

Which is worse, the vaccine or the virus?

There seems to be some major misunderstanding or misconception about the COVID-19 vaccines.

To better understand these it may be worthwhile to first recognize that there are two ways to become immune to COVID-19:

1. by administration of a vaccine
2. by infection with the SARS-CoV-2 virus

Currently the vast majority of people in the United States are becoming immune to COVID-19 by one of these routes although there are some people who appear to have a feature in their immune system that inherently protects them from infection due to the presence of certain types of immune cells in the lining of their nostrils as the result of a particular mutation (Augusto, D.G., Murdolo, L.D., Chatzileontiadou, D.S.M. et al. A common allele of HLA is associated with asymptomatic SARS-CoV-2 infection. *Nature* 620, 128–136 (2023). <https://doi.org/10.1038/s41586-023-06331-x>). But if you are not one of these fortunate few you are very likely to be infected if you are not vaccinated.

So for most of us, we have two ways of developing immunity and both can cause some "side effects" meaning undesirable health effects. Let's compare those.

Common side effects of the vaccine:

1. some pain at the injection site
2. fatigue
3. body ache
4. fever
5. very rarely and only for an extremely small number of people: heart inflammation which usually subsides within a relatively brief time period

Usual duration: 24-48 hours but sometimes a few days; for most people these symptoms are relatively mild, but for a few they can last for up to a week and reduce your ability to function.

Common side effects of infection by the virus

1. fatigue
2. body ache
3. fever
4. diarrhea and/or vomiting
5. heart inflammation and other cardiovascular damage
6. loss of taste and smell
7. cognitive impairment
8. death

Usual duration: (except for #8) minimum 5 days up to a year or longer, some effects may be permanent (e.g., #8). For some people these symptoms are relatively mild but for most they are at least as severe as what is usually experienced with influenza which is rather unpleasant, and for a number of people, the effects are so severe they must be

given extreme medical care that can be very unpleasant and traumatic such as breathing assistance with a ventilator.

So, it seems clear that the side effects are very likely to be much worse for infection with the virus than for vaccination for most people. Let's dig a little deeper to see why that is so.

Let's consider the components of the vaccine and how they work. Keep in mind that both the vaccine and the virus trigger the immune system to develop the ability to destroy the virus and protect us from its damaging effects.

The vaccines have been designed by scientists using the best available scientific knowledge to optimize the ability of the vaccine to stimulate the immune system while being completely unable to cause an infection. The vaccine does this by mimicking just enough of the virus to trigger a strong immune response. The vaccine is designed to use as little of the components of the virus as possible so that the side effects are minimized. Indeed, the Moderna and Pfizer-Biontech vaccines use only one part of the virus function - it's called messenger-RNA. The shorter name is mRNA. When the virus infects a cell, it makes mRNA and it forces the cells to use that mRNA to make new parts of the virus. The complete virus consists of RNA, proteins, and lipids and is a much more complex structure than the vaccine. And, of course, it causes more "side effects" than the vaccine and those are much more severe and longer lasting, even fatal. The vaccine has been pared down to one functional component and designed to have maximum effectiveness for giving you immunity, with the smallest chance that it will cause serious side effects. That's due, in part, to the fact that it has only one component of the virus, mRNA. This vaccine, as are all vaccines, is based on the virus. It is not an entirely different type of agent. So, if you are afraid of the vaccine, you should be MUCH more afraid of the virus.

One could ask whether there may be long-term side effects of the vaccine. The only way to know for sure is to wait and see. But let's think about how the vaccine works and how the virus works. Notice that the vaccine is working more or less the same way that part of the virus works and contains some of the same types of components. So, if there are long-term side effects of the vaccine, there will likely be long-term side effects of the virus. However, there is a much greater chance that the virus will cause worse long-term side effects than the vaccine because the vaccine has been designed using the best available scientific knowledge to minimize the chance of such effects.

So, given all of this, you may not be surprised to know that I have had seven doses of the vaccines: the two doses required for the standard full vaccination regimen, and multiple boosters. I much preferred getting the majority of my immunity that way because it is much more likely to give me less severe, shorter duration side effects.

Yes, I was infected with SARS-CoV-2 twice and developed symptoms. However, I only felt badly for the first three days within five days I was back to normal. At 70+ years of age, I think it's likely I would have had a worse experience if I had not been vaccinated. I will continue to receive boosters as they become available and have and will receive vaccines that prevent other serious afflictions such as influenza, shingles, pneumonia, and tetanus, as well as others.