



## COVID-19 VACCINES

This month we witnessed the historic approval of two vaccines, which are effective in preventing humans from getting the COVID-19 disease. 70,000 vaccine doses were given to test effectiveness and track for safety prior to approval. This data is substantially more than many medicines have when they are released for use.<sup>1</sup> Both vaccines have been tested on a broad range of ages and ethnicities, including more than 20% of test subjects being 65 years of age or older. Men and women participated about equally in the clinical trials. Neither of the approved vaccines have egg products, preservatives, or latex in them. The side effects are also similar: 1) pain, swelling, and redness in the injected arm, and 2) chills, fever, and headache a day or two after the injection (evidence that the immune system is responding to the vaccine). The Pfizer-BioNTec vaccine is given in 2 doses, 21 days apart. The Moderna vaccine also requires 2 doses, but they are given 28 days apart. Both use lipid nano<sup>2</sup>

### How do they work?

The point of vaccines is to expose the body to “virtual” bacteria or viruses, so that the body can develop immunity to the microorganism. Then when you are exposed to the real infectious agent, your body already knows how to kill it. Getting a vaccine is basically a training exercise in how to fight an infectious agent. The two new vaccines both go about exposing the body to a simulated case of COVID-19 by using messenger RNA (mRNA). Normally mRNA brings instructions to your cells to create proteins. Once the message is delivered, the mRNA dissolves. Both vaccines use synthetic mRNA to tell your body to make a viral spike like the one on the SARS-CoV-19 virus. This stimulates the body’s immune system to make antibodies to fight the virus. Since this isn’t the real virus, you don’t get COVID-19. but your body has learned how to destroy the virus. Then if you are exposed to the real virus, your body immediately responds and destroys the virus before it can make you sick.

### Why are they available so quickly?:

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<sup>1</sup> Shane Crotty, PhD, <https://www.youtube.com/watch?v=eK0C5tFHze8>

<sup>2</sup> Pfizer-BioNTec <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/different-vaccines/Pfizer-BioNTech.html>;  
Moderna <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/different-vaccines/Moderna.html>

Research into using mRNA to create vaccines has been going on for about 30 years. Pfizer and Moderna had platforms that could theoretically be used to create any vaccine by simply inserting the right mRNA sequence for a disease. Once the DNA of the SARS-CoV-19 virus was analyzed, scientists began working to create a synthetic mRNA that would focus on the spike protein from the SARS-CoV-19 virus. Research on other corona viruses had already revealed that the spike protein was the key to infection.<sup>3</sup> These key areas of previous research allowed both vaccines to be developed more quickly than was possible in the past.

Other factors also played a role in the speed with which these vaccines were produced and approved:

- The basic manufacturing process for mRNA vaccines is consistent. Thus, there are fewer steps for the FDA to approve than have been seen in older vaccines. Fewer approval steps means that development can proceed more quickly.
- Vaccine safety data from the past showed that if a vaccine was consistently safe during two months of widespread testing, then no long-term problems ever developed. Consequently, the FDA did not require years of testing.
- A large amount of money was given to companies, which helped them to complete their research, create and test their vaccine, and ultimately distribute these two vaccines.<sup>4</sup>

### **When can I be vaccinated?**

No one knows exactly when there will be enough vaccine available for everyone in to be vaccinated. The CDC has the following recommendations to prioritize distribution:

- Phase 1a: Healthcare personnel and residents of long-term care facilities
- Phase 1b: Frontline essential workers and people aged 75 or older
- Phase 1c: People aged 65-74, people 16-64 with underlying medical conditions, and workers who are considered essential but not frontline workers
- New recommendations to include more groups will be issued as vaccine availability increases.<sup>5</sup>

As of today, one knows when there will be enough of the vaccines available for everyone who wants to be vaccinated to do so. While we wait, it is important to wear masks around people not in your household and observe social distancing. These simple steps protect our friends, families, and ourselves.

*Let us not become weary in doing good, for at the proper time we will reap a harvest if we do not give up. Galatians 6:0*

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<sup>3</sup> Komaroff, Anthony, MD; *Why are mRNA vaccines so exciting?*; <https://www.health.harvard.edu/blog/why-are-mrna-vaccines-so-exciting-2020121021599>

<sup>4</sup> Shane Crotty, PhD, <https://www.youtube.com/watch?v=eK0C5tFHze8>

<sup>5</sup> <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/recommendations.html>