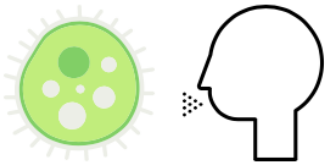
How Do Vaccines Work?

The Immune System

Before we begin diving into all-things vaccines, it is helpful to first know our body's natural defenses against germs and diseases: The immune system. It contains specialized organs, cells and tissues that help us fight against disease and infection.



(Piktochart, 2020)

What happens when a germ or a foreign agent enters our body?

We have special immune cells that are able to recognize that this germ is not natural to our body, in other words, it is foreign. When this recognition occurs, our immune system is signaled to make special proteins to help destroy the germ. These proteins are called antibodies. However, it can take some time for our body to create these proteins and fight against it, so during this window period, we experience symptoms like fever, aches, pains, and tiredness (TED-Ed, 2016). These symptoms are actually an indicator that our immune system is preparing its attack against the germ! Once the germ is destroyed, we not only begin to feel better, but our immune system will actually *remember* this germ that got us sick, which will help it destroy the germ even quicker if we ever encounter it again. This is why you may hear that the immune system has a "memory"

Vaccines

Now, how do vaccines fit into this? Vaccines are developed to take advantage of our immune system's capacity for memory. More specifically, vaccines boost our immune system's ability to recognize viruses faster, so they we can destroy it before it makes us feel sick. There are different types of vaccines, but the common theme to them is that they all present elements or pieces of a virus for our immune system to "remember" so that it can prepare its defense in case we ever encounter it in the future (CDC, 2021).

A common concern is around the fact that vaccines introduce parts of a virus into our body (depending on the vaccine type), which may seem paradoxical to the purpose of vaccines, which is to prevent infection from viruses. But the key point is that these are pieces of a virus, which means that on their own, they are harmless. Some vaccines may contain a live virus called a vector vaccine, but they are different from the virus you are seeking protection from and contains

the genetic material of the virus of interest (CDC, 2021). This is another way of getting our immune system acquainted with parts of a virus, by using our own cells to make those pieces and allowing our immune system to develop a memory against it (CDC, 2021). The live virus is also weakened so that it won't cause an infection.

(Piktochart, 2020)

What Type are the COVID-19 Vaccines?

The two Canadian-approved vaccines for COVID-19 are the Pfizer vaccine and the Moderna vaccine. Both are mRNA vaccine types, which means it instructs our cells to make proteins belonging to the virus (CDC, 2021). Our immune system is then able to recognize these foreign parts and increases its defenses against the COVID-19 virus (CDC, 2021). Currently, the vaccines are administered in two doses: the first dose is to allow your immune system to mobilize a response, and the second dose is to confer long-lasting protection and immunity (CDC, 2021).

Fun fact: Researchers at the University of British Columbia helped Pfizer figure out how to formulate the mRNA vaccine (since mRNA is prone to degrading)!

Why do I feel sick after getting the vaccine?

Besides the sore spot on the arm, most people feel fine after getting the vaccine. For some, they may experience some under-the-weather feelings which may lead some to think they are sick. These are potential side effects of the vaccine and it is an indicator that it is working! Remember what our immune system does when it encounters something foreign? It mounts an immune response against it, so we may experience some symptoms and side effects during this time.

(Piktochart, 2020)

The most commonly reported side effects following administration of the COVID-19 vaccine are pain and swelling at the injection site, body chills, headache, feeling tired and feeling feverish (GC, 2021). Most reactions are temporary and will disappear in a few days. Older adults who are healthcare workers and are among the first to receive the vaccine, shared their vaccine experiences in terms of relief, pride, and progression. Furthermore, some evidence has shown

that older adults may experience fewer side effects due to a less active immune system. North Vancouver's 102-year-old former pilot recently received the COVID-19 vaccine, making her the oldest person on the North share to be vaccinated for COVID-19. She explains her courageous history and optimism around the vaccine. In addition, Elders in Cowichan Tribes report feeling gratitude and relief as they line up to the receive COVID-19 vaccine. As vaccine rollout continues, we are sure to hear more stories and experiences with the COVID-19 vaccine.

Vaccine Safety for Older Adults

Clinical trials, which tests for vaccine efficacy and safety in a large population, for both Moderna and Pfizer vaccines had many participants who were older adults. For the Moderna trial, of the 30,000 participants included, 7500 were adults aged 65 and older (Baden et al., 2021). For the Pfizer trial, almost 16,000 of the 37,000 participants were aged 55 and older (Polack et al., 2020). The side effects observed were minor, with older adults reporting fewer side effects than younger people. Vaccines were also found to be safe for older adults with other conditions such as asthma, diabetes and heart disease (Gregory, 2021). It is encouraged for older adults to voice any concerns they may have to their healthcare provider and vaccine administrator.

(Piktochart, 2020)

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