

# VACCINES:

## WHY DO WE NEED THEM AND HOW DO THEY WORK?

Vaccines are one of the most important tools available to prevent infectious diseases, and they have saved hundreds of thousands of lives over the past century by preventing measles, pneumonia, meningitis and many other diseases that most people living today have never experienced. Even though vaccines are commonly used, many people still have concerns about their use. There are also many questions about how vaccines work. Here are a few key points about vaccines and about the COVID-19 vaccines in particular:

- 1)** Vaccines all have one goal: to prevent disease (sickness). The Pfizer and Moderna vaccines for COVID-19 reduce disease by about 95%.
- 2)** Some vaccines can also prevent transmission (spreading of the germ to others). We still do not know if the COVID-19 vaccines will prevent transmission.
- 3)** Vaccines work by “educating” your immune system (infection fighting cells in your body) on what to do if the particular germ gets into your body... like a fire drill for your immune system. Some vaccines require more than one dose before the immune system really knows how to protect you from the real germ.
- 4)** There are different types of COVID-19 vaccines in development, but they all work in the same basic way: to show the COVID-19 Spike protein to our immune system so it can fight it when it sees it again. The Spike protein is the major protein on the surface of the virus that allows the virus to get into our cells. We now know that by educating our immune system about the Spike protein, we are able to prevent COVID-19 sickness.
- 5)** The COVID-19 vaccines that are expected to be available soon (or are already available) can be grouped into three different types:
  - a.** mRNA vaccines (for example, Moderna and Pfizer)... these vaccines provide the recipe for the Spike protein so our body can make it inside our own cells and then use it to educate our immune system. This type of vaccine has been in development for over a decade for other viruses and some cancers.
  - b.** Adenovirus vaccines (for example, J&J and AstraZeneca)... these vaccines use a “common cold” virus that has the COVID-19 Spike protein in it to educate our immune system. This type of vaccine has been used to prevent Ebola and studied as a possible HIV vaccine.
  - c.** Protein vaccines (for example, NovaVax)... these vaccines use purified Spike protein itself to educate our immune system. This type of vaccine is like the Hepatitis B vaccine we currently use in the United States.
- 6)** All of the currently available COVID-19 vaccines are given by injection (shot) into the muscle of the upper arm. Other vaccines are being developed that can be given in other ways, such as nose spray.
- 7)** Side effects of the available COVID-19 vaccines are similar to what people experience after getting a flu shot: people who get the vaccines may have fatigue (feel very tired), headache and low-grade fever (and maybe chills) for a day or two after getting the vaccine. This is expected because this is the body’s normal immune response to germs.
- 8)** The COVID-19 vaccines will not give you the virus. They do not contain the SARS-CoV2 virus itself, only the the recipe to make the Spike protein.
- 9)** While many people are concerned that the COVID-19 vaccines have been manufactured and tested in less than one year, no short-cuts were taken with the production of the vaccines or the studies that show safety and effectiveness. The paperwork burden was reduced to allow these life-saving vaccines to be available quickly AND safely. The long-term safety profile for all COVID-19 vaccines is a continued focus of ongoing research. Other vaccines made by the same methods (mRNA, adenovirus and protein) have no known long-term safety issues.
- 10)** Should people who have had COVID-19 already get the vaccine? Yes, the vaccine actually educates the immune system more effectively than COVID-19 virus infection.

