



Respiratory System

1) A pharmaceutical scientist discovers a new drug that can inhibit the binding of the influenza virus to respiratory epithelial cells in subjects. Which of the following proteins is most likely being targeted with this drug?

- A) gp41
- B) Hemagglutinin
- C) gp120
- D) sialic acid
- E) Neuraminidase

Correct answer =
B) Hemagglutinin

2) A patient presents to the primary care clinic for a routine wellness visit in October. As part of the visit, he is administered an intramuscular influenza vaccine. Which of the following best describes the type of vaccination this patient received?

- A) Subunit vaccine
- B) Live attenuated vaccine
- C) Messenger RNA vaccine
- D) Inactivated vaccine

Correct answer =
D) Inactivated vaccine

3) A patient presenting to the emergency department with fever, headache, myalgia, and runny nose is found to have influenza. Which of the following best describes the viral characteristics of this pathogen?

- A) Single-stranded DNA
- B) Negative-sense, single-stranded RNA
- C) Positive-sense, single-stranded RNA
- D) Double-stranded RNA
- E) Double-stranded DNA

Correct answer = B) Negative-sense, single-stranded RNA



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4) A team of researchers is attempting to develop a new pharmacotherapy for the treatment of respiratory infections. Pathogen X, as identified by the researchers, is introduced to an in vitro model consisting of human nasopharyngeal epithelial cells grown within a culture container. Pathogen X is found to produce an enzyme that binds sialic acid residues on the surface of nasopharyngeal epithelial cells. This enzyme allows pathogen X to subsequently enter the epithelial cells. Clinically, pathogen X causes symptoms including shortness of breath, fevers, myalgias, and joint pain. Furthermore, infection by pathogen X can predispose patients to subsequent infection by *Staphylococcus aureus*. Which of the following is the most likely identity of pathogen X?

Correct answer =
=Influenza virus

- A) *Mycoplasma pneumoniae*
- B) Influenza virus
- C) *Legionella pneumophila*
- D) Cytomegalovirus
- E) *Streptococcus pneumoniae*

5) An epidemiologist is studying major influenza outbreaks over the past century. In particular, the epidemiologist is investigating the 2009 worldwide outbreak of H1N1 influenza. Which of the following genetic events was the most likely cause of that outbreak?

Correct answer =
B) RNA segment reassortment

- A) Point mutation in neuraminidase
- B) RNA segment reassortment
- C) Point mutation in hemagglutinin
- D) Nonsense mutation in neuraminidase
- E) Missense mutation in hemagglutinin