

Zinc and COVID-19: What malaria drugs can teach us

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Medical Disclaimer: *The information in this article is for general information purposes only and does not constitute medical advice. Contact your health care provider about any questions concerning your health.*

Without a federal pandemic response team to consolidate data and coordinate a response, the coronavirus situation is looking a few bacteria short of a decent kombucha. Despite herculean efforts by devoted medical professionals who are almost to the point of sharing hospital gowns, you cannot depend on available or effective treatment. The best plan is to optimize your own immune response and avoid the need for emergency intervention.

Luckily, the South Koreans have a Cracker Jack pandemic response team and they developed a treatment plan that kept their mortality levels at a fraction of what other countries are experiencing. If you get sick, you cannot write your own prescriptions based on their protocol, but you may be able to use what they discovered to prevent the need for more intensive interventions.

The Birds and the Bees: Virus Version

Recall that viruses are pieces of genetic material that cannot reproduce themselves. They need an organism with cells capable of replicating genetic material. COVID-19 is an RNA virus twisted under a protective fatty layer. On its surface is a protein so small it is just called the letter S. If they can find a friendly receptor, S proteins can attach a virus to a cell wall and dump in its genetic material for a little viral hanky-panky. Cell walls are loaded with different kinds of receptors because substances are constantly passing in and out. The receptors are molecularly specific, like a lock is to a key to keep out trouble.

S protein fits into receptors of lung cells. They dock, just like the Starship Enterprise. In goes the RNA strand ready to replicate. All RNA, including destructive viral RNA is made from the same 4 nucleotide building blocks. RNA is a string of coded instructions for how to reproduce and make proteins the cell needs to function. The RNA readers (ribosomes) will copy any instructions if they contain some combination of the 4 nucleotides and a boss enzyme gives the command. A human enzyme would never tell the ribosomes to copy foreign RNA, so the viruses provide their own enzyme. This enzyme is called RNA-dependent RNA polymerase (RdRP) or replicase, for short. RdRP tells the cell to copy the virus RNA and make it snappy.

Viruses reproduce quickly and take over as many cells as fast as they can. All too soon the immune system will notice the foreigner in the dock on the cell surface and start the ejection process. The more RdRP, the faster and more aggressive the invasion.

RdRP Meet Zinc

You have heard zinc is good for your immune system, but did you know it is ultimate RdRP kryptonite? Zinc blocks RdRP and slows down virus reproduction. In theory, zinc could control COVID-19 but it must get into the cell. Zinc needs the biological equivalent of a UPS truck to transport it through the cell's protective membrane. This facilitator molecule is called an ionophore. Ionophore means ion carrier. Zinc is an ion or a molecule with an electrical charge. The ionophore binds to zinc, carries it from the blood through the fatty bilayer of the cell wall and drops it off inside.

The old malaria drugs, chloroquine and hydroxychloroquine are zinc ionophores. They transport zinc into the cell to shut down RdRP in malaria but doctors in South Korea and China report they also help patients with COVID-19, though there are no clinical studies. The protocols (which reportedly sometimes include added zinc) have not undergone the rigor we all love but who has had the time?

One old study found that a small amount of chloroquine was more effective at increasing intracellular zinc than taking large amounts of zinc. Chloroquine is an old, cheap prescription medicine with an arm's length of side effects. (Hydroxychloroquine is similar but with fewer side effects.) Good to know how it might help. Better not to need it.

If zinc has trouble getting into the cell, is it worth taking extra zinc?

I think so. While high amounts of zinc will not change the intercellular levels by much, poor zinc status is what a virus wants in a host. And many people have sub-optimal intake or tissue levels of zinc and don't know it. This may be one reason young adults or older people who seem healthy can succumb to COVID-19.

Common reasons people may not have enough zinc:

1. Picky eating. A diet of refined foods is low in zinc. Zinc is found in nuts, seeds, legumes, whole grains, some vegetables, meat and seafood.
2. Poor absorption due to digestive issues.
3. Exposure to aluminum, mercury, lead, or other heavy metals. (Aluminum is everywhere. Even vaccines and medicines can contain significant amounts.)
4. Use of reflux medications. Over the counter reflux medicines block the uptake of many nutrients including calcium, magnesium, iron, vitamins B-12 and D, and zinc.
5. Higher need due to illness or growth. This includes exposure to COVID-19.
6. Less absorption with advanced age.
7. Too much copper or iron intake.
8. Alcohol consumption. A zinc dependent enzyme helps break down alcohol. Even if you did not drink much in the past, you may be catching up in the present.

If you have none of these risk factors consider that one of the symptoms of COVID-19 is loss of smell and taste, also a classic symptom of zinc deficiency.

Most people can use an extra 15 to 30 mg of zinc a day, especially when under immune stress. A decent multiple vitamin and mineral will contain zinc, but it is all about the absorption and balance with other nutrients. Check with a knowledgeable health professional if you have questions.

Eat Your Ionophores

Preliminary research suggests that the plant compounds, quercetin and epigallocatechin-gallate (EGCG) may also work as zinc ionophores.¹ Both antioxidants raised the intracellular levels of zinc in laboratory tests but who knows if or how much of these substances would do the same in real live people. Quercetin is found in loads of fruits, vegetables including apples, berries, brassica vegetables, onions and tomatoes. One study found organically grown tomatoes had 79% more quercetin than conventionally grown. Quercetin is known to have anti-inflammation, antiviral activity and reduce infection risk.²

EGCG is the main reason green tea is good for you. It is the most active of a family of compounds called catechins. Catechins have beneficial effects in metabolic syndrome, inflammation diseases and fighting cancer.³

The reason nutrition professionals yammer on about eating whole foods is because of all the mysterious and beneficial regulating compounds they contain. Quercetin and EGCG being just two. There is a word for movies where the handsome but troubled hero lives on nothing but warm beer and reheated toaster pastries yet has endless energy to jump off moving trains and tackle villains. That word is fiction. I bet Dwayne Johnson gets plenty of quercetin in real life. And Jason Statham probably guzzles green tea.

You could play with supplemental quercetin and EGCG if you feel vulnerable, but nobody knows how much might help with COVID-19. I take quercetin in the spring with vitamin C to reduce allergy symptoms and am thinking about stepping it up. I figure it can only hurt my pocketbook. On the other hand, I bet the price of hydroxychloroquine is way up. Should have bought stock when I could.

Many thanks to Dr. Roger Seheult co-founder of MedCram and his many enlightening and fascinating talks on COVID-19 on YouTube. Here is one: <https://www.youtube.com/watch?v=Eeh054-Hx1U>

¹ <https://pubs.acs.org/doi/abs/10.1021/jf5014633>

² <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4808895/>

³ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6315581/>