The current Pfizer and Moderna vaccines have a higher rate of side effects than other vaccines because they are reactogenic. This is considered good because it means the body is creating an aggressive response. Side effects include pain and swelling at the injection site, as well as systemic symptoms like fatigue, headache, muscle pain, joint pain, chills, nausea, vomiting, and fever. These effects generally appear within 48 hours.

mRNA is otherwise known as messenger RNA. It is a genetic material that contains instructions that make proteins. mRNA vaccines for COVID-19 contain synthetic mRNA. Inside the body, the mRNA enters human cells and instructs them to produce the "spike" protein found on the surface of SARS-CoV-2, the virus that causes COVID-19. The body recognizes the spike protein as an invader and produces antibodies against it. If the antibodies later encounter the actual virus, they are ready to recognize and destroy it before it causes illness.

The m-RNA vaccine creates T-cell activity. What are T-cells? T-cells are white blood cells that are especially important to the immune system – they go out find and fight disease within the body. They play a crucial role in adaptive immunity. Adaptive immunities function is to destroy invading pathogens and any molecules associated with that pathogen within the body. Since it is responsive, the point is to seek out only foreign molecules, not the body itself.

The t-cell's lead to longer lasting protection than B-cells. What are B-cells? They are largely involved in the body's response to foreign invaders through humoral immunity. Humoral immunity is also called antibody-mediated immunity. Together helper T-cells the B-cells produce antibodies against a specific antigen. The humoral immune system deals with antigens from pathogens outside of infected cells. Together helper T-cells and B-cells make antibodies and killer cells to develop. Killer T-cells directly kill cells that have already been infected by a foreign invader. T-cells can send out a chemical response or instruction to the immune system to ramp up a response!

* Info found @ Google.com