# mRNA COVID-19 VACCINES AND YOUR IMMUNE SYSTEM



## How does the virus that causes **COVID-19 infect a person?**

SARS-CoV-2 is the virus that causes COVID-19.1

#### **SARS-CoV-2 Virus Structure:**



RNA: Carries the genetic information for the virus.2

Spike protein:
A fatty layer (lipids) protects viral RNA. Spike proteins are on the fatty layer.2

- The virus is breathed in through air that contains the virus.3 The virus attaches to cells in your airway using spike proteins.2
  - RNA from the virus enters your cell, creating an infected cell<sup>2</sup>
  - Then the virus creates more copies of itself.2
- Viruses are released and go infect other cells in the body.<sup>2</sup>

### How do mRNA COVID-19 vaccines work?

mRNA COVID-19 vaccines **train** your immune system to recognize and help fight against the COVID-19 virus.4

#### **Vaccine Structure:**

The vaccine cannot give you COVID-19. The vaccine does not contain the live virus that causes COVID-19. The mRNA vaccine ingredients include:4,5



The vaccine

Spike protein mRNA: MRNA that has instructions for making spike proteins.⁵

Lipids (fat): Reprotect vaccine RNA and help mRNA enter cells.5,6



Lipids help the spike protein mRNA enter vour cell.4,5



The mRNA creates spike proteins.⁴



The immune system recognizes the spike protein as foreign and triggers an immune response.4,7



Your body has now learned to recognize and help fight against future encounters with the virus that causes COVID-19.4,7



Visit covid19pfizer.com to receive information on COVID-19 and a vaccine option from Pfizer and BioNTech, and to learn how you can help protect vourself and those you take care of.



visit:

To learn more, References: 1. CDC. About COVID-19. Updated July 2023. Accessed October 2023. https://www.cdc.gov/coronavirus/2019-ncov/your-health/about-covid-19.html 2. Jackson C, Farzan M, Chen B, Choe H. Mechanisms of SARS-CoV-2 entry into cells. Nat Rev Mol Cell Biol. 2022;23:3-20. doi: 10.1038/s41580-021-00418-x 3. EPA. Indoor Air and Coronavirus (COVID-19), Updated June 2023. Accessed October 2023. https://www.epa.gov/coronavirus/indoor-air-and-coronaviruscovid-19 4. CDC. Understanding How COVID-19 Vaccines Work. Updated September 2023. Accessed October 2023. https://www.cdc.gov/coronavirus/2019-ncov/vaccines/different-vaccines/how-they-work.html 5. CDC. Overview of COVID-19 Vaccines. Updated September 2023. Accessed October 2023. https://www.cdc.gov/coronavirus/2019-ncov/vaccines/different-vaccines/overview-COVID-19-vaccines.html 6. Hald Albertsen C, Kulkarni JA, Witzigmann D, Lind M, Petersson K, Simonsen JB. The role of lipid components in lipid nanoparticles for vaccines and gene therapy. Adv Drug Deliv Rev. 2022;188:114416. doi: 10.1016/j.addr.2022.114416 7. MedlinePlus. What are mRNA vaccines and how do they work? Updated November 2022. Accessed October 2023. https://medlineplus.gov/genetics/understanding/therapy/mrnavaccines/