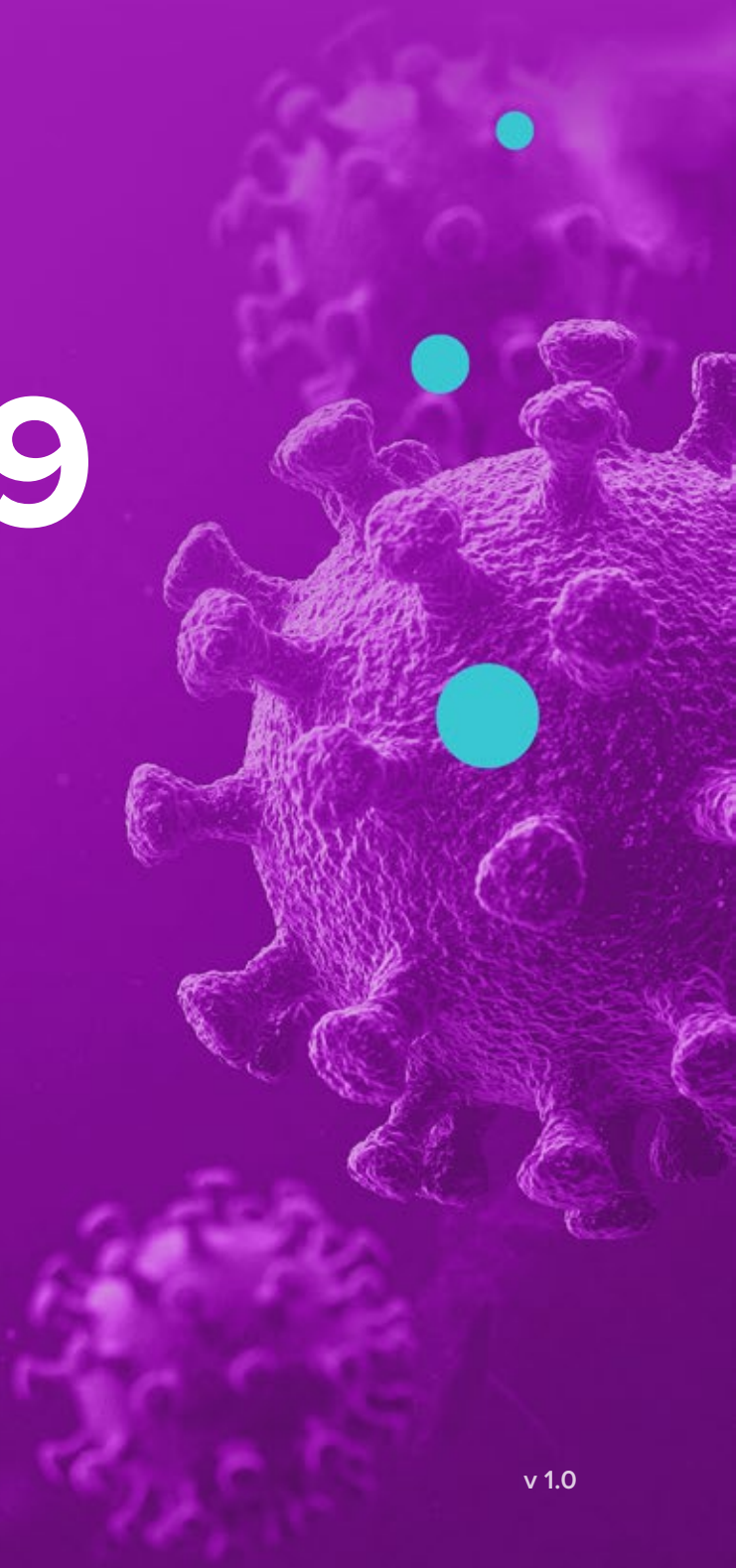
E-BOOK

Fighting COVID-19

The Ultimate Supplement & Gene Guide



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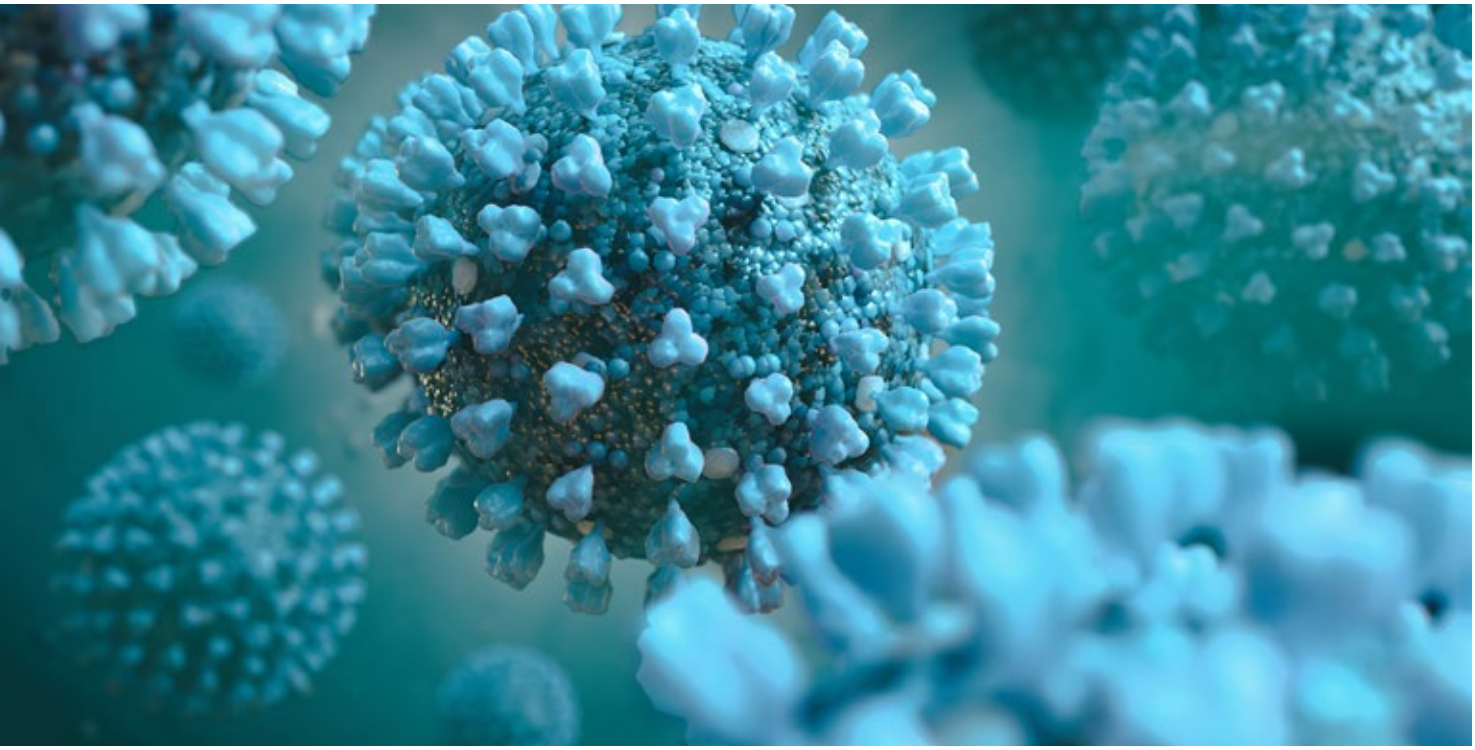
Content



COVID-19 Fatality Rate

What is COVID-19?

The current outbreak of coronavirus disease, better known as COVID-19, is a disease caused by an infection of a virus called SARS-CoV-2 (formerly known as 2019-nCoV) [R].

Coronavirus actually refers to a group of viruses, including SARS, MERS, and SARS-CoV-2 [R].

Viruses, in general, work by invading the body's own cells and using the components inside to help replicate and spread.

The SARS-CoV-2 virus, in particular, appears to enter human cells by attaching to the ACE2 receptor, which serves as an entry point for the virus [R].

How It Spreads So Quickly

What's clear about this particular coronavirus disease (COVID-19) is that it spreads much more quickly than the flu. Almost twice the number of people get infected per a coronavirus carrier compared to the flu. Put another way, it's twice as 'viral'. On average, a person with the flu will spread it to 1.3 people. For coronavirus, the number is 2.0-2.5. That difference can have an exponential effect in spreading the virus.

One reason that coronavirus is spreading so fast is due to the longer time period that it takes for symptoms to appear, called the incubation period.

The flu virus takes 1-4 days to produce symptoms, whereas this coronavirus takes 1-14 days, or longer in 1% of cases. On average, people experience symptoms 5 days later. The longer it takes to realize that you have coronavirus, the more people you will meet and give the virus to.

This is why social distancing is very important. Even if you feel fine, keeping your distance from people is the only way to lower the chances of spreading the virus.

The Real Problem With COVID-19

The biggest issue with Coronavirus is that many people who become critically ill from the infection need to be hospitalized, put on ventilators, and quarantined for 2 weeks.

The reason why governments across the globe are taking swift and early action is because coronavirus patients are flooding hospitals. Around 2% of people with the flu need to be hospitalized, whereas the number is 19% for COVID-19 patients.

In addition, these patients need to be put in special wards and quarantined so that they don't spread the virus. The doctors and patients need special equipment such as masks, ventilators, etc...

If we take California as an example, according to recent state data, California has around 72,400 general acute beds, with an occupancy rate of 54%.

The population of California is 40 million people. One model predicted that 56% of the population of California would be infected over eight weeks, if no serious measures were taken [R].

That would mean that 22.4 million people would have contracted coronavirus in California alone if people didn't distance themselves from one another.

If 19% of the 22.4 million needed to be hospitalized, 4.25M people would require hospitalization, which is clearly much higher than the number of available beds.

The True COVID-19 Death Rate

In early 2009 swine flu made headlines with a death rate that ended up being similar to that of the seasonal flu, which is around 0.1%.

The WHO previously announced that the death rate from coronavirus was around 3.4% to their best knowledge, but that it'll change as they get more data. At this stage of data that I'm seeing, I would say that the actual death rate is around 0.5%-0.75%. However, there is not enough data to know for sure.

If this were the correct number, the fatality rate would be 5-7.5X higher than the flu.

A Lancet study published on March 30th estimates the real overall fatality rate at 0.66% in China, when adjustments were made for cases that were unaccounted for as a result of not experiencing symptoms, or having mild symptoms [R].

In this study, to figure out the true infection fatality ratio, the researchers looked to data from people who were tested when they flew back to their home countries from Wuhan, China during the outbreak, as well as data from Diamond Princess cruise ship passengers, who were all tested [R].

Since these tests were given to people who didn't necessarily show symptoms, the researchers were able to estimate the prevalence of such cases [R].

Consistent with previous research, the new study also found that the death rate varied greatly by age. While the death rate was around 0.0016% in 0 to 9-year-olds, it increased to about 7.8% for people who were age 80 and above [R].

The researchers also found that nearly 1 in 5 people over the age of 80 infected with COVID-19 were likely to require hospitalization whereas only 1% of people under 30 were likely to be hospitalized [R].

In Italy, where they do have a large population of elderly individuals, they are seeing some of the highest fatality rates. In comparison with the common flu, which Italy typically sees about 17,000 deaths for the entire year, the fatalities from COVID-19 have already surpassed 17,000. The CDC has a broad estimated fatality risk range of 0.25%-3.0% for COVID-19, while saying that “lower estimates might be closest to the true value” [R].

Why the large variance? It has to do with:

- Undiagnosed mild claims
- Diagnostic kit shortages
- Age of infected people
- Health of infected people
- Shortage of hospital space/equipment/quality of case
- The amount of time that has passed since people have been diagnosed with COVID-19

Cruise Ship Probably Provides the Most Accurate Data

On January 25, a symptomatic passenger departed the Diamond Princess cruise ship in Hong Kong, where he was evaluated; testing confirmed SARS-CoV-2 infection. On February 3, the ship returned to Japan, and the ship was quarantined [R].

There were a total of 3,711 passengers on the ship who were forced to quarantine [R].

This gives us some of the best data, since they tested almost everyone on the ship (3,618 people) [R].

When you don’t have an enclosed area, unless you test everyone in the country, it’s impossible to get an accurate assessment of the people who have the virus and, therefore, the death rate.

In addition, a reasonable amount of time has passed to get a better picture of how the dust is settling.

Out of 712 people confirmed to have the virus, 12 people have died, and 10 are in serious condition [R, R].

This yields a 1.7% fatality rate. If we assume 2 more people will die, that yields a 2% rate of death.

Out of 712 people, a bit over 5% (37) of them required intensive care [R].

However, keep in mind that the ship's passengers were older and skewed toward males. For example, 58% of the passengers on the ship were older than 60, versus around 20% of the general population over 60. The median age was 69 years old vs 38 years old for the general US population.

In addition, 81% of the ship's passenger population were male! Males are more likely to die from coronavirus, many people believe as a result of higher rates of smoking and generally being unhealthier.

Given that the cruise ship was an older male population, it would seem plausible to me that the fatality rate would be 1/3 of a 2% fatality rate (0.66%) when dealing with a general, more heterogeneous population than the cruise ship. This would match with the Lancet number.

It's interesting to note that almost half (331 or 46.5%) of the people didn't show any symptoms *when they were tested (they were tested early on)* [R, R].

It's unclear how many of these people stayed asymptomatic, but one study estimates the number of asymptomatics with the virus on the cruise at 18% [R].

The relatively large number of asymptomatics goes to show you that if you are healthy, there's a reasonable chance you won't even feel anything if you get the virus.

For our SelfDecode users, that could be a sliver of good news in the midst of all of this. Because at SelfDecode, we are all about optimizing your health and well-being. When you know that your genes predispose you to certain health risks, you can learn what supplement and lifestyle changes to make so that you can live in the healthiest way possible.

Who Is Most At Risk For COVID-19?

The most interesting study that I've seen regarding COVID-19 is that having heart disease, hypertension or diabetes increases the risk of dying more than smoking in hospitalized patients [R].

In a study of 191 COVID-19 patients who were hospitalized, 15 had heart disease. The fatality rate of these 15 people was 87%. 13 of these 15 people died, while 2 survived. I've been speaking to doctor friends on the frontline and they've confirmed to me that cardiovascular patients are getting hit really hard [R].

Keep in mind that this study is only dealing with the most severe patients, because it only involves those who were hospitalized.

Nevertheless, it seems like COVID-19 is a big problem for people with pre-existing heart disease.

These conditions are mostly caused by an unhealthy lifestyle. I don't know a single person who is healthy on a consistent basis and has type 2 diabetes or hypertension – even old people!

People can have genes that increase their risk of heart disease, hypertension and diabetes of course, but these genes can be surmounted by a healthy diet & lifestyle tailored for the individual. You've just got to know when you have genes that are putting you at risk!

Those Most at Risk [R]:

- Elderly (OR = 1.10 for each year, when adjusted)
- People with Heart Disease (OR=21.4, 2.14 when adjusted)
- People with COPD/Chronic obstructive lung disease (OR=5.4)
- People with Hypertension (OR=3.05)
- People with Diabetes (OR=2.85)
- Current smokers (OR=2.23)
- Males (OR=1.64)
- People with Asthma [R, R] or any condition affecting the respiratory system
- Immunocompromised people (HIV, Cancer treatment, corticosteroid use) [R]
- Obesity [R]
- Other preconditions (liver, kidney disease, etc...) [R]

Nearly all of the risk factors above, in my opinion, can be prevented or reversed with a healthy diet and lifestyle, especially when it's tailored to the individual.

I think even the higher risk of death due to being elderly can also be reduced. The theory is that age causes the immune system to worsen (specifically defects in T-cell and B-cell function) [R]; however, there are many ways to boost the immune system.

When it comes to gender, 5X more males smoke than females, and they drink 5X more alcohol than women. In general, they are less healthy [R].

Men are also more likely to have heart disease, strokes, diabetes and COPD, likely as a result of generally less healthy lifestyles [R].

Taken altogether, this is actually good news. It means by improving your general health, you can likely lower your risk of dying from the virus.

Should Young People Be Concerned?

It's clear that age really is the biggest risk factor for COVID-19. Every year of age can increase your likelihood of death by up to 14%.

However, while younger people don't have an exceedingly high risk of dying if they catch the virus, they do have a high rate of hospitalization. Actually, compared to other age groups, the rate of hospitalization is not as different as you would think.

You would think that if the likelihood of dying is much lower, the likelihood of being hospitalized is also much lower, but that doesn't seem to be the case.

According to a study done by the CDC, between 14-21% of people 20-44 are hospitalized from the virus [R].

For all age groups combined, the hospitalization rate is not too different at 21-31.5% [R].

In comparison, the flu has a much lower hospitalization rate of 1-2%, according to the CDC [R].

We also don't know what the long term damage of getting COVID-19 would be to the lungs, if any – even for young people.

So when the WHO and CDC say that young people are not off the hook, I agree with them.

Why There's a Reasonable Chance You'll Get Coronavirus

Many people think that getting Coronavirus won't happen to them. But as I discussed, governments are already resigned to the fact that coronavirus will spread throughout much of the population.

We are living in a global world, and even if one country gets rid of the virus, there are 194 other countries that it can come back from.

Even though governments are doing what they can to slow it down, the truth is many, if not most, people will end up getting it.

The virus is still spreading in France, Italy and Spain, even with relatively strict lockdowns. It will of course slow down, but it won't stop.

Coronavirus spreads way faster than the flu, and the CDC has found that it can live on surfaces for up to 17 days! Most viruses and bacteria can only live on surfaces for a few days max.

Therefore, it seems inevitable that this thing will spread throughout the population, just as the flu has. The only question is how fast. In fact, many experts are saying the same thing: 20-80% of the population will eventually get the virus.

When Will a Vaccine Come Out?

In the best case scenario, all experts say a minimum of 12 months. But the truth is, a vaccine may never come out. There are a wide range of viruses that have no vaccines: HIV (AIDS), HSV 1 & 2 (herpes), EBV (mono), and even the first SARS virus, which started in 2002. The list goes on.

So while some of the brightest minds are working on a vaccine, it's not a given that we will get one, and certainly not a given that it will come out in 12 months.

Even if we do get a vaccine, it'll take a while to ramp up production and get everyone vaccinated.

In other words, experts don't expect a vaccine to be widespread for another 1.5-2 years at the minimum.

What Can You Do To Protect Yourself?

When you look at the situation, you really have 2 strategies to defend yourself against this thing. You can either isolate yourself until a vaccine or super effective treatment emerges, or you can prepare your body, and get ready for the fight.

As I mentioned, you have to think about your whole body. Your immune system, your respiratory system, your cardiovascular system, and your general health.

I don't think there has ever been a better time to focus on optimizing both your general health and specific bodily functions and processes.

Right now, I am personally researching a regimen with my science team that will optimally prepare us for COVID-19 when and if it does come. Some of this regimen will be using information from genetics.

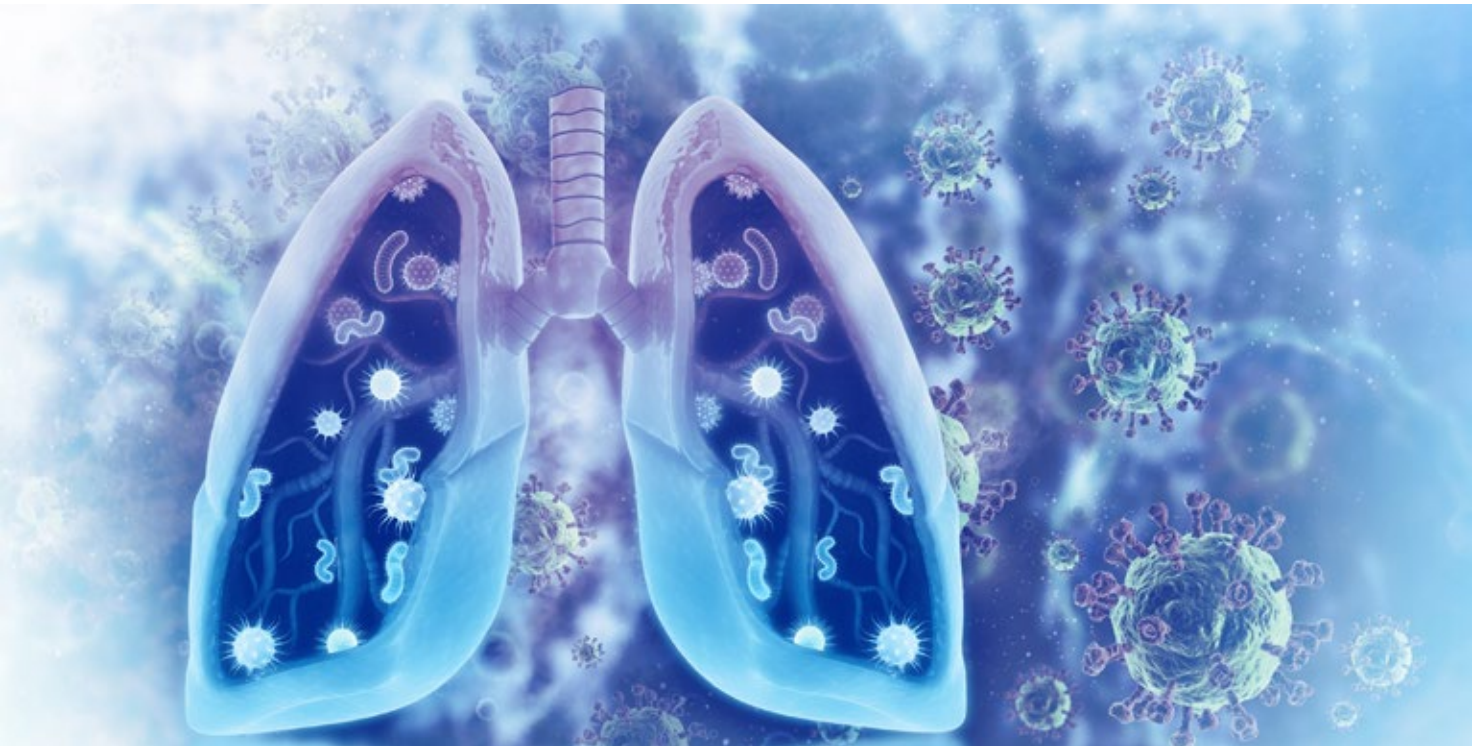
In addition, we have been releasing a lot of posts on SelfHacked, SelfHack (my opinion pieces), and the SelfDecode blog about COVID-19 and coronavirus.

We're answering questions like:

- Are Some People More Susceptible to Coronavirus Infection?
- Can this Antiviral Response Gene Protect Against Coronavirus?
- Can NAC Help Fight Coronavirus?
- Can Vitamin D Help Fight Coronavirus?

Our goal is to make sure you are as prepared as possible to fight the virus, and to guide you on this journey. Because, sadly, I don't think this will go away anytime soon.

Knowledge is your best weapon in the fight against COVID-19.



Long-term Effects of COVID-19

Since COVID-19 is a brand new virus, we can't be certain what the long term effects of COVID-19 will be, but there have been some interesting studies researching this topic. They have shed some light on possible long-term effects from COVID-19 including lung damage, heart damage and male fertility.

COVID-19 & Lung Damage

According to specialists, Covid-19 pneumonia is different from the most common cases in that it doesn't respond to antibiotics and it's more severe. For example, coronavirus pneumonia tends to affect all of the lungs, instead of just small parts [R].

Once we have an infection in the lung, then the body's response is first to try and destroy the virus and limit its replication [R].

If the immune system isn't powerful enough in the beginning, it can result in more significant

lung damage, as often occurs in older people or those who have health conditions.

In a study of 138 patients hospitalized for COVID-19 in China, chest CT scans showed “patchy shadows” or “ground glass dark spots” in the lungs of all patients [R].

Dr. Owen Tsang Tak-yin, of the Infectious Diseases Centre in Hong Kong, says that some patients’ lung function could decline by about 20 to 30% after recovery and result in a difficult time catching their breath if they walk quickly.

While it’s too early to establish long-term effects of the disease, scans of nine patients’ lungs “found patterns similar to frosted glass in all of them, suggesting there was organ damage [even after recovery],” Tsang said.

We don’t know in what percentage of cases the damage is permanent. It could be a very low percentage. What we do know is that lung damage from this coronavirus is more severe than normal pneumonia, which is an area of concern.

COVID-19 & Heart Damage

A number of studies and factors related to Coronavirus seem to be pointing to the possibility that COVID-19 may cause heart damage.

One thing we know is that COVID-19 appears to enter human cells by attaching to the ACE2 receptor, which serves as an entry point for the virus and this particular receptor is found in high levels in the heart [R]. So, it makes sense that this may expose the heart to more damage if the virus is existing in higher concentrations.

Additionally, there have been two studies performed by JAMA Cardiology that seem to point to cardiovascular complications caused by Coronavirus.

One study of 416 COVID-19 patients in China from JAMA cardiology found that around 20% of patients developed an injury to the heart during hospitalization [R].

In addition, more than half of the patients with cardiac injury experienced in-hospital death in this study, indicating that COVID-19–induced heart damage is associated with a massive increase in the death rate [R].

You might think that the higher death rate would be due to the individuals already having

heart problems, but the study concluded that this type of injury was an independent risk factor of dying from COVID-19, even when adjusting for prior cardiovascular diseases, and many other risk factors [R].

However, the researchers did find that many of the people experiencing cardiac injury also had high levels of inflammation and previous cardiovascular issues [R].

Higher levels of inflammation after developing COVID-19 may arise from a poor immune system that lets the viral load increase too much, which is then followed by a cytokine storm.

That means if you have a poor immune system or heart issues, you may be even more susceptible to experiencing heart damage from COVID-19.

The other study on 138 patients hospitalized with COVID-19 that found that 7.2% of patients developed acute cardiac injury, and that patients who were in the ICU were 22% more likely to have cardiac injury than non-ICU patients [R].

It's interesting to note that cardiovascular complications also occurred in the first SARS virus [R].

If you have a cardiovascular issue, or you believe it runs in your family, I would recommend checking out our Cardiovascular DNA Wellness Report, which gives personalized recommendations based on your genes to improve your cardiovascular system. Once you upload your DNA, you'll be able to see if you have the genetic variants that put you at a higher risk for cardiovascular issues through your personalized SelfDecode report.

Potential Long Term Effects on Male Fertility

Although it is too early to tell for sure, one area where long term damage might occur is in the male reproductive system.

It's known that a broad range of virus families – including HIV, mumps, influenza, Zika, and Coxsackie – may induce inflammation of the testicles which can sometimes result in male infertility [R].

Unlike bacterial infections, which usually invade accessory glands, viruses circulating in the blood mainly attack the testes [R].

For coronavirus, they might be an even easier target. Testes seem to have an abundance of ACE2, which is the main receptor that COVID-19 uses to infiltrate our cells, so it can expose them to more damage [R].

The harmful effects of viruses involve the direct damage of sperm cells, abnormal sex-hormone secretion, and inflammation [R].

SARS, a similar virus to COVID-19, has been reported to cause testicular inflammation [R].

One study that compared 81 recovered COVID-19 patients to a healthy control group of 100 people found that the ratio of testosterone to luteinizing hormone (a hormone that helps your reproductive system) was lower [R].

The effect on COVID-19 on male fertility is still unknown, but it's one of the possible long term effects from the disease.

Why Your Immune Health is Really Important

Multiple studies I've read speak about damage, or more severe damage, occurring when the immune system doesn't respond well, and viral replication gets out of control. People in the ICU, for example, had higher viral loads [R].

Viral load was also shown to correlate with age, which is in turn associated with low immunity. This could explain the high degree of severe disease in older patients with COVID-19, according to a LANCET study [R].

The high viral load in elderly patients is associated not only with low immunity but also with high levels of the ACE2 receptor in older adults [R]. ACE2 is basically the gateway on a cell where the virus is able to gain entry.

If you haven't checked out our SelfDecode blog post on the ACE2 gene, you need to do that right now. My results for the ACE2 gene are good, so that's comforting. If you have risk variants for the gene, we discuss potential ways to counteract the risk.

If your immune system is not up to par, your viral load gets out of control, and heart & lung damage are more likely to occur.

This is why you need to start building up your immune system now and improving your gener-

al health, in preparation for the virus, because it's very likely to be widespread in the population.

I am not waiting to get the virus to improve my immune system. I have been doing my coronavirus regimen since the virus started spreading in large numbers to the west.

Why are people dying?

What is ARDS?

Acute respiratory distress syndrome (ARDS or, informally, “wet lung”) is a dangerous condition that may develop over the course of severe cases of respiratory diseases like the flu and COVID-19 [R, R, R].

In simple terms, during ARDS, the lungs no longer work correctly. They often fill with fluid, leading to labored breathing, reduced blood oxygen, and eventually organ failure. People who develop ARDS typically need to go on a ventilator, and around half die [R, R, R].

ARDS and subsequent organ failure are common complications and causes of death in people with COVID-19.

ARDS & Coronavirus

One study examined 191 confirmed COVID-19 patients in Wuhan, China. 50 out of the 54 patients who died were shown to have developed ARDS, while only 9 of the 137 survivors developed ARDS. [R]

This is a strong indication that developing ARDS plays a big part in your survival of COVID-19.

The problem with Coronavirus is that it easily sets the stage for ARDS to develop by infecting and damaging the lung cells. Your body's response to this might cause a malfunction and the onset of ARDS.

Once that happens, ARDS can develop **incredibly quickly** in critically ill coronavirus patients.

ARDS & IL18 Gene

The IL18 gene codes for a protein called interleukin 18 (IL-18). IL-18 is an inflammatory cytokine (a type of messenger protein involved in inflammatory and immune responses).

In combination with other cytokines, IL-18 stimulates Th1 and natural killer cells to produce the key antimicrobial agent IFN-γ [R, R] and activate inflammatory pathways [R].

When properly regulated, this mechanism helps fight off infections. Unfortunately, high IL-18 may lead to inflammation and have been associated with autoimmune and inflammatory disorders.

IL-18 was identified as a biomarker for ARDS in the blood of 88 critically ill patients who developed this condition [R]. A study in rats suggested that IL-18 may trigger ARDS by promoting the migration of neutrophils into the lungs, resulting in the inflammation of their tissues [R].

Variants that are associated with higher gene expression of IL18 are more common among people who develop acute lung injury (a mild form of ARDS).

ARDS & IL17A Gene

The IL17A gene codes for an inflammatory cytokine, IL-17 (interleukin-17). Activated Th17 cells

produce IL-17 to enhance the inflammatory response and recruit white blood cells such as neutrophils and monocytes [R, R].

Up to a certain point, IL-17 plays a beneficial role in stimulating the immune response against microbes and other threats. However, excess amounts can cause widespread inflammation and contribute to a range of inflammatory disorders and cancer [R, R].

Uncontrolled inflammation caused by excessive cytokine release is the hallmark of ARDS. The stimulation of white blood cells can cause a so-called cytokine storm and do more damage than the infection itself [R, R, R, R, R].

IL-17 is one of the pro-inflammatory cytokines responsible for this phenomenon. Patients with ARDS usually have elevated IL-17 in the lungs and blood, which correlates with ARDS severity [R, R, R].

ARDS & IL10 Gene

IL-10 may prevent and reduce the severity of acute respiratory distress syndrome (ARDS).

During an immune response, the body produces many inflammatory cytokines and white blood cells to fight off an infection. Among these, IL-10 serves a protective role, preventing the immune response from damaging host tissues

However, because IL-10 suppresses inflammation and the immune response, it is a prime target for viral hijacking. In fact, some viruses have evolved ways to increase IL-10 or even produce their own IL-10 to protect themselves from the host's white blood cells and other defenses [R, R, R, R].

Higher IL-10 may be protective against ARDS and may improve survival rates of people who develop ARDS [R].

Generally, people with variants associated with higher expression of IL10 tend to fare better.

One SNP in the IL10 gene has been associated with better outcomes in ARDS.

The same SNP, rs1800896, has also been associated with survival rates in cytokine storms.

What Are Cytokine Storms?

"Cytokine storm" is a term for a dangerous condition in which the immune system overproduces inflammatory cytokines in response to a disease. This inflammation then causes more damage to our tissues. Cytokine storm syndrome has also been implicated in severe cases of COVID-19, and it increases the risk of dying from it [R, R, R].

Cytokine Storms & IL10 Gene

IL-10, as many other cytokines, is typically very high during a cytokine storm. It is also specifically elevated in cases of COVID-19 that require hospitalization [R].

IL-10 appears to increase in disease as a response to existing inflammation. If this is the case, then high IL-10 could be beneficial even in a cytokine storm, because it may be holding back an even worse reaction [R].

IL-10 may also be implicated in a phenomenon known as T cell exhaustion, which occurs when T cells (a type of white blood cell) lose their ability to produce cytokines and can no longer effectively fight off infection [R, R, R].

Variants in the IL10 gene have been linked to infection rates and outcomes. Genotypes that confer higher IL-10 are generally associated with lower rates of infection and less severe sickness.

Genetics

Coronavirus: A Potential Genetic Link

Initial research suggests that age, gender, geographic location, and underlying health conditions may all influence the severity and susceptibility to COVID-19 [R, R].

Interestingly enough, there is some evidence that genetics may also play a role in disease severity.

In this next section, we'll discuss the connection between the genes you carry and COVID-19.

ACE2 Gene

Think of ACE2 as a doorway for COVID-19. The ACE2 receptor is a protein that sits across the cell membrane in many tissues, including the lungs. The COVID-19 virus uses ACE2 to invade

the host cell, making this protein a target for potential treatments.

A recent analysis suggests a connection between the ACE2 gene and susceptibility to COVID-19 infection. In this analysis, researchers identified several SNPs in which the major allele is associated with increased expression of ACE2 receptors in human tissues, including the lungs [R].

Because the COVID-19 virus attaches to ACE2 receptors, the authors of this analysis suggested that people with decreased ACE2 expression might be less susceptible to the disease [R].

Some people may have higher or lower levels of ACE2 expression, which may help explain why some people have severe infections, while others are asymptomatic.

Check your ACE2 gene!

MX1 Gene

MX1 codes for a protein that prevents the replication of viruses inside host cells.

It's essential for the body's immune response to viruses **it has never encountered before** and, therefore, has no antibodies against.

Interferons activate MX1 and put it to work, but coronaviruses can suppress interferons, which allows them to reproduce without MX1 getting in the way.

But some variants of this gene actually show a high expression of MX1 **even when** interferons are absent.

So if you carry this variant, you are less susceptible to contracting the coronavirus.

Check Your MX1 Gene!

IL6 Gene

Interleukin-6 (IL-6) is a cytokine that has either proinflammatory or anti-inflammatory properties, depending on the circumstances and the tissue that secretes it.

IL-6 plays a protective role in the immune system's response to viruses. However, too much IL-6 appears to be very harmful and contributes to cytokine storms. There may even be a direct correlation between how high IL-6 spikes and how serious a viral infection becomes.

High IL-6 is associated with severe pneumonia and respiratory infections.

Some variants of the IL6 gene increase IL6 expression and may predispose you to more severe respiratory infections and, more broadly, lung inflammation, which are key contributors to the increased death rate of COVID-19.

Check Your IL6 Gene!

OAS-1 Gene

Most genes that scientists are researching in relation to coronaviruses affect the immune response and inflammation. The OAS-1 gene is different: it influences the way our body attempts to destroy the very structure of viruses that manage to sneak inside [R].

Activated OAS-1 turns "on" an enzyme called ribonuclease L (RNase-L), which is capable of destroying all genetic material in the form of RNA. Viruses like those in the coronavirus family store all of their genetic material in RNA, allowing them to be targeted by mechanisms like OAS-1 [R].

Without RNA, coronaviruses can't produce the proteins they need to survive — thus they lose the ability to multiply and spread.

OAS-1 also helps clear junk products while recycling useful compounds from dying cells (via autophagy and apoptosis).

Some variants may increase the activity of the OAS pathway, which helps fight coronavirus and prevent COVID-19.

Check Your OAS-1 Gene!

TMPRSS2 Gene

Before a coronavirus can invade a human cell, proteins on its surface must be primed by an

enzyme called TMPRSS2.

Coronaviruses got their name from the “crown” of spikes visible all around them when viewed through a microscope. These spikes, or S proteins, are the viruses’ ticket into our cells: they bind to and hijack proteins on the target cell’s surface and use them to get inside [R].

The virus that causes COVID-19 is called SARS-CoV-2, and it binds to a protein called ACE2 to enter a human cell. However, this is only the last step in a more complicated process [R, R].

When the virus first enters the body and contacts human cells, TMPRSS2 changes the spikes (S proteins) from their initial state to a different shape. This process is called “priming.” The newly primed S proteins can then bind to ACE2 and enter the cell [R].

High TMPRSS2 expression could make people more susceptible to severe coronavirus infection.

Therefore, some variants that decrease expression could be protective against Coronavirus.

Check Your TMPRSS2 Gene!

AGER Gene

AGER codes for a protein called RAGE. RAGE is a type of immune protein that binds to other proteins and activates the immune response [R].

RAGE is produced at the highest levels in the lung compared to other tissues.

RAGE causes inflammation primarily by activating NF-κB, which then increases the production of other inflammatory signals like IL-1 [R, R].

However, increased NF-κB also circles back around and promotes RAGE. This feedback loop may make it difficult to break out of the cycle of inflammation, leading to potentially worse outcomes unless either RAGE or NF-κB is blocked [R, R].

This inflammatory feedback loop could feed into cytokine storms and make ARDS more likely to occur.

At rs2070600, over 90% of people with the ‘TT’ genotype developed ARDS less than a week

after entering the ICU.

If you carry this genotype, it's important to implement your recommendations to protect yourself from serious illness due to COVID-19.

Check Your AGER Gene!

CCL2 Gene

The CCL2 gene codes for a cytokine that powerfully attracts immune cells to the site of infection in the body.

It can have such a big impact on immunity that it has been linked with everything from infections to cancer to autoimmune and inflammatory diseases to obesity [R, R, R, R].

High CCL2 levels may contribute to lung damage and even death, and might help SARS infect immune cells and spread.

People with a high-producing CCL2 genotype may be more likely to catch SARS-CoV, as an overactivation of CCL2 increases your susceptibility to many infections.

Scientists recently described a case of COVID-19 where the recovering patient had low levels of CCL2, so if you have the risk variant that increases CCL2, applying your lifestyle, diet and supplement suggestions is crucial in protecting yourself from COVID-19.

Check Your CCL2 Gene!

MBL2 Gene

The MBL2 gene codes for a protein called MBL that screens for invading microbes.

MBL works as a sort of a surveillance system for microbes that might have entered the body. It recognizes and binds to sugar molecules on the surface of bacteria, viruses, and yeast. This binding acts as the "on" switch for heightened immune activity [R].

The way MBL functions is extremely old in an evolutionary sense. Scientists say it's our most basic, primal form of immune defense [R].

Low MBL may worsen inflammation, which is linked to serious COVID-19 complications. Normal MBL seems to be anti-inflammatory.

Rare MBL2 variants have been linked with an increased risk of SARS, ARDS, and ventilator use due to serious lung damage.

Check Your MBL2 Gene!

AHR Gene

The AHR gene is basically a master-switch which turns other genes on and off [R].

It's important for neutralizing toxins and also plays a role in immunity and inflammation.

A variant in AHR has been associated with a higher risk of developing ARDS, an often fatal complication of respiratory diseases such as pneumonia.

AhR may be protective in respiratory infections by:

- Combating oxidative stress [R, R]
- Activating certain parts of the immune response [R]
- Decreasing neutrophils (a type of white blood cells) [R] -- neutrophil accumulation and infiltration into the lungs is a key feature of ARDS [R, R, R].
- Decreasing inflammation and inflammatory cytokines, including Th17 [R] -- patients with ARDS usually have elevated IL-17 in the lungs and blood, which correlates with ARDS severity [R, R, R].

Some variants of the AHR gene have decreased AHR levels, which means less protection for the lungs.

Check Your AHR Gene!

CYP1A1 Gene

CYP1A1 is an enzyme that is mainly found in the lungs. It's main task is to help remove toxic chemicals from the lungs and to protect against oxidative stress, by neutralizing reactive oxygen species (ROS) in the lungs.

Variants that decrease CYP1A1 enzyme levels may contribute to inflammation in pneumonia by making the lungs more vulnerable to oxidative stress. This same variant is more common in those with pneumonia and was associated with a higher risk of developing ARDS, an often fatal complication of respiratory diseases such as Coronavirus.

Men tend to have lower CYP1A1 levels than women. This could potentially be one reason why women have lower fatality rates than men in COVID-19.

Check Your CYP1A1 Gene!

TNF Gene

The TNF gene is responsible for creating a protein called TNF-alpha, an inflammatory cytokine that plays a major role in the body's immune and inflammatory response [R].

TNF-alpha has many different effects throughout the body, often working in combination with other types of cytokines

Some of the effects of TNF-alpha include [R]:

- Inflammation and fever
- Appetite suppression
- Stimulating phagocytosis, which helps remove harmful substances like bacteria

Certain variants of TNF can change the inflammatory response, which may increase the risk of certain conditions such as acute respiratory distress syndrome.

Certain variants of the TNF gene can result in higher levels of TNF-alpha, which may also increase the risk of developing ARDS (and the risk of cytokine storm as well) [R, R, R, R].

Check Your TNF Gene!

IL13 Gene

IL-13 is a cytokine that belongs to type 2 immunity. It can prevent excessive inflammation but also trigger allergic reactions.

Type 2 immunity, driven by the Th2 cells, is often regarded as anti-inflammatory, but it can also trigger inflammation under specific conditions.

The battle between pro- and anti-inflammatory cytokines can determine ARDS occurrence and severity. The anti-inflammatory effects of IL-13 may prevent lung injury in critically ill patients [R].

Some IL13 variants result in higher IL-13 levels, which lowers the rates of acute lung failure **but** may play a role in allergic reactions.

Check Your IL13 Gene!

NOS3 Gene

NOS3 produces nitric oxide (NO) in the blood vessels, which increases blood flow and preserves heart health.

Nitric oxide decreases blood pressure. High blood pressure does not only increase the risk of heart disease, but is also one of the main risk factors for COVID-19 hospitalization, complications, and death [R, R].

Coronavirus blocks NOS3 activation and stimulates the breakdown of nitric oxide into nitrogen radicals. This would lead to nitric oxide depletion and could dramatically increase death by heart conditions, especially in COVID-19 patients with underactive NOS3 variants [R].

Check Your NOS3 Gene!

IL8 Gene

Interleukin 8 (IL-8) is a potent inflammatory protein or cytokine. It acts as a signal to attract white blood cells at sites of infection, especially in the lungs.

IL-8 plays a role in viral respiratory infections, cancer, and a range of inflammatory conditions [R, R, R].

Uncontrolled inflammation caused by excessive cytokine release is the hallmark of ARDS. The stimulation of white blood cells can cause a so-called cytokine storm and do more damage

than the infection itself [R, R, R, R, R].

IL-8 is a central cytokine in ARDS development. ARDS patients have much higher IL-8 levels in the blood and lungs, which correlate with disease progression and mortality [R, R, R].

Multiple studies have found that variants that increase IL-8 expression in white blood cells, which contributes to ARDS development. [R, R, R].

Check Your IL8 Gene!

MYD88 Gene

The MYD88 gene codes for a protein with central roles in the immune response and inflammation. MYD88 enables the activation of NF-kB, the master regulator of inflammation.

The cascade TLR4—>MyD88—>NF-kB results in increased production of inflammatory cytokines such as IL-1b, IL-6, IL-8, and TNF-a. They have a protective role against microbial infections, but excess levels can sometimes cause more harm than good [R, R].

One variant, the 'G' allele at rs7744, may change the part of the MYD88 gene that codes for a protein. This phenomenon is known as "alternative splicing" and results in different protein forms coded by the same gene [R, R].

According to some research, the alternative of MyD88 may suppress TLR4 instead of activating it, which results in lower inflammation and may protect against ARDS [R, R].

The above mechanism may explain the protective effects of rs7744-G against ARDS, despite the fact it increased MyD88 expression.

Check Your MYD88 Gene!

VEGF Gene

VEGF produces a growth factor in the blood vessels that promotes their development and repair. Variants with a reduced production of this protein are associated with an increased risk of ARDS, a potential complication of diseases such as COVID-19.

The *VEGF* gene encodes a protein called vascular endothelial growth factor (VEGF). VEGF binds to receptors on the cells that line the inside of the blood vessels [R, R] and activates pathways that promote their proliferation, development, migration, organization, and survival [R, R, R].

The main *VEGF* polymorphism that has been linked to ARDS is rs3025039, located at the region that controls when and where the gene is expressed (the *promoter*). One variant causes lower blood levels of the VEGF protein, possibly because it prevents the binding of a protein needed to activate the expression of the gene [R].

This specific variant was associated with an increased incidence of ARDS and risk of dying from this complication in three studies (from China, the US, and the UK) on over 1,700 people [R, R, R].

Check Your VEGF Gene!

FAAH Gene

The FAAH gene helps create an enzyme called FAAH, which is responsible for breaking down certain compounds in the body like:

- Several types of fatty acids
- Certain endocannabinoids (compounds that activate the cannabinoid system)
- Oleamide, a sleep-inducing compound

Because of its link to cannabinoid and pain receptors, many studies have explored the effects of the FAAH gene on pain relief, drug abuse, and anxiety [R, R].

There is also some evidence that certain variants of FAAH may influence susceptibility to acute respiratory distress syndrome (ARDS).

A certain variant of the FAAH gene is associated with lower levels of the FAAH enzyme and a higher risk of developing ARDS, according to results from Caucasian populations. Some researchers think this happens because this FAAH variant reduces HDL cholesterol, leading to higher levels of inflammation.

Check Your FAAH Gene!

Supplements

Zinc

Zinc is a dietary trace mineral that helps immune cells develop and stay healthy. It's important for preventing an array of infections and problems that can arise from poor immune function [R].

The new coronavirus belongs to a big family of RNA viruses. In lab experiments, increasing zinc levels in the cells of RNA viruses stopped the viruses from multiplying [R, R].

Viruses need some zinc to survive, but they maintain relatively low internal zinc levels. In fact, high zinc levels are a big red alarm for viruses — one that can lead them to commit suicide (*apoptosis*) [R].

Zinc lozenges have become particularly popular, but Zinc lozenges are useful to take when

you catch a cold, which tends to stays in your throat. The new coronavirus appears to cause serious complications by entering the lungs, so lozenges are unlikely to be effective.

Most people can get enough of this mineral from a balanced diet, but people who are at risk of deficiency, including those with gut disorders or other chronic health problems, might need to supplement to maintain adequate zinc levels in the body.

Dosage:
15-30mg is a good dosage for zinc in the form of picolinate to support the immune system.

Does Joe Recommend?
Zinc is THE number one supplement that you must take. Lozenges are better than pills, but both could be useful. I switch off. I take around 15mg a day and make sure to take 1mg of copper with it.

Important When You Have The Negative Variants Of:

- OAS-1 Gene
- IL13 Gene
- IL17A Gene
- AGER Gene
- CCL2 Gene
- ACE2 Gene
- IL6 Gene
- TNF Gene

Vitamin D

Besides its benefits to bone health, vitamin D plays an important role in the immune system.

A number of studies have also found that supplementation with vitamin D may have protective effects against respiratory tract infections, although it's unknown if this applies to 2019-nCoV as well [R, R, R].

Unfortunately, vitamin D deficiency is very common. According to some estimates, almost 50% of people worldwide do not get enough vitamin D [R].

The primary source of vitamin D is sunlight exposure, which causes a chemical reaction in your skin that produces vitamin D. Other sources include supplements and some types of food [R].

However, it should also be noted that the virus that causes COVID-19, like some other pathogens in the coronavirus family, hijacks the ACE2 protein to gain entry into the cell and in some animal studies, vitamin D increased the expression of ACE2 [R, R].

Increasing ACE2 could theoretically make it easier for the coronavirus to hijack the protein and gain entry to the cell, though we don't know for sure.

The safest approach is to just make sure you have sufficient levels of vitamin D (30ng/dl) from getting enough sun, rather than going overboard with supplements.

Dosage:
Generally speaking, most experts recommend that adults get at least 600 IU of vitamin D each day [R].

Does Joe Recommend?
Try to get your vitamin D from sun, but if you're not able to, you should supplement until your levels get into the optimal range. But no need to get it *too* high.

Important When You Have The Negative Variants Of:

- MX1 Gene
- IL17A Gene
- OAS-1 Gene
- TNF Gene
- IL10 Gene
- IL6 Gene
- IL13 Gene
- CCL2 Gene
- ACE2 Gene
- VEGF Gene

NAC

NAC (N-Acetyl Cysteine) is an antioxidant that boosts glutathione levels, one of the body's strongest antioxidants. Some scientists believe it helps with states of increased oxidative stress that underlie chronic health problems [R, R].

Due to its antioxidant properties, researchers believe that NAC can be particularly important for immune health.

Studies also revealed that NAC can be used to reduce inflammation and mucus in people with lung diseases like chronic bronchitis and COPD. It helps break down mucus and replenish glutathione in the lungs, which reduces airway damage and breathing difficulties [R].

Compared to healthy people, those with lung diseases are at a much greater chance of being hospitalized and dying from the new coronavirus disease (COVID-19). Coronavirus infection often causes symptoms that resemble those NAC is used for.

NAC is not found in food. However, you can get cysteine — the amino acid NAC releases — from various protein-rich foods such as [R]:

- Red meat and poultry
- Eggs
- Fish
- Dairy

Additionally, your body can make cysteine from other sulfur-containing compounds found in foods like [R]:

- Garlic
- Onions
- Broccoli and other cruciferous vegetables

Dosage:
600 mg per day is the typical dose for general wellness. European monographs mention 600-1200 mg per day as the dosage for breathing difficulties due to mucus buildup. Clinical studies mostly used higher doses of about 600-800 mg three times per day.

Does Joe Recommend?
NAC is an amazing general supplement, as a result of its ability to increase glutathione. It's particularly good for lung health and respiratory infections. I think this is a critical part of an anti-coronavirus stack. It's especially important in a vegan or vegetarian diet, as an individual could use more cysteine in this diet.

Important When You Have The Negative Variants Of:

- TNF Gene
- IL17A Gene
- IL6 Gene
- CCL2 Gene
- AGER Gene
- MYD88 Gene

Vitamin C

Vitamin C is a powerful antioxidant that supports lung function. Once ingested, vitamin C instantly reaches the lining of our airways, acting as the first life of defense against harmful oxidation caused by microbes, smoking, and other stressors [R, R].

Viral infections activate our immune cells and cause oxidative stress, depleting vitamin C levels. Increased intake under such conditions can ensure antioxidant protection, support the immune response, and suppress viral replication [R, R, R, R].

Like COVID-19, the influenza A virus infection or flu can compromise lung function and lead to pneumonia. Vitamin C is essential for the antiviral response in the early stage of flu infection, and a deficiency may worsen lung damage [R, R].

The common cold is a viral infection of the upper respiratory tract (sinuses, nose, and throat). It's usually caused by rhinoviruses, but the potential threats include influenza and coronaviruses, too [R].

Additionally, Vitamin C may function as a weak antihistamine agent to provide relief from flu-

like symptoms such as sneezing, a running or stuffy nose, and swollen sinuses [R].

Overall, Vitamin C is a crucial antioxidant that protects the respiratory system from viral infections, cigarette smoke, and other stressors and supplementation may reduce the severity and duration of different respiratory conditions.

Dosage:
The current recommended daily intake for Vitamin C is 75 mg/day for women and 90 mg/day for men. Amounts up to 125 mg/day are recommended for pregnant or lactating women, and an additional 35 mg per day for smokers [R].

Does Joe Recommend?
Vitamin C is a staple of immune supplements, and it has the most evidence behind it compared to everything else. But it doesn't mean it's better than everything else, rather it was popularized by Linus Pauling early on, which catalyzed a lot of research in the west. I make sure to get more than enough vitamin C in a day, something around 250mg a day. I recommend making sure you get enough vitamin C, which is easy to do if you eat a lot of salads. If you don't, take a supplement.

Important When You Have The Negative Variants Of:

- MYD88 Gene
- CCL2 Gene
- NOS3 Gene
- IL6 Gene
- IL13 Gene

Vitamin E

Vitamin E is an essential fat-soluble vitamin that supports heart health and strengthens the immune response. On the other hand, high-dose supplements may worsen inflammation and do more harm than good, which is why it's a good idea to get Vitamin E from natural sources.

The primary function of vitamin E is to combat oxidative stress by getting rid of free radicals. Along with vitamin C, it protects fat molecules like LDL cholesterol from harmful oxidation and helps maintain the structure and function of each cell [R, R].

Vitamin E plays vital roles in [R, R]:

- Heart and brain health
- Immunity
- Skin health
- Fertility

The best way to boost vitamin E naturally is to consume a variety of vitamin E-rich whole foods like [R, R]:

- Wheat germ oil

- Sunflower seeds and oil
- Nuts (almonds and hazelnuts)
- Peanuts
- Spinach
- Broccoli

Dosage:
You can't overdose on vitamin E from food sources, but high-dose supplements are a potential threat. The safe upper limit is 1000 mg daily, which is equivalent to 1100 IU of synthetic or 1500 IU of natural alpha-tocopherol [R].

Does Joe Recommend?
Vitamin E is important to immune health, and most people don't get enough vitamin E. I recommend vitamin E that comes with a mixture of different types of vitamin E, not only alpha tocopherol. I personally put some vitamin E in my olive oil bottle and mix it to make sure I get my recommended daily value. However, I don't take much more than I need.

Important When You Have The Negative Variants Of:

- NOS3 Gene
- IL10 Gene
- CCL2 Gene

Garlic

As coronavirus continues to spread, garlic seems to be gaining more popularity than ever. Demands for garlic are increasing, prices are going up, and stores are running low.

Eating garlic is healthy. This is especially true for raw garlic, which is higher in active compounds and nutrients.

Limited studies suggest that garlic may strengthen the immune response, reduce inflammation, and help prevent heart disease and diabetes (along with lifestyle changes).

All in all, there is a solid amount of small-scale, low-quality research on garlic. But proper clinical trials are lacking and many purported benefits of garlic remain unproven [R].

Based on its overall effects, the only role garlic may play amid the COVID-19 pandemic is promoting general health.

Dosage:
The effective dosage of garlic has not been determined. Studies in adults used the following doses [R]:

- 4 grams (1 to 2 cloves) of raw garlic
- 300 mg dried garlic powder (standardized to 1.3% alliin or 0.6% allicin) 2 to 3 times per day
- About 7 grams of aged garlic extract per day

Does Joe Recommend?
Garlic is one of the best antimicrobial foods that we consume. I can't think of a better one. It needs to be raw and chopped up though. It can be good before or during COVID-19.

Important When You Have The Negative Variants Of:

- AHR Gene
- IL8 Gene
- CYP1A1 Gene
- AGER Gene
- CCL2 Gene
- MBL2 Gene
- MYD88 Gene
- TMPRSS2 Gene

Copper

Copper (Cu) is an essential trace mineral. Among other roles, copper supports a healthy immune response and antioxidant defense [R, R, R].

Balanced copper intake supports immunity, helping to prevent infection; too little or too much copper leads to inflammation. Research also reveals that coronavirus can't survive long on copper surfaces.

Most people get enough copper and don't need to supplement. However, copper has to be balanced with zinc in the body [R, R].

Since some people are turning to zinc as an immune booster amid the COVID-19 pandemic, copper deserves special attention. If you are taking a zinc supplement, you need to make sure you are also getting enough copper to avoid deficiency because zinc supplements can reduce copper levels by increasing *metallothioneins*, proteins that bind copper and prevent its absorption.

Copper-rich foods include [R, R, R]:

- Liver (especially calf, lamb, beef)
- Seafood (oysters, squid, lobster, crab)
- Fruit and vegetables (dark leafy vegetables, potatoes, mushrooms, avocados, dried fruit)
- Seeds (sesame, sunflower, pumpkin)
- Nuts (cashew, hazelnuts, Brazil nuts, walnuts)
- Beans (chickpeas, soybeans, adzuki)
- Dark chocolate and cocoa

Dosage:
The Recommended Dietary Allowance (RDA) for copper is [R]:

- Children: 0.3 – 0.9 mg/day (depending on age)
- Adults: 0.9 mg/day
- Pregnancy and breastfeeding: 1 – 1.3 mg/day

The average adult in the United States gets about 1.0 to 1.6 mg/day. The Tolerable Upper Intake Level is 10 mg/day. This is the highest daily intake that is likely to pose no health risk for most people [R].

Does Joe Recommend?
Yes, this is a must to take with Zinc. 1mg copper with 15mg zinc is my recommendation. If you take 30mg of zinc, then include 2mg of copper.

Astragalus

Astragalus has received attention recently with the ongoing COVID-19 virus outbreak due to its potential to boost the immune system, help fight certain infections, and improve lung function according to some studies [R].

The root of the astragalus plant is commonly used in traditional Chinese medicine for many conditions, such as fighting infections.

In fact, it's been one of the most commonly recommended herbs for COVID-19 in Traditional Chinese Medicine [R].

Polysaccharides is the most important compound in astragalus and is responsible for the antiviral and anti-inflammatory capabilities of this herb [R, R, R].

These polysaccharides have many effects, such as reducing inflammatory cytokines like TNF-α, IL-6, and IL-8 [R].

Other active compounds found in astragalus include saponins, which may lower cholesterol

and boost the immune system, as well as flavonoids, which have antioxidative properties [R, R].

Several studies suggest that the components inside astragalus may have antiviral effects against respiratory infections, which affect the sinuses, throat, airways or lungs [5]. Astragalus may help improve lung function, primarily by reducing airway inflammation and protecting against tissue damage caused by lung disorders [R, R].

Interestingly enough, astragalus may help boost the effectiveness of certain vaccines, which can potentially improve protection against infections [R].

Astragalus has protected against lung injury and decreased airway inflammation in mice with COPD, asthma, and allergic reactions [R, R, R, R].

People with COPD/Chronic obstructive lung disease are up to 5.4X more likely to die from Coronavirus. So Astragalus might be a good preventive measure for these people.

Dosage:
2.25 grams of astragalus granules, which are equivalent to 15 grams of crude astragalus

Does Joe Recommend?
Astragalus is a great supplement to take as a preventativee BEFORE coming down with COVID-19. I don't recommend it after getting diagnosed.

Important When You Have The Negative Variants Of:

- IL8 Gene
- AGER Gene
- VEGF Gene
- MBL2 Gene

Cordyceps

Cordyceps is a group of fungi commonly used in traditional Chinese medicine.

There's some evidence that supplementation with cordyceps may help protect the lungs and stimulate the immune system.

Cordyceps may be able to stimulate the immune system through several processes, such as [R]:

- Increasing the activity of macrophages, a type of white blood cell
- Increasing the activity of natural killer cells
- Stimulating T-cells
- Increasing the numbers of CD4+ and CD8+ cells
- Increasing the production of IFN-γ

On the other hand, cordyceps may also suppress immune system activity. Although this may seem contradictory, this suppression can have beneficial anti-inflammatory effects, including [R]:

- Inhibition of NF-κB
- Inhibition of TNF-α and IL-β

Two mouse studies show that cordyceps extract and its isolated active components may help fight against the influenza virus, which is responsible for the flu [R, R].
In both of these studies, cordyceps increased immune system activity and improved the survival rate in mice [R, R].

Cordyceps has also been reported to improve COPD in some Chinese trials.
Interestingly, some animal studies also suggest that cordyceps may help protect the lungs from damage caused by cigarette smoking [R, R].

Dosage:
Because cordyceps is not approved by the FDA for any condition, there is no official dose. However, there are unofficial doses suggested by supplement manufacturers.
Generally speaking, clinical studies have used 1-3 g/day as the dosage for most cordyceps extracts. Most supplements contain 600-1,000 mg of the extract per capsule.

Does Joe Recommend?
Cordyceps is great supplement that is balancing, rather than overly stimulating. For this reason, it can be taken before or after COVID-19.

Important When You Have The Negative Variants Of:

- MBL2 Gene
- IL18 Gene

Echinacea

Echinacea is among the most widely used herbal immune boosters in both North America and Europe. People traditionally use extracts from different echinacea species to help fight bacterial infections and the common cold [R].

Based on its immune effects, echinacea may play a role in prevention of SARS-CoV-2 virus.

A study, led by a team of Swiss scientists, investigated the effects of a standardized echinacea preparation called Echinaforce® against several coronaviruses in cells (HCoV-229E, MERS-CoV, and SARS-CoVs).

Echinaforce irreversibly inactivated one virus strain called human coronavirus or HCoV-229E. This strain is typically associated with milder, cold-like symptoms. We can't claim Echinaforce will have the same effects on cells of the SARS-CoV-2 virus, which is behind the current epidemic.

In the same study, scientists also poured Echinaforce over most types of cells before exposure to HCoV-229E, but they didn't manage to prevent infection. The only exception were

respiratory cells, which were protected against infection caused by droplets of HCoV-229E, a lab scenario imitating a natural infection. With more research, this might hold value for the new coronavirus that needs to enter lung cells to cause serious damage [R, R].

Scientists believe that echinacea extracts may reduce cold symptoms by reducing inflammation and mucus in the airways. Airway inflammation–especially of cells that line tiny sacs in the lungs–is implicated in COVID-19.

Echinacea may increase interferons. Theoretically, this might be beneficial for preventing infection but potentially detrimental in later stages of COVID-19.

Once coronaviruses enter the body, they force the immune system to mass-produce inflammatory molecules. Cytokines lose control and start damaging tissues, setting off a "cytokine storm" — the turning point that makes infection serious [R, R].

Too much interferon (type I IFN) causes lung complications in people with coronaviruses similar to the 2019 strain (SARS-CoV and MERS-CoV)[R].

Thus, interferon-boosters like echinacea might do more harm than good in people who are already infected with the virus [R].

Echinacea has antiviral activity against viruses that have membranes. These include [R, R, R, R]:

- Rhinovirus
- Herpes simplex
- Influenza A and B
- Coronavirus
- Respiratory syncytial virus

Echinacea may prevent viruses from entering cells; it likely can't reach viruses once they're inside cells. [R, R, R]

Echinacea probably doesn't affect the ACE2 receptor, which the new coronavirus uses to enter the body.

Echinacea extract may reduce early flu symptoms [R].

A meta-analysis found that echinacea reduces the risk of recurrent respiratory tract infections and their complications [R].

Dosage:

- 0.9 mL three times daily (2400 mg echinacea daily) for 4 months for prevention
- An increase to 0.9 mL five times daily (4000 mg echinacea daily) at the first sign of a cold

The typical dosage for echinacea powders (including capsules) taken by mouth is 300mg-500mg three times per day.
Tinctures are usually used at up to 10mL daily, depending on the strength.

Does Joe Recommend?
Echinacea is a well researched supplement in the West. I wouldn't say it's my top supplement, but it does seem to be decent to take before getting COVID-19. I would only take it if you have variants in the genes listed.

Important When You Have The Negative Variants Of:

- IL8 Gene
- CCL2 Gene

Resveratrol

Resveratrol, an antioxidant from red wine and berries has recently landed itself on the list of "potentially therapeutic options for coronavirus" due to some cell-based studies which indicated that it can prevent MERS-CoV infection in cells, help infected cells live long, reduce caspase 3 and reduce nucleocapsid production [R], [R], [R].

This is important because the less caspase 3, the less cells are dying from the virus and most coronaviruses have nucleocapsid shells, likely including the 2019 coronavirus strain.

Researchers also believe resveratrol may have dual antioxidant activity: it seems to directly fight free radicals and boost other antioxidant enzymes, genes, and pathways. Some also think it holds promise as an anti-aging compound [R, R].

Antioxidants contribute to strong immunity and general wellness, and they might be particularly important for the elderly. Getting enough dietary antioxidants along with a healthy lifestyle may help prevent many health problems down the line. Susceptibility to infection is one, but we have yet to see exactly how this plays out for the new coronavirus [R, R].

Resveratrol has one well-known flaw: poor bioavailability. It is absorbed in the gut a bit better than other polyphenols (like quercetin) but gets broken down fast, leaving little free resveratrol in the bloodstream.

Some ways to potentially increase the bioavailability of resveratrol include [R, R]:

- Taking it with piperine, a natural compound found in black pepper
- Combining resveratrol with other polyphenols or flavonoids
- Searching for Liposomal or nano-resveratrol formulations
- Taking resveratrol along with a high-fat meal

Resveratrol is found mostly in grape skin and red wine. “Itadori tea” (made from Japanese Knotweed) is another great source. Some berries, legumes, dark chocolate, peanuts also contain smaller amounts [R, R].

Dosage:
Most supplements will have 50-500 mg of resveratrol, although some contain up to 1,200 mg. Clinical studies typically used 150-500 mg/day by mouth [R]. Evidence suggests that trans-resveratrol is the more active form (compared to cis-resveratrol). Make sure to check the supplement label.

Does Joe Recommend?
Resveratrol does have some activity against coronaviruses. However, I would only recommend resveratrol if it comes up for genes you are at risk for.

Important When You Have The Negative Variants Of:

- VEGF Gene
- ACE2 Gene

Reishi Mushroom

Reishi mushroom is a potent fungus that has been used for thousands of years in traditional Chinese medicine. Proponents claim it is especially good at modifying the immune system by increasing it when weakened, or lowering it when it is too active [R].

Studies have also shown that reishi may reduce inflammation in rheumatism, asthma, and pink eye without notable side effects [R].

During later stages of COVID-19, antiinflammatory substances may be beneficial in preventing a cytokine storm.

Reishi has also been used to improve lung function, which is important with COVID-19, because it can be particularly hard on the lungs, and people often need oxygen and ventilators.

Dosage:
Because reishi mushroom is not approved for any conditions, there is no official dose. Users and supplement manufacturers have established unofficial doses based on trial and error. They normally recommend taking 1-2 caps per day of the extract. In clinical trials, doses of up to 6 grams of extract per day were used depending on the condition [R, R, R, R, R, R].

Does Joe Recommend?
Reishi is my favorite medicinal mushroom and I recommend it as a supplement to boost the immune system before being exposed to COVID-19. You should especially take it if you have genes where it's recommended.

Important When You Have The Negative Variants Of:

- MBL2 Gene

Shiitake Mushrooms

Shiitake is an edible mushroom from East Asia, praised for its nutritional and healing properties. It's one of the pearls of traditional Chinese medicine. Folks mostly take it to boost immunity, longevity, circulation, and liver health [R, R].

Scientists haven't yet tested shiitake mushrooms against the new coronavirus (SARS-CoV-2 or COVID-19), but a standardized mixture of polysaccharides from shiitake mushroom (AHCC) activated immune cells in humans and animals with viral infections such as [R]:

- Influenza B (in humans) [R]
- Hepatitis C (in humans) [R]
- Human Papillomavirus (in humans and mice) [R]
- Influenza A (H1N1) (in mice) [R, R]
- Avian influenza virus (H5N1, in mice) [R]
- West Nile encephalitis (in mice) [R]

Dosage:
When using shiitake as a food, a standard portion is 15g dried mushrooms (4 pieces). That would equal about 150g of raw mushrooms. There are no official doses for shiitake supplements, but manufacturers suggest using 1-2g of dry extract daily (10-20g powdered mushrooms) or 1-2 ml of liquid extract (20-40 drops). In healthy volunteers, 5-10g of shiitake daily was sufficient to enhance their immunity [R].

Does Joe Recommend?
Shiitake is a great supplement to take before getting COVID-19 to make sure your immune system is working optimally when you get it to fight the virus so that the load doesn't get too high before it's too late. You should especially take it if you have genes where it's recommended.

Important When You Have The Negative Variants Of:

- MBL2 Gene

Maitake

Maitake mushrooms are praised for their immune-boosting properties. They can support bone marrow function and increase the activity of protective white blood cells.

Maitake was able to suppress different viruses in preclinical research, including the influenza virus, which can have similar respiratory complications as the new coronavirus. It also improved the two main risk factors for severe COVID-19 infections: high blood pressure and diabetes.

They likely work by inhibiting the renin-angiotensin system (RAS). In theory, this may increase the expression of ACE2 receptors and worsen COVID-19 infection, but it's too early for conclusions [R, R].

This mushroom is available in various supplement forms. Dry extracts (caps, bulk powders) and liquid extracts (tinctures) are the most common, and some of them are standardized to 30% of D-fraction.

Dosage:
For boosting the immune response, the effective dosage in one clinical trial was 3 mg/kg, twice daily. That would be 420 mg of maitake extract daily for a 70-kg adult [1].

Does Joe Recommend?
Maitake is a great supplement to take before getting COVID-19 to make sure your immune system is working optimally when you get it to fight the virus so that the load doesn't get too high before it's too late. You should especially take it if you have genes where it's recommended.

Important When You Have The Negative Variants Of:

- MBL2 Gene

Oregano

Oregano is not just a tasty aromatic herb, it's also been in use as a natural antiseptic since Ancient Greece. Added to meals, oregano supports heart health and antioxidant defense. It seems to be active against enveloped viruses in test tubes as well.

Among the compounds found in oregano, thymol and carvacrol have the strongest antimicrobial activity [R, R, R].

In animals and cells, oregano essential oil and its active compounds inactivated viruses that cause [R, R]:

- Contagious diarrhea and vomiting (murine norovirus)
- Cold-like symptoms and respiratory infections (respiratory syncytial virus)
- Gut and heart inflammation (coxsackievirus B3)
- Cold sores (herpes simplex virus type 1)

The last 3 viruses belong to a larger family of *enveloped viruses*. The 2019 coronavirus is the newest member of this family [R].

The fact that oregano oil was active against enveloped viruses is encouraging because envelopes help viruses stick to host cells. These tiny rod-like structures also make viruses much more aggressive and successful at invading cells (which is called *viral infectivity*). All coronaviruses, including the strain behind the pandemic, are enveloped [R].

Limited human studies reveal that oregano may help boost antioxidant defense and heart health. This could be important amid the current pandemic, as staying healthy might reduce your chance of serious COVID-19 complications.

Dosage:
The recommended dosage of oregano/its essential oil varies. Using roughly 1 g/day of the dried herb may provide enough antioxidants [R]. Doses used in clinical trials were:

- Antioxidant effects: 25 mL extract after meals or 300-600 mg/day phenolic compounds [R, R]
- High blood cholesterol: 25 mL extract after meals [R]

Does Joe Recommend?
Oregano oil is a supplement that is good both before and after catching COVID-19. You should especially take it if you have genes where it's recommended.

Important When You Have The Negative Variants Of:

- IL6 Gene

Licorice

Licorice refers to the root of the *Glycyrrhiza glabra* plant which is often used for its sweet flavor.

This plant root is also used in many traditional herbal medicines, where it is believed to help with digestive issues, cough, menopausal symptoms, and infections [R].

According to research, there may be some validity to these claims as researchers have found that the active compounds inside licorice may have antiviral properties [R].

One of the main active compounds inside licorice is glycyrrhizin, which has a variety of effects in the body, including antiviral properties [R].

According to research, glycyrrhizin may help fight infections through several mechanisms, including [R]:

- Interfering with the ability of viruses to release from infected cells
- Inhibiting virus gene expression
- Activating the development of T-cells

Licorice contains many other biologically active compounds that may also have antimicrobial properties, such as licochalcone A, liquiritigenin, and glabridin [R].

There is some evidence that licorice may help fight certain infections, including viruses that are closely related to the current coronavirus outbreak.

However, research in humans is limited and often involves products that contain several different herbal ingredients in addition to licorice, making it difficult to evaluate its true effect.

Dosage:
A large majority of clinical trials on licorice have studied it as a component of various herbal mixture products, making it difficult to identify an ideal dose. For those that do decide to take licorice, it is important to limit your intake of glycyrrhizin. According to some studies, daily glycyrrhizin intake should not exceed 0.2 mg/kg of body weight [R, R].

Does Joe Recommend?
Licorice could be a good supplement that you take after you get COVID-19, however, only people with low blood pressure would do well on it. If you have high blood pressure, don't take it, even if it shows in your genetic recommendations. However, if your blood pressure is normal, then I would recommend it, especially when it's recommended based on your genes.

Important When You Have The Negative Variants Of:

- MYD88 Gene
- MBL2 Gene
- IL6 Gene

Vitamin B

The various B vitamins play many important roles in the body, including several key effects in the immune system. This has led some researchers to evaluate their impact on infections [R, R].

For example, a study looking at almost 2,500 Indian children found that the group with the lowest vitamin B9 levels had a 44% higher incidence of lower respiratory tract infections [R].

Research suggests that B vitamins affect the immune system in several ways, such as:

- Increasing the number of T cells [R]
- Promoting the activity of macrophages, a type of white blood cell [R]
- Activating antimicrobial peptides [R]
- Helping the immune system recognize bacteria [R]
- Maintaining the effectiveness of natural killer cells [R]

Overall, B vitamins have beneficial effects on the immune system, primarily by helping components of the immune response identify and eliminate harmful intruders.

Dosage:
The various B vitamins all have different recommended dosages. Most people get enough B vitamins from their diet, but deficiencies can occur.

- Vitamin B3 – 16 mg for adult men, 14 mg for adult women
- Vitamin B5 – 5 mg for adults
- Vitamin B6 – 1.3 mg for adults between the ages of 19 and 50
- Vitamin B9 – 400 mcg for adults
- Vitamin B12 – 2.4 mcg for adults

Does Joe Recommend?
Get your blood checked for these and upload them to LabTestAnalyzer. If you are taking brewer's or nutritional yeast, I mix a few capsules with these because a small amount goes a long way.

Iron

Iron (Fe) is an essential element. Your body needs iron to [R, R, R, R, R, R]:

- Mount an effective immune response
- Build resistance to infections
- Produce red blood cells and energy
- Transport oxygen in the blood and muscles
- Protect cells against free radical damage, as a part of antioxidant enzymes (including catalases)

Because of these powerful roles, low iron levels can have detrimental health effects. On the other hand, excessive levels of iron can trigger reactive oxygen species that damage tissues and DNA [R, R].

Therefore, it's important to keep iron levels in balance.

Preliminary data suggest that coronavirus may alter iron balance in the body. Low blood iron and high ferritin levels have been linked with worse COVID-19 outcomes, but this has yet to be confirmed.

Iron is an important dietary nutrient that we need in just the right amounts. Too much iron might worsen inflammation, which can make COVID-19 more serious. On the other hand, iron deficiency may increase susceptibility to infection.

Make sure to get enough iron from both vegetables and meat as part of a healthy diet. Don't supplement unless recommended by a doctor.

Dosage:
Adults require at least 8 mg of iron per day [R, R]. Women of childbearing age (19 – 50 yrs) should get around 18 mg/day. Infants and children 1 to 3 years require 11 and 7 mg/day, respectively, while children aged 4 – 8 and 9 – 13 require at least 10 and 8 mg/day [R, R].

Joe's take:
Being iron deficient is detrimental for health. It's especially bad for COVID-19 because there's research that shows that the new coronavirus targets red blood cells and causes even lower iron.
People feel like they have mountain sickness in part because they don't have enough hemoglobin. You need iron for hemoglobin.
Therefore, get your iron labs checked (RBC, hemoglobin, serum iron, ferritin, transferrin) and upload them to LabTestAnalyzer.
If it's suboptimal, eat more red meat. If that doesn't work, take 18mg a day of iron until you get these labs in the optimal range.

Important When You Have The Negative Variants Of:

- IL13 Gene

Selenium

Selenium is a crucial antioxidant and supports the immune system and antiviral response. A deficiency in selenium impairs the immune response, while supplementation activates white blood cells and helps them destroy cancer cells and pathogens.

Lack of selenium can set off the immune system and cause even harmless viral infections to progress and become dangerous. Scientists have observed this phenomenon for influenza and coxsackievirus [R, R, R, R, R, R].

Interestingly, one variant of coronavirus isolated from a selenium-deficient region (Hubei province) was more similar to human SARS-CoV-1 than the variant from a selenium-adequate region (Guangdong province). SARS-CoV-1 is a form similar to COVID-19 (SARS-CoV-2) that also causes respiratory complications [R, R, R].

Studies seem to show that selenium supplementation may have antiviral effects, especially in deficient people, whose nutritional status may impair the immune response [R, R].

Dosage:
Selenium exists naturally in a variety of foods, the best sources being Brazil nuts and fish [R, R, R]. Although the RDA is 55 mcg, most clinical studies used selenium doses of 100-200 mcg/day, taking into account all sources. If you can't achieve this intake with food, consider taking a supplement.
The Tolerable Upper Intake Level for selenium in adults is 400 mcg/day. That is the maximum daily intake at which no adverse health effects are expected in most people [R, R].

Does Joe Recommend?
Selenium is a mineral that is easy to get more than enough of in food if you eat a healthy diet. It's something that needs to be balanced, so I recommend eating healthy rather than getting it from food. You want to double check that you're eating foods high in selenium, especially if you have genes that would benefit from more selenium.

Important When You Have The Negative Variants Of:

- VEGF Gene
- IL8 Gene
- CCL2 Gene

Omega-3

Omega-3 fatty acids are a type of polyunsaturated fat that have important anti-inflammatory effects.

Examples include EPA and DHA, which are commonly found in fish oils, and ALA, which is found in plant oils [R].

Omega-3 fatty acids have many purported health benefits. With the current coronavirus outbreak, their potential ability to help fight infections and improve lung function are of particular interest [R, R].

Omega-3 fatty acids are known for their anti-inflammatory effects. They can influence inflammation through several mechanisms, such as [R]:

- Reducing the gene expression of inflammatory compounds
- Altering the concentration of proteins and hormones that affect inflammation
- Helping produce resolvins, an anti-inflammatory compound

There's also some evidence that the fatty acids EPA and DHA may stimulate the immune system to better fight infections [R].

In addition, some of the compounds that EPA and DHA help to produce, such as resolvins and protectins, have antibacterial and antiviral properties [R].

Dosage:
There is no official recommended dose of EPA and DHA, but most experts suggest getting about 1-3 grams each day [R]. ALA is considered an essential fatty acid and male adults should get at least 1.6 grams while female adults should get at least 1.1 grams [R].

Does Joe Recommend?
I recommend taking 1g of fish oil a day, or more if your platelets are suboptimally high or your blood is too thick. Make sure to check this in your lab tests on LabTestAnalyzer.

Important When You Have The Negative Variants Of:

- IL18 Gene
- TNF Gene
- CYP1A1 Gene
- FAAH Gene
- NOS3 Gene
- VEGF Gene
- AGER Gene
- CCL2 Gene

Bee Pollen

Bee pollen is a nutritious bee product used as a dietary supplement and traditional remedy for immunity, microbial infections, liver health, and more. It is rich in immune-stimulating polysaccharides, such as glucans and galactans, researched for their potential anti-cancer effects [R, R, R].

Preliminary research brings up the potential of BP to combat an array of pathogenic microbes, mostly bacteria [R, R, R, R].

In a small study of 20 professional swimmers, a six-week supplementation with pollen extract significantly reduced “the number of training days missed due to upper respiratory tract infections” (4 days vs. 27 days with placebo) [R]. In another study, active components from plant pollen inhibited the spreading of three flu virus subtypes (H1N1, H3N2, and H5N1) in test tubes.

Dosage:
Clinical trials on bee pollen are few, and they have used different, unstandardized BP extracts (150-300 mg). It's hard to determine the precise recommended dosage, but traditional uses suggest up to 3-5 teaspoons for adults and 1-2 teaspoons for children [R, R, R]. Start with a much lower dose — ¼ teaspoon or just a few grains for children — and observe for the signs of an allergic reaction. If you tolerate BP well, you can gradually increase up to the maximum doses above [R].

Does Joe Recommend?
I don't recommend taking this by itself, but with honey it's a good idea.

Chaga

In cells, chaga mushroom extract inhibited the following viruses:

- Hepatitis C [R]
- Oral herpes [R, R]
- Epstein-Barr [R]
- HIV [R]
- Viral diseases in cats and mice [R, R]

Additionally, chaga may reduce inflammation by blocking an over-activated immune response [R].

Inflammation can be problematic in a cytokine storm that results in respiratory distress, which is a key issue with the COVID-19 virus.

Chaga extract reduced pro-inflammatory pathways (NF-kB) and messengers (nitric oxide and PGE2) in rats and decreased the response to pain [R].

Chaga also reduced inflammation in mice with IBD by suppressing cytokines (TNF-alpha and IL-1beta) and messengers (nitric oxide) [R].

Diabetes is a risk factor for complications in COVID-19.

In diabetic mice, chaga extract significantly decreased blood glucose, insulin, and fat levels. This may help prevent both diabetes and its complications [R].

Does Joe Recommend?
Chaga is a balancing medicinal mushroom. It's a healthy option before or after COVID-19 infection.

Important When You Have The Negative Variants Of:

- MBL2 Gene

Agaricus Blazei

In a small trial on 5 people with chronic hepatitis C, *Agaricus blazei* extract slightly reduced viral load and induced some immune-related proteins [1].

In cell-based studies, *Agaricus blazei* polysaccharides inhibited the viruses that cause:

- Poliomyelitis [R]
- Oral and genital herpes [R, R]
- Common flu [R]
- Western equine encephalitis [R]

Agaricus does have general immune stimulatory properties, which may be good in general if you're immunodeficient.

The cell wall of *Agaricus blazei* and other fungi contains β-glucans that are recognized by immune cells and stimulate the immune response [R, R].

In a clinical trial on 100 women with gynecological cancers, treatment with *Agaricus blazei* extract increased natural killer cell activity [R].

Additionally, in cells, beta-glucan-rich Agaricus blazei extracts increased the production of cytokines (TNF-alpha, IL-1beta, IL-6, IL-8, and MCP-1) growth factors (G-CSF), and messenger molecules (nitric oxide and ROS) [R, R, R, R, R].

Does Joe Recommend?
I don't recommend this by itself, but with other mushrooms, it can be good.

Monolaurin

Scientists think monolaurin might disrupt virus replication by blocking DNA replication signals. In the lab, when monolaurin binds to the viral envelope, it makes the virus more susceptible to the immune system [R, R].

Monolaurin might be active against viruses that have a fat (lipid) membrane on the outside. Since monolaurin is the same size as the fat molecule of the virus, it absorbs into the cell's fat layer. Since it does not have good binding power, the skin envelope breaks apart. This prevents the virus from attaching and entering host cells, stopping infection and replication. Have in mind that this is still just an unproven theory based on cellular studies [R, R].

In one study, glycerol monolaurate increased the proliferation of T cells (but not B cells) [R].

However, another study found that this compound also alters the fatty membrane of T cells, resulting in changes in their signaling and function (e.g., reduced production of cytokines such as IL-2, IFN-γ, TNF-α, and IL-10) [R].

This implies that monolaurin may impair immune function and potentially do more harm than

good in case of COVID-19.

Keep in mind that this is all theory, and there's no good evidence to know if it would help or be harmful in COVID-19.

Does Joe Recommend?
I do not recommend monolaurin, because it has some properties which inhibit the immune response.

Lactoferrin

Lactoferrin is a glycoprotein produced by glands and white blood cells (neutrophils) during inflammation that has strong antibacterial, antiviral, and immunoregulatory activity [R].

Lactoferrin can exert changes on white blood cells, through increasing natural killer cell, neutrophils, and macrophage activities. This increases cytokine, and nitric oxide production as well as limits pathogen growth [R, R, R]. Lactoferrin also affects adaptive immune cells (T-cells and B-cells) [R].

Several studies have shown that lactoferrin does have some general anti-infection properties.

In 2 clinical trials on 312 bottle-fed babies, supplementation with bovine lactoferrin reduced the incidence of respiratory tract infections and symptoms such as running nose, cough, and wheezing [R, R].

A combination of lactoferrin and whey protein reduced the incidence and severity of common colds in another trial on 126 people [R].

In human cells, lactoferrin also inhibited hepatitis B [R], HPV [R], rotavirus [R], respiratory syncytial virus [R], and influenza [R] by using similar mechanisms.

Lactoferrin helped reduce airway inflammation in a mouse asthma model [R]. Similarly, a lactoferrin spray reduced airway hyperreactivity and narrowing in asthmatic sheep [R]. In cells, it blocked histamine release [R].

Does Joe Recommend?
Yes, I highly recommend it, especially if your iron levels are low or high. If you need iron, you should take this while you supplement.

Propolis

Overall, propolis shows antimicrobial potential in test tubes, animals and a few low quality human trials. There are no cell based studies on the novel coronavirus at this time.

We don't really know the impact on taking propolis for infections, especially COVID-19, but it seems like a generally healthy immune support supplement.

A number of studies have shown that propolis may be helpful for respiratory viruses.

In an old clinical trial on 50 people with a common cold caused by rhinovirus, propolis sped up recovery [R].

A propolis extract (NIVCRISOL) reduced the number of cases with chronic symptoms and the presence of pathogens in the upper airways in a clinical trial of children with rhinopharyngitis [R].

Additionally, an herbal preparation with propolis, echinacea, and vitamin C reduced the incidence and duration of respiratory infections in a trial on 430 children [R].

Propolis extract was active against the viruses that cause the following disease in test tubes:

- Oral and genital herpes [R, R, R, R]
- Chickenpox [R]
- Common flu [R, R]
- AIDS [R, R, R]
- Polio [R]
- Newcastle disease [R]

Propolis and its active compounds also stimulated the immune system in animals vaccinated against the following viruses:

- Bovine herpesvirus type 5 [R]
- Porcine parvovirus [R]
- Suid herpesvirus type 1 [R, R]
- Newcastle disease [R, R]

Additionally, asthma is a risk factor for complications in COVID-19, so theoretically, improving asthma can reduce your risk of complications if you get COVID-19.

In a small trial on 24 asthmatic patients, those receiving propolis showed a reduction in the incidence and severity of nocturnal attacks and an improvement in lung function.

Does Joe Recommend?
I recommend this as part of a mixture with honey or on its own.

Colostrum

Consuming colostrum is a healthy way to boost the immune system. Though there's no direct evidence that it can be helpful for COVID-19, several clinical trials suggest there may be some benefit for respiratory infections, the flu, HIV, and other infections.

In a clinical trial with 12 healthy people, colostrum increased white blood cell activity (such as monocytes) and T cell levels (CD3+) after 1 hour. It also briefly reduced blood levels of natural killer cells. After a couple of hours, new natural killer cells entered the blood, which restored their levels [R].

Several studies revealed that colostrum may be beneficial for people with respiratory illnesses and infections.

In one clinical trial of 174 people, fewer people reported upper respiratory tract infection symptoms when taking 60 g/day of colostrum protein for 8 weeks compared to whey protein [R].

In 5 clinical trials on 152 athletes or physically active people, supplementation with bovine

colostrum during periods of intense exercise was effective at reducing the incidence of upper respiratory infections [R, R], enhancing the immune system [R, R], or both [R].

Colostrum has often been called the “baby’s first vaccination”.

Interestingly enough, two studies with 285 people suggest that colostrum, either on its own or in combination with other drugs, may be a superior means of prevention compared to a vaccine. People who took colostrum had the flu for fewer days than people who received the vaccine [R, R].

Does Joe Recommend?
I strongly recommend colostrum to people who are not sensitive to dairy. This can be good both before or after you get sick.

Ginger

Ginger is a healthy spice that has anti-microbial and anti-viral activity against a range of viruses in test tubes and a few animal studies. Ginger seems to have some limited clinical evidence for ARDS and asthma, but more research is needed.

The most serious complication of COVID-19 is acute respiratory distress syndrome (ARDS) and lung failure.

In 32 critically ill patients with ARDS and dependent on mechanical ventilation, a diet supplemented with ginger (given through a feeding tube) improved blood oxygen levels, reduced the duration of mechanical ventilation, and prevented pneumonia [R, R].

Ginger, therefore, seems like a promising approach to reduce inflammation of the lungs.

Animal studies hint that ginger may be better for Th2 dominance. Zerumbone, an active ingredient in ginger, enhanced the Th1 and reduced the Th2 response in mice with allergic asthma. It decreased the production of various Th2 immune substances, helping rebalance the immune system and reduce allergies. Ginger-treated mice had fewer asthmatic symptoms,

mucus, and lung inflammation [R].

Does Joe Recommend?
Raw ginger is an incredible food. I recommend drinking as a tea, cut up ginger in its raw form.

Important When You Have The Negative Variants Of:

- AGER Gene
- MX1 Gene

Honey

One of the symptoms and biggest annoyances of COVID-19 is a dry cough.

A clinical trial showed that honey significantly lowered frequency, severity, and annoyance of cough in 300 children. It also improved sleep quality for the children and their parents [R].

For acute coughs for children, a meta-analysis of 3 trials and 568 children concluded that honey was better than no treatment, diphenhydramine (Benadryl), or placebo for relief. Honey was not better than dextromethorphan, though, and there was no strong evidence either for or against the use of honey to treat an acute cough [R].

In test tubes, honey inhibited the viruses that cause the flu [R] and chickenpox [R]. A compound isolated from honey (methylglyoxal) was active against HIV in another study [R].

Honey killed several microbes, including those that cause pneumonia (Klebsiella pneumoniae) and upper respiratory tract infections (Haemophilus influenzae), in antibacterial studies [R, R].

Overall, raw honey has anti-microbial properties and is a traditional home remedy for respiratory infections, and is worthwhile to try.

Does Joe Recommend?
I strongly recommend honey for coughs and when you're sick. Before it also good.

Melatonin

Melatonin is known as the sleep hormone, but it also plays a role in regulating the immune response.

The membranes of immune cells such as CD4+ T cells, CD8+ T cells, and B cells all have melatonin receptors. By binding to them, melatonin can either activate or suppress these cells and modify the immune response [1].

Melatonin also reduces inflammation by blocking major inflammatory hubs such as NF-KB. This results in a decreased production of pro-inflammatory cytokines such as IL-1β, IL-2, IL-6, IL-12, TNF-α, and IFN-γ [2, 3].

Importantly, it blocks NLRP3. This protein complex amplifies inflammation during lung infections and contributes to the development of ARDS [4, 5].

In line with this, melatonin relieved acute lung injury and prevented its progression to ARDS in rats and mice by blocking NLRP3 [10, 11, 12].

Melatonin seems to counteract the negative effects of viral infections, including the development of ARDS, through its anti-inflammatory and antioxidant activities. Although evidence is lacking, some scientists believe it may have this protective effect in people infected with SARS-CoV-2 as well [5].

Melatonin has been reported to indirectly regulate the production of the ACE2 receptor, which the SARS-CoV-2 virus uses to enter cells. It may do so by blocking calmodulin, a protein that interacts with ACE2 to promote its expression at the cell surface [25, 26, 27].

Does Joe Recommend?
If you have blue blocking glasses for night time, melatonin isn't needed. If not, then I recommend it.

Important When You Have The Negative Variants Of:

- MYD88 Gene

Black Cumin Seed

Black seeds and their oil have a long history of folklore usage in the Indian and the Arabian civilizations as food and medicine and have been commonly used as treatment for a variety of health conditions pertaining to the respiratory system, cardiovascular system, and immune system support, as well as for general well-being [R].

Black cumin is best known as an anti-inflammatory supplement.

A boiled extract of the seeds improved asthmatic symptoms in one study (15 mL/kg of 0.1 g boiled extract daily) of 29 asthmatic patients. It reduced the frequency of asthma symptoms, wheezing, and improved lung function over 3 months. The patients who took black cumin seed extract also had a reduced need for additional medications and inhalers [R].

Additionally, a couple of small-scale human studies suggest that black seed may help reduce allergic symptoms, especially in people with breathing difficulties.

Some scientists believe that black seed may also help with breathing problems that are not caused directly by allergies. The boiled extract of the seeds improved breathing and

lung function, reducing the need for inhalers, in a study of 40 chemical war victims who had breathing difficulties [R].

Also, in a clinical trial on 186 people with inflammation in their tonsils or throat, capsules containing black seed and chanca piedra extracts relieved pain and swallowing difficulties, and reduced painkiller use [R].

Does Joe Recommend?
Black cumin is a great everyday supplement before getting coronavirus. It's less recommended during an infection.

Important When You Have The Negative Variants Of:

- IL10 Gene
- IL6 Gene

Elderberry

Elderberries are glossy, tart, deep-purple fruits of the *Sambucus* tree. Among many varieties, the most common one is the European elder or black elderberry (*Sambucus nigra*) [R].

Elderberry is a common supplement taken to reduce the symptoms and severity of the flu.

Sambucol is a popular, widely-available brand of standardized elderberry extracts. In clinical studies with over 80 people with influenza A or B, taking Sambucol syrup for 5 days relieved flu symptoms 4 days faster than the placebo [R, R, R].

Elderberry lozenges (4x/day) reduced fever, headache, muscle pain, and nasal congestion within 48 hours in a clinical study on 64 people with the flu [R].

In multiple clinical trials, elderberry helped reduce the symptoms of the common cold and sinus infections. It also has direct antiviral activity against some coronaviruses.

In one clinical study of 312 people traveling overseas from Australia, elderberry extract reduced the severity and duration of common cold symptoms compared to the placebo [R].

Additionally, elderberry extract was active against the human coronavirus NL63 in test tubes. This virus mainly causes lower respiratory diseases in children and is one of the three known coronaviruses that invade cells via the same receptor as SARS-CoV-2 (ACE2) [R].

Does Joe Recommend?
I recommend elderberry lozenges when you come down sick. It's not necessary for prevention.

Important When You Have The Negative Variants Of:

- CCL2 Gene
- MBL2 Gene

Royal Jelly

Royal jelly is a milky substance secreted by honey bees and fed to developing offspring. Like honey, it can be harvested by beekeepers from honey bee colonies grown in unique queen-making beehives.

Royal jelly can affect the immune system by balancing levels and improving responses of specific immune cells [Th1/Th2]. In mice, supplementation shifted the immune response to an allergen from Th2 to Th1 dominance, reduced allergen levels in the blood, and improved skin allergy response [1, 2].

As opposed to propolis, which improved asthma symptoms in mice, both royal jelly and honey worsened them. This may be due to their immuno-stimulatory and vasodilatory effects [5]. However, its protein MRJP3 did reduce allergic responses in asthmatic mice [6].

In fact, royal jelly has been reported to *cause* allergic reactions with asthma, respiratory distress, and anaphylaxis in sensitized people [7, 8, 9, 10].

Does Joe Recommend?
I would recommend it as part of a honey mixture, not on its own.

Schisandra

Schisandra, also referred to as Schizandra or *Schisandra chinensis,* comes from a vine native to China and parts of Russia. Its berry is used as a form of traditional Chinese medicine.

The fruit is also known as the Five Flavor Berry because its taste captures the five major flavors – sour, sweet, salty, bitter, and spicy [1].

In a pilot trial on 50 people with chronic hepatitis C, an oral combination of antioxidants including schisandra reduced viral load, ALT levels, and tissue damage in 25-44% of the patients and improved health assessment in 58% [2].

Compounds isolated from different schisandra species were active against the following viruses in test tubes:

- HIV [10, 11, 12, 13, 14, 15]
- Herpes simplex 1 [16, 17]
- Epstein-Barr virus [18]

In 60 pneumonia patients, a product containing rhodiola, schisandra, and Siberian ginseng (ADAPT-232) reduced the duration of antibiotic treatment and improved quality of life, compared to standard treatment alone [19].

In an antibacterial study, lignan-containing schisandra extract inhibited a microbe that causes pneumonia (*Chlamydia pneumoniae*) [20].

Both schisandra extract and its compound schisantherin A reduced lung inflammation and acute respiratory distress syndrome caused by bacterial lipopolysaccharide (LPS) in mice [23, 24].

The combination of schisandra's active compound schisandrin B and licorice's glycyrrhizin protected mice from lung tissue scarring caused by a chemotherapeutic drug (bleomycin) [25].

Does Joe Recommend?
I would only recommend it if you're immunodeficient as a result of chronic stress.

Important When You Have The Negative Variants Of:

- VEGF Gene

Ginseng

Ginseng is a plant found in North America and eastern Asia. There are many different types of ginseng, such as American ginseng, Korean red ginseng, Indian ginseng, and Siberian ginseng. American ginseng is a very popular variety [1, 2].

In a trial of 227 people, those who took 100 mg of an Asian ginseng extract (G115) were less likely to catch a cold or flu. The ginseng group also had higher levels of NK cell activity [3]. In another trial on 100 people, Asian ginseng reduced the incidence and severity of upper respiratory infections [4].

According to a review of 12 studies involving 1,560 COPD patients, Asian ginseng may improve the quality of life and lung function and enhance the effectiveness of drug treatments. However, the authors warned that most studies carried out up to then (2011) had a high risk of bias [22].

Evidence suggests that ginseng boosts immune function. Those taking red ginseng powder during chemotherapy treatment had a higher 5-year disease-free survival and overall survival rate in a study on 42 people [51].

In another trial on 96 people with lung cancer, ginseng carbohydrates enhanced the immune function by increasing Th1 cytokines (IFN-gamma and IL-2) while reducing Th2 cytokines (IL-4 and IL-5) [52].

Does Joe Recommend?
Ginseng is a good herb, but the quality can vary a lot with different pills. I think most ginsengs on the market are not very effective.

Important When You Have The Negative Variants Of:

- VEGF Gene
- TNF Gene
- IL17A Gene

Probiotics

Probiotic supplements including different species of *Lactobacillus* (*L. casei*, *L. paracasei*, *L. delbrueckii*, *L. rhamnosus*, *L. plantarum*, *L. acidophilus*, and *L. gasseri*) and *Bifidobacterium* (*B. animalis* and *B. bifidum*) reduced the incidence and duration of respiratory tract infections in multiple studies on both adults [R, R, R, R, R, R, R, R, R, R] and children [R, R, R, R, R, R, R].

Probiotics have been suggested to work by correcting imbalances in the gut microbiota that cause an impaired immune system [R].

Does Joe Recommend?
One of the symptoms of COVID-19 is gut issues. I would take this before and during COVID-19. Make sure to get one with 30 billion or more species per a pill.

Important When You Have The Negative Variants Of:

- OAS-1 Gene
- MX1 Gene
- IL6 Gene

Andrographis

Andrographis extracts reduced symptoms such as cough, sore throat, runny or stuffy nose, and headache in people with uncomplicated respiratory tract infections [R, R, R, R].

A meta-analysis of 33 trials with over 7k people concluded that andrographis can help reduce the severity and duration of respiratory infections [R].

There are also promising studies looking into the effects of andrographis in people with pneumonia [R].

In mice with flu and pneumonia, andrographis improved survival and inflammation when used as an add-on to conventional drugs [R, R].

Does Joe Recommend?
I would recommend Andrographis as a good supplement before or during COVID-19.

Important When You Have The Negative Variants Of:

- CYP1A1 Gene
- AGER Gene
- IL6 Gene

Ashwagandha

Several studies have indicated that ashwagandha could help with lung function. In a clinical trial on 40 elite cyclers, 8-week supplementation with ashwagandha improved respiratory endurance [R].

An herbal remedy containing ashwagandha sped up recovery from viral hepatitis in 29 patients [R].

Ashwagandha has also shown antiviral activity against HIV, herpes, and infectious bursal disease in cell-based studies [R, R, R, R].

Interestingly, a recent simulation study suggested that withanone may help prevent the SARS-Cov-2 virus from binding to the ACE2 receptor, and thus entering cells [R].

In asthmatic mice, pretreatment with withaferin A reduced airway inflammation, injury, and scarring. This compound also had anti-inflammatory effects in human cells isolated from the airway lining [R, R].

There is also some evidence that ashwagandha may help with immunity. In a small trial of 5 people, ashwagandha extract improved the immune response by activating white blood cells. In two other trials on 142 people, an herbal mix containing ashwagandha increased the activity of natural killer cells [R, R].

In mice, ashwagandha extract enhanced immunity by activating bone marrow cells, macrophages, and lymphocytes [R, R].

Does Joe Recommend?
If you have negative variants for the ACE2 gene, I would highly recommend Ashwagandha.

Important When You Have The Negative Variants Of:

- ACE2 Gene

Skullcap

Baicalein is a flavone, a type of polyphenolic flavonoid, that is extracted from the roots of Scutellaria baicalensis and Scutellaria lateriflora.

Baicalin is a flavone glycoside, the glucuronide of baicalein, which is obtained through the binding of glucuronic acid to baicalein. It is primarily used in Asian countries as an herbal supplement.

Pure baicalin improved lung function in rats suffering from allergic diseases [R].

When given to asthmatic rats as a pretreatment, baicalin stimulated a healthy remodeling of the airway. Similarly, baicalein reduced airway inflammation, injury, and remodeling in asthmatic mice [R, R, R].

Traditionally, Chinese skullcap is used to fight off infections, especially respiratory ones. A meta-analysis of 8 clinical trials concluded that the Chinese medicine Shunag Huang Liang may relieve fever, cough, sore throat, and reduce the disease course in acute upper respiratory tract infections. However, the authors warned about the poor quality of the included studies [R].

Skullcap extract, herbal medicines containing it (KIOM-C and San Wu Huangqin), and its active compound baicalein improved survival and reduced viral load, lung injury, and inflammation in mice infected with the 2009 swine pandemic flu (H1N1). In one of them, baicalein enhanced the effects of the antiviral drug ribavirin [R, R, R, R, R, R, R].

In one cell study, skullcap was more effective in reducing the replication of the swine flu virus than a drug used to treat and prevent it (oseltamivir phosphate) [R].

Skullcap, herbal formulations containing it, and its active components also inhibited the following viruses in test tubes:

- Enterovirus 71 [R, R]
- Hepatitis B [R]
- Hepatitis C [R]
- Duck hepatitis A virus [R]
- Dengue [R, R]
- Coxsackievirus B3 [R]
- Epstein-Barr virus [R]
- Tick-borne encephalitis virus [R]

Does Joe Recommend?
Skullcap would be recommended if you have negative genetic variants for MX1 or you have anxiety, since it can also help anxiety.

Important When You Have The Negative Variants Of:

- MX1 Gene

Curcumin

Some clinical trials suggest that two months of curcumin supplementation at 500 mg/day can reduce hay fever symptoms like sneezing, itching, runny nose, and congestion. Therefore, some scientists believe that curcumin helps balance the immune response [R].

In a study on almost 2,500 people, eating a diet rich in curcumin was associated with an improved lung function, especially among current and past smokers [R].

Because curcumin blocks cytokine release, it has been suggested to prevent life-threatening complications of severe viral infections such as ARDS and cytokine storm [R].

In mice with acute lung injury caused by severe bacterial infections, curcumin (injected, as a nose spray, and directly delivered into the lungs) prevented its progression to ARDS by reducing lung inflammation, swelling, and damage [R, R, R, R, R].

A recent study in mice suggested that curcumin protects from ARDS by promoting the development of anti-inflammatory Tregs [R].

In mice infected with the flu, curcumin increased survival and reduced lung damage, inflammation, macrophage activation, and viral load [R, R].

The anti-inflammatory and antioxidant activity of curcumin protected mice from cytomegalovirus infection as effectively as the antiviral drug ganciclovir [R].

A molecular simulation study identified curcumin and some of its derivatives as potential inhibitors of the ebola virus [R].

In a similar study, both curcumin and its derivative demethoxycurcumin were identified as potential inhibitors of SARS-CoV-2 capable of targeting its main protease [R].

This mechanism can add to the ability of curcumin to inhibit enveloped viruses by breaking down their fatty membrane [R].

Does Joe Recommend?
I'm a huge fan of bioavailable curcumin, especially if you have a lot of negative variants related to cytokines. The fact that it shows some potential against SARS-CoV2 is just another one of many reasons to take it. It can be taken before or during COVID-19.

Important When You Have The Negative Variants Of:

- IL-4 Gene
- IL-6 Gene
- IL-10

Joe's Protocol

I've been biohacking my immune system for over 10 years. I have done many experiments and I have noticed things that worked to prevent me from getting sick, and things that haven't.

Combined with my knowledge of the human body, I will let you know the secrets I have learned that have improved my immune system.

Over the years, I've done a lot of research and trial and error, and these are the top supplements that I use to prevent myself from getting sick.

- Nutritional or Brewer's yeast – contains nucleotides, cysteine, and folate, all of which feed the immune system.
- NAC – cysteine increases glutathione and is great for the respiratory system. Proven to reduce the likelihood of getting sick.
- Zinc – best mineral for immunity. I find I get sick less often when I take it.
- Reishi, Shiitake, Maitake & Medicinal Mushrooms – powerfully boost the immune system. Actually, I've gone overboard a few times in my experiments and got fevers from taking too much.
- Astragalus
- Oregano Oil – I use drops plus the pills.
- Lactoferrin
- Bee products – honey, propolis, royal jelly, pollen.
- Colostrum with honey – I take 15g of colostrum at a time if I feel I'm about to get sick or am already sick. I don't take it daily because it does have dairy and I'm a bit sensitive to it.
- Echinacea is also a good supplement, as it boosts immunity and shows some activity against coronaviruses.
- Monolaurin is specifically very good for viral infections, but I haven't been able to verify this with testing. I have taken up to 30g a day of this stuff with no noticeable side effects, whereas most supplements come with recommendations of 1-3g.

Top Foods

- Raw Garlic cloves. I cut up 1 piece into a large salad.
- Raw Ginger – I have a big glass of juiced ginger, equal parts ginger and apple. It burns but I love it.
- Raw onions – in my salad
- Salads

Lifestyle Tips

I find staying hydrated to be quite important for infection prevention. Dry weather in the winter is more likely to get you sick, because it seems viruses can take hold better in dry weather. If you drink more water, it can cause your mucus membranes to be more moist and lower the likelihood that you'll get infections. Viruses are more likely to degrade in moist conditions.

Studies have found that drinking tea, for example, can decrease the likelihood of getting a cold and flu.

I have found that when I'm stressed, I'm much more likely to get sick. Stress is known to suppress the immune system.

Not getting enough sleep is the quickest way for me to get sick.

Stress and sleep are probably the most noticeable for me in terms of preventing me from getting sick.

I have also found recently that being colder or doing cold therapy in general increases the likelihood that I get sick. It powerfully suppresses inflammation, but the immune system and inflammation are linked. You can't decrease inflammation without suppressing the immune system in some way, and vice versa. Being cold includes acute cold or chronic cold.

I have also found that if I combine too many anti-inflammatory lifestyle therapies, I am more likely to get sick. These include sun, exercise, sauna, and cold therapy.

For example, when I would get a good amount of sun and exercise while playing volleyball, doing cold therapy in the ocean often suppressed my immune system too much.

It's most important to pay attention to your body. If you are feeling run down, don't push yourself too much.

I don't support excessive sun, exercise, sauna usage or cold therapy, whereas I am a big fan of these in moderation. I also don't support combining moderate amounts of all four of these together – for example going into the sauna right after getting a lot of sun.

Moderation is the key and you should switch off between the therapies. Even moderate amounts of these therapies suppress the immune system, but the immune system needs a certain dosage of these stressors to stay in balance, and in the long term it's healthier. But in the short term, these therapies suppress the immune system.

- Drink more water, especially hot water (teas)
- Sleep well
- Stress reduction/Meditation
- Stay warm
- Don't overdo certain health behaviors (as mentioned)

Quit These

I've personally noticed that I would be way more likely to get sick if I consumed any of the following:

- Smoking (nicotine as well, but much less)
- Marijuana and drug use (cocaine, MDMA, psychedelics)
- Alcohol
- Added sugars (soft drinks, flours, etc...)
- Processed foods
- Dairy

Personal Hygiene

To be honest, I have not noticed trends between good hygiene and how often I get sick, which goes to show you how powerful the other things that I am recommending are. But these approaches make sense and are recommended by global and national health bodies.

- Frequent hand-washing
- Don't touch face
- Don't shake hands
- Fully cover mouth if you cough
- Don't bite nails or put hands in mouth
- Don't touch doorknobs, handles – I use my shirt or jacket to open doors

As a result of Coronavirus, I've been taking the following extra measures:

- Social distancing – try to keep distance from people (for more extreme times such as now)
- Cleaning my phone & laptop trackpad daily

If I eat messy foods, I'll also wear gloves, but that's more out of convenience, as thoroughly washing hands will accomplish the same thing.

And of course, listen to any guidance by the health authorities. Currently, I am in Israel and they will be enforcing a lockdown soon.

I am taking these products now (links to iherb where they are available for purchase):

- 1200mg NAC
- 30g Nutritional yeast or Brewer's yeast
- 1 capsule Echinacea/Astragalus immune mix & Astragalus/Mushroom mix
- Astragalus
- Multiple servings: Honey, Royal Jelly, Bee Pollen, Propolis Ginseng mixed in tea
- 1 serving Mushroom blend powder – 10 mushroom blend
- 1 Mushroom blend pills – includes reishi, maitake, shiitake and other immune stimulants
- 1 capsule Oregano Oil + Oregano oil drops
- 250mg Lactoferrin
- Zinc

I have this on hand as needed:

- Colostrum

The thing about my protocol is that it's personalized for me! I've been working on building this thing for YEARS, based on my research into my own genes and finding out what works best for me. I wanted to share a little more about how I built my protocol so that you can build your own personal anti-infection protocol too!

Don't get me wrong, there are lots of things in my protocol that are good for pretty much everyone when it comes to boosting your immune system. Some of these include:

- Supplementing with NAC
- Keeping stress levels low and sleeping well
- Supplementing with an Echinacea/Astragalus immune mix
- Taking Colostrum

But, there are also some health practices I follow that are tailored specifically to me and my genes.

For example, I drink a brewer's yeast shake every morning. While brewer's yeast is good for boosting immunity in general, it is particularly helpful for me because of my poorly functioning MTHFR gene. It contains B vitamins and folate that helps to increase my methylation and lower homocysteine levels, which in turn help to keep my inflammation levels low. Chronic inflammation can actually harm your immune system, so you can understand why brewer's yeast is even more important when you have the MTHFR variants that I do.

How To Build Your Own Personal Anti-Infection Protocol

1. Learn about your unique genetic variants.

The first thing you'll need to do is learn about your own genes, what issues they predispose you to and how your unique DNA affects your health. The easiest way to do this is by uploading your DNA to SelfDecode and downloading your personalized DNA Wellness Reports!

2. Identify sub-optimal genes that you want to optimize.

You can find out which genes you need to optimize by looking at your detailed personalized DNA Wellness Reports, checking your genetic scorecards on the SelfDecode blog (red sad face means it's time to optimize!) or searching your symptoms in the Symptoms and Conditions analyzer to find out which genes may be the cause of your issues.

3. Implement targeted recommendations to optimize your overall health and boost your immune system.

In order for your immune system to be strongest, it's important to keep your whole body as healthy as possible. That's why you want to look at your health as a whole when working to boost your immune system. At the end of each of your personalized reports from SelfDecode there is a list of prioritized supplements and lifestyle recommendations so that you'll know exactly what you need to do to counteract any negative effects from your genes.

Treatment / standard of care / CDC guidelines

CDC Guidelines

When to Seek Medical Advice

If you are experiencing symptoms of COVID-19, seek medical advice at once. If your city, state, or country has communicated a protocol to follow to get tested, follow those instructions carefully. If not, call your doctor to determine next steps.

The CDC has advised that most cases of COVID-19 should be treated at home, seeking a doctor's advice by phone only. The reason for this advice is that COVID-19 is highly contagious, and even physically entering a doctor's office could spread the virus to at-risk patients. However, even if you have a mild case, your local health department will want to know whether you have COVID-19. Therefore, people with symptoms of respiratory coronavirus infection should call their doctors regardless of the severity of those symptoms [R].

Home Care

Unfortunately, there are currently no vaccines, drugs, or investigational products approved by the FDA to treat COVID-19. If you are sick or caring for someone at home, the CDC recommends having your healthcare provider's phone number on hand and carefully monitoring symptoms in case they get worse. Emergency warning signs include difficulty breathing, persistent pain or pressure in the chest, confusion, or a bluish tint in the lips or face [R, R].

As part of any regimen for preventing infection and recovering from illness, it is extremely important to focus on hygiene and rest.

Click here for the CDC's complete guide to caring for someone with COVID-19 at home.


SelfDecode™