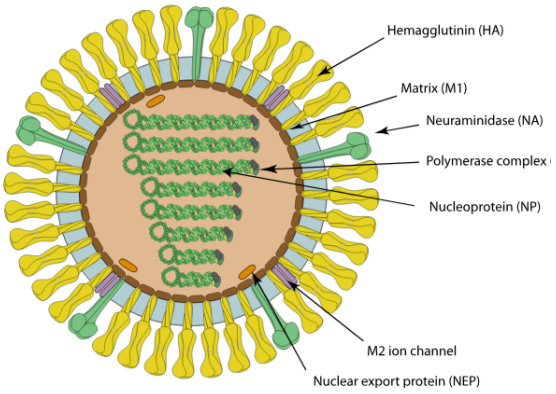
Student Pre-Activity Assessment of Flu Fighters Activity

I. For each of the following statements, indicate if the statement is correct or incorrect. If the statement is incorrect, explain why in 1-2 sentences.

a. All viral genes/proteins (Figure below: H1N1 virion and proteins) may be used to design a vaccine against influenza infections.



Credit:ViralZone

b. In humans, a vaccine cannot protect against an influenza infection.

c. Mutations may not impact the effectiveness of influenza vaccines.

II. Multiple Choice

i. Which of the following best describes the central dogma of molecular biology?

a) DNA -> RNA -> Protein
b) Protein -> RNA -> DNA
c) RNA -> DNA -> Protein
d) DNA -> Protein -> RNA

ii. Which of the following is the correct description of a codon?

a) A sequence of three nucleotides in tRNA that pairs with the mRNA codon
b) A sequence of three nucleotides in mRNA that specifies a particular amino acid
c) A sequence of amino acids in a protein that determines its function
d) A sequence of nucleotides in DNA that codes for a tRNA molecule

iv. Which level of protein structure is defined by the sequence of amino acids in the polypeptide chain?

a) Primary structure
b) Secondary structure
c) Tertiary structure
d) Quaternary structure

iii. Which of the following is true about Influenza vaccines:

a) Influenza is caused by bacteria
b) Influenza viruses are never involved in epidemics
c) Minor changes in the surface antigens of influenza viruses may occur every year
d) The burden of influenza disease is mostly in children

iv. Which of the following is true about Influenza vaccines:

a) Influenza vaccines must be given annually
b) Influenza vaccines must be given once in a lifetime
c) Most of the vaccines are prepared from bacteria grown in embryonated hens' eggs

iv. Which of the following is the most specific characteristic of the adaptive immune system?

a) Antibodies
b) Antigens
c) A small a foreign substance
d) A big carbohydrate molecule

v. Which of the following is true about the adaptive immune response?

a) It is similar to the innate immune response
b) It happens immediately after viral infections
c) It is composed of humoral and cellular responses
d) It is only present in insects

vi. What is herd immunity?

a) The number of disease-fighting white blood cells in a person
b) The protection the whole population has against a disease because a threshold number of individuals are immune to the disease
c) Immunity in a herd of dogs
d) The number of people that opt out of getting vaccinations

III. Short-Answers

Using your knowledge of the central dogma, convert the nucleotide sequence into an mRNA, and the mRNA into a protein, naming each step of the process. You can refer to the codon chart on this page to help.

5′ A T G G C T G C T G T T G T C C A A C A G A A C G A C C T A 3′

1. Nucleotide to mRNA
   Name of the process: _____

2. mRNA to protein
   Name of the process: _____