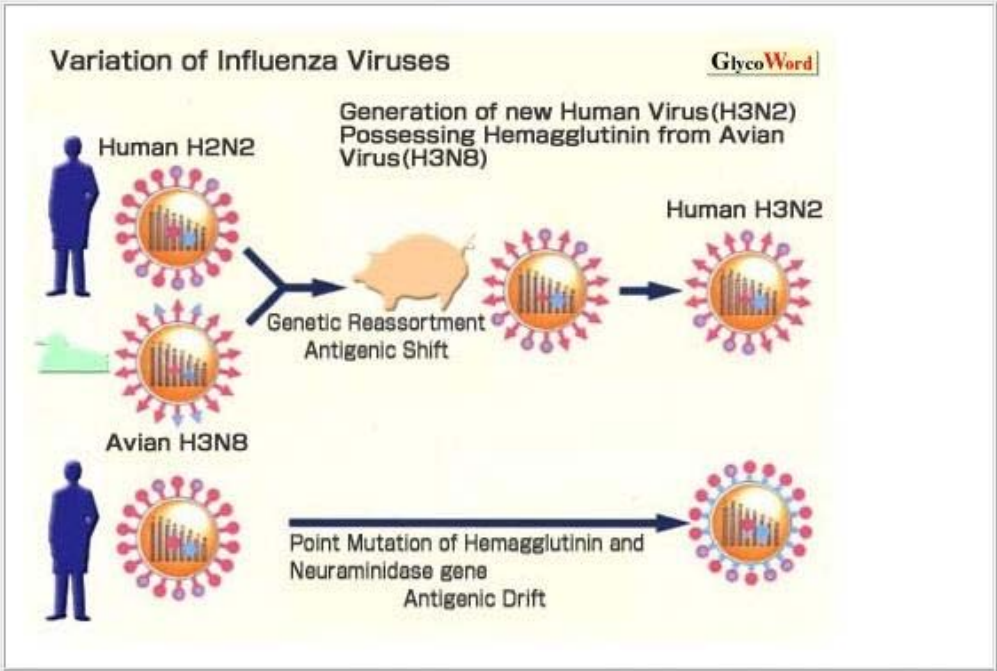
- wherever humans live in close proximity to chickens, ducks, and pigs there is a risk for genetic shift ( )

- when an animal is co-infected with multiple influenza viruses, they can “exchange” genes and create new genomes

- this is how deadly influenza viruses are created!







ตัวอย่างกระบวนการ antigenic shift (บน) ระหว่างคนและสัตว์ปีก ทำให้เกิดไวรัสสายพันธุ์ใหม่ ซึ่งมีความเป็นไปได้ที่ทำให้สุกรสามารถติดเชื้อได้

Study Objectives

1. **What kind of virus is Influenza?**
2. **What age groups typically die with seasonal flu? With Spanish Flu?**
3. **What is there a difference in mortality rates for seasonal flu and Spanish flu?**
4. **How many influenza pandemics have occurred in the 20th century? Name them.**
5. **Describe how influenza is transmitted?**
6. **Describe the typical symptoms of influenza. What was different about the Spanish flu?**
7. **How long does it take for symptoms to occur? How long is someone infectious?**
8. **Describe how influenza is transmitted.**
9. **Describe how to prevent the transmission of influenza.**
10. **Describe how influenza can be treated.**
11. **Compare and contrast antigenic drift with antigenic shift.**
12. **Define pandemic.**
13. **What is the function of cytokines in the body?**