



## Vaccine Immune Response

With many COVID-19 vaccines being produced and tested around the world, billions of people will receive a vaccine in hopes of coming back to some sort of normalcy in their daily lives. It's important to understand the factors that can influence a person's response to vaccination. In addition, it's important to understand how to build immunity through a healthy lifestyle and how this can reduce the inflammatory collateral damage to the body.

Basically, vaccines are designed to help develop immunity by imitating an infection caused by an invading virus. There are currently 3 types of COVID-19 vaccines. One is an **mRNA vaccine** that contains "instructions" for our cells to make a harmless version of the virus. Another is a **protein subunit vaccine** that includes harmless proteins of the virus. Lastly, there is the **vector vaccine** that contains a weakened version of a live virus similar to the COVID-19 virus. All of these vaccines rely on the presumption that our immune systems will recognize and remember how to fight the virus. If we decide to get the vaccine, how can we help ourselves to get the best possible outcome?

Unfortunately, we may not have specific data related to factors that influence the COVID-19 vaccine for years. We can, however, look at our response to other viral vaccines such as influenza and possibly forecast the factors that may influence efficacy or any adverse effects. Intrinsic factors that can affect an

individual's response to vaccines are: age, sex, genetics, blood type, intestinal microbiota and comorbidities. While it is impossible to address each of these here, let's talk about a few of them. In the extreme ages of life (elderly and newborn) vaccine responses are generally diminished, of course, it depends on the vaccine itself. Females generally have a higher antibody response to vaccines (that is good) but can also experience more adverse reactions. Those battling comorbidities, such as diabetes mellitus 2 or cardiovascular disease can generally have a lower antibody response to vaccines. Some behavioral factors that can affect a person's response to vaccine are alcohol consumption, smoking, exercise, acute psychological stress, sleep deprivation and BMI (body mass index). While these are all pretty self-explanatory, it's worth noting that people who exercise regularly and get their vaccine in a well-rested state generally have a higher antibody response.

Lastly, it is worth noting that some of the key micronutrients and vitamins that help to protect our immune system are vitamin c, zinc, N-acetylcysteine (NAC), quercetin, selenium, vitamin D and probiotics. A 2018 study found that various strains of probiotics can actually increase the efficacy of 17 different vaccines! You don't have to take all of these supplements, just pick a couple of them and start there. I think a high-quality probiotic and vitamin D are a great place to start.

## IMPROVE YOUR HEALTH... IMPROVE YOUR LIFE!



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