

1. What is the function of the mRNA in the SARS-CoV-2 vaccine?
 - a. It teaches the muscle cells to make antibodies against the virus.
 - b. It instructs muscle cells and dendritic cells to make SARS-CoV-2 spike proteins.
 - c. It protects the lipid nanoparticles from being degraded by enzymes found in the body.

2. What is the function(s) of the lipid nanoparticles in the SARS-CoV-2 vaccine?
 - a. They protect the mRNA inside from being degraded by enzymes in the body.
 - b. They instruct the muscle cell to make antibodies against the virus.
 - c. They protect the mRNA inside from being toxic to the body.
 - d. They enable the mRNA inside to enter muscle cells and dendritic cells.

3. Viral peptides bound to MHC-I molecules is needed to activate what cells?
 - a. naive T4-lymphocytes
 - b. dendritic cells
 - c. naive T8-lymphocytes
 - d. naive B-lymphocytes

4. Viral peptides bound to MHC-II molecules are needed to activate what cells?
 - a. naive T4-lymphocytes
 - b. dendritic cells
 - c. naive T8-lymphocytes
 - d. naive B-lymphocytes

5. Muscle cells translate the mRNA contained in the vaccine into antigenic SARS-CoV-2 spike proteins that the cell attaches to its plasma membrane, as well as secretes.
 - a. true
 - b. false

6. Muscle cells are able to do which of the following?
 - a. Place viral peptide bound to MHC-II molecules on its surface.
 - b. Place viral peptide bound to MHC-I molecules on its surface.
 - c. Place viral peptides bound to both MHC-I and MHC-II molecules on its surface.

7. Dendritic cells that have taken up the viral mRNA contained in the vaccine as well as viral spike protein by way of endocytosis are able to do which of the following?
 - a. Place viral peptide bound to MHC-I molecules on its surface.
 - b. Place viral peptide bound to MHC-II molecules on its surface.
 - c. Place viral peptides bound to both MHC-I and MHC-II molecules on its surface.

8. Antigen-presenting dendritic cells are required to activate what cells?
 - a. Naive B-lymphocytes
 - b. Naive T4-lymphocytes

- c. Naive T8-lymphocytes
- d. Both naive T4-lymphocytes and naive T8-lymphocytes

9. How do antibodies made against SARS-CoV-2 protect the body?

- a. They bind to the spike proteins of SARS-CoV-2 and block it from binding to ACE-2 enzyme on human cells.
- b. They bind to the ACE-2 enzyme of SARS-CoV-2 and block it from binding to spike proteins on human cells.
- c. They bind to SARS-CoV-2 infected cells and kill them through apoptosis.

10. What is the function of effector T4-helper lymphocytes in protection against SARS-CoV-2?

- a. They bind to viral peptide bound to MHC-II molecules on virus-infected cells and kill them through apoptosis.
- b. They bind to the spike proteins of SARS-CoV-2 and block it from binding to ACE-2 enzyme on human cells.
- c. They secrete a variety of cytokines that are needed to regulate the immune responses against the virus.

11. What is the role of cytotoxic T-lymphocytes (CTLs) in protecting against SARS-CoV-2 infection?

- a. They bind to the spike proteins of SARS-CoV-2 and block it from binding to ACE-2 enzyme on human cells.
- b. They bind to viral peptide/MHC-I complexes on the surface of virus-infected cells and kill them through apoptosis.
- c. They bind to viral peptide/MHC-II complexes on the surface of virus-infected cells and kill them with cytokines.

12. How are mRNA vaccines for SARS-CoV-2 delivered into human cells?

- a. mRNA coding for spike protein is delivered into cells using a modified SARS-CoV-2 virus.
- b. mRNA coding for spike protein is delivered into cells using lipid nanoparticles.
- c. mRNA coding for spike protein is delivered into cells using a modified adenovirus.

13. How is the DNA used in SARS-CoV-2 vaccines delivered into human cells?

- a. mRNA coding for spike protein is delivered into cells using a modified SARS-CoV-2 virus.
- b. mRNA coding for spike protein is delivered into cells using lipid nanoparticles.
- c. mRNA coding for spike protein is delivered into cells using a modified adenovirus.