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Quiz Title: MOA of mRNA COVID-19 Vaccines

1. True or False. The messenger RNA (mRNA) contained in the new mRNA-based COVID-19 vaccines carries the instructions to generate copies of the SARS-CoV-2 “spike protein”.

- A. True
- B. False

ANSWER: A. True

EXPLANATION: The Centers for Disease Control and Prevention (CDC) explains that the mRNA found in mRNA-based COVID-19 vaccines “can most easily be described as instructions for the cell on how to make a piece of the “spike protein” that is unique to SARS-CoV-2.

2. True or False. As a stable molecule, the mRNA in COVID-19 vaccines can easily enter the cells of the immune system at the vaccination site.

- A. True
- B. False

ANSWER: B. False

EXPLANATION: As stated on the CDC website, the mRNA in COVID-19 vaccines requires a special coating that protects it from enzyme degradation and facilitates its entrance into dendritic cells and macrophages near the site of injection.

3. True or False. Since it contains only the portion of mRNA sufficient to generate a segment of the viral protein, the vaccine cannot cause COVID-19 infection.

- A. True
- B. False

ANSWER: A. True

EXPLANATION: The mRNA COVID-19 vaccine was created to generate only a portion of the viral protein sufficient to be antigenic, not the full SARS-CoV-2 virus. Therefore, according to the CDC, this vaccine is not considered harmful.

4. True or False. The mRNA in COVID-19 vaccines does not enter the nucleus of the immune cells and so cannot affect the cell genetic material.

- A. True
- B. False

ANSWER: A. True

EXPLANATION: Since RNA molecules do not enter a cell nucleus, the mRNA in COVID-19 vaccines is not able to alter the DNA of the immune cells in which it enters. In addition, the mRNA is degraded by the cell enzymes after being used to synthesize the antigenic portion of the virus spike protein. The CDC specifies that “this information helps counter misinformation about how mRNA vaccines alter or modify someone’s genetic makeup.”

5. True or False. As an antigen, the portion of the COVID-19 spike protein is expressed on the surface of immune cells, preparing the immune system to fight the COVID-19 infection.

- A. True
- B. False

ANSWER: A. True

EXPLANATION: The protein (antigen) generated through the mRNA is displayed on the cell surface, causing the immune system to start producing antibodies specific to SARS-CoV-2, and activating T-cells to fight off the virus in case of infection.

This quiz is based on:

Centers for Disease Control and Prevention (CDC). Understanding and explaining mRNA COVID-19 vaccines. March 18, 2021. Accessed March 31, 2021. Available at: <https://www.cdc.gov/vaccines/covid-19/hcp/mrna-vaccine-basics.html>