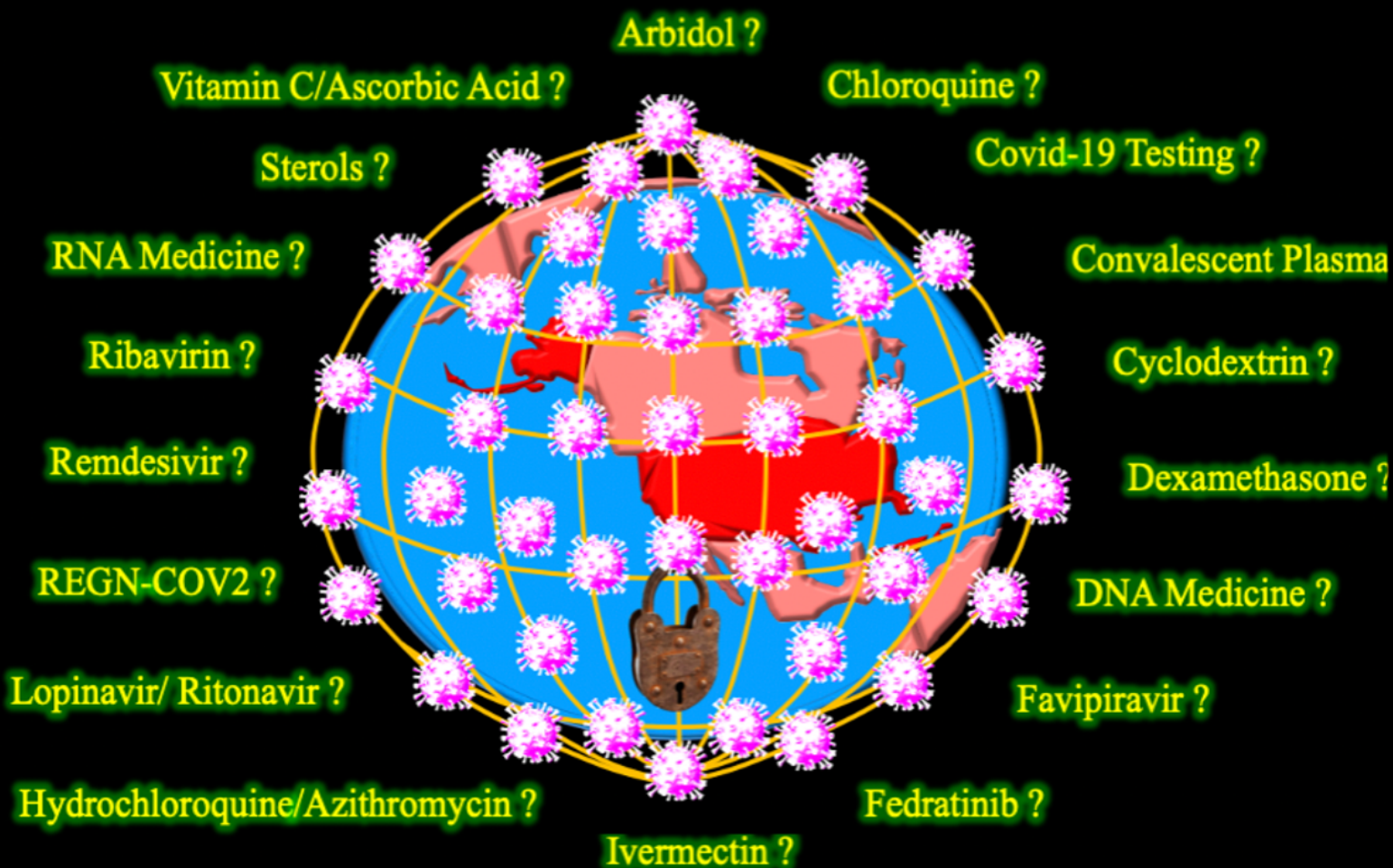


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Fear of coronavirus locks down the world
and resets activities on the earth

Beneficial Effects of Nutrients for Prevention of Severe COVID-19 Symptoms

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A balanced diet is beneficial for health in general and decreases the risk of developing medical conditions such as diabetes, heart disease, and weakened immune systems. As these medical conditions are associated with a higher risk of developing severe symptoms of COVID-19, it is expected that nutrition should also affect the symptoms of COVID-19. Here we describe some of the nutrients that have been reported to affect COVID-19 symptoms, including tryptophan, melatonin, vitamin D, and omega-3 fatty acids. Together with lifestyle changes, they can alleviate much of the morbidity due to the pandemic, while waiting for vaccines and new drugs to be developed.

Keywords: COVID-19, nutrients, melatonin, vitamin D, omega 3

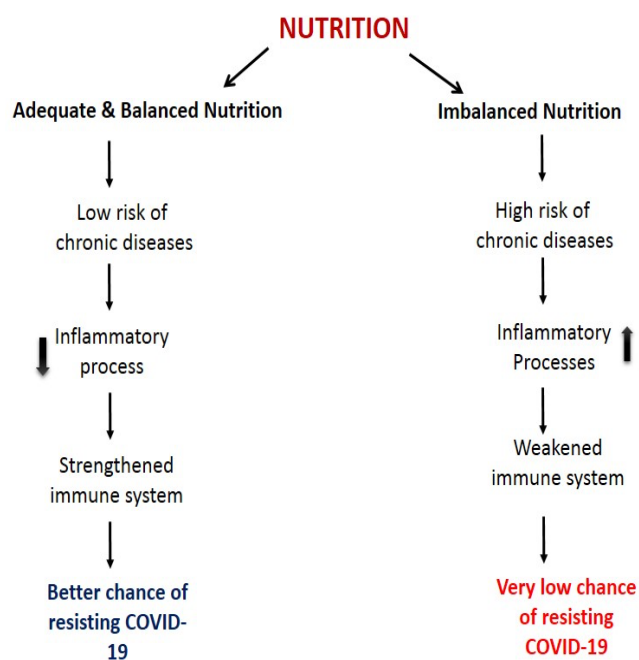
The outbreak of COVID-19 has had a disastrous effect on global health and the economy. In December 2019, scattered reports started to emerge on the emergence of a new strain of coronavirus in Wuhan, China. This subsequently developed into a pandemic by March 2020¹. As a result of the increased morbidity and mortality associated with COVID-19, attention has focused on the development of a vaccine, which will not be available for the entire population, and in the interim, managing the outbreak with such measures such as quarantines and social distancing. Other measures such as repurposing drugs previously developed for other ailments will also take time. Therefore, strategies depending on integrative medicine and lifestyle changes have the potential to quickly reduce much of the morbidity due to the COVID-19 outbreak.

Preventive measures such as social distancing, personal hygiene, crowd avoidance, and wearing masks and gloves, have already done much to decrease the spread of the new coronavirus in some countries. Reports demonstrating that the immune and respiratory systems are highly affected by COVID-19 has suggested therapies using existing drugs to better treat patients with COVID-19.^{2,3}

The COVID-19 pandemic has impacted all walks of life globally including children, school and college students, health care workers and professionals from other fields.⁴⁻¹⁰ Universities and pharmaceutical companies in several countries are racing to develop a vaccine against the coronavirus. But even if a vaccine is developed in record time, it would not be developed, tested for safety, and distributed widely before 2021. In the meantime, a

growing body of evidence demonstrates that nutrients that are already available to most of the population can help to ameliorate the symptoms of COVID-19. These nutrients include tryptophan, melatonin, vitamin D, and omega-3 fatty acids.⁹

Many studies have reported that vitamin D strengthens the



immune system in all organs, including the brain, and have shown that vitamin D is an immune system modulator.¹¹⁻¹⁵ Further, supplementation with vitamin D

Fig. 1. Role of nutrition and nutrients in COVID-19.

could be protective against acute respiratory tract infections.¹⁶ Vitamin D can boost the innate immune system by suppressing the excessive production of inflammatory markers during a cytokine storm, which has been linked with the severity of COVID-19 in patients.¹⁷ Another article suggested that there may be a possible link between vitamin D deficiency and COVID-19.¹⁸ Moreover, a recent study found that there is a significant relationship between vitamin D levels and mortality caused by COVID-19 in elderly patients, who are more vulnerable due to low levels of vitamin D.¹⁹ Figure 1 summarizes the role of nutrition in COVID-19 .

Tryptophan can be metabolized into serotonin, which is modulated by interferons; and reduced tryptophan also affects susceptibility to depression, which may be affected by COVID-19 or be an unintended consequence of social isolation to contain the pandemic. A recent commentary suggested that use of interferons in hospitals should be complemented with nutritional intake for COVID-19 patients which should be enriched with sources of tryptophan (for example, protein drinks, milk, and oats).²⁰ Metabolism of tryptophan is channelled into the kynurenine pathway in COVID 19 patients, which regulates inflammation and immunity. The link between tryptophan and interleukin-6 (IL-6) levels may provide the rationale for therapeutic strategies being tested.²¹ It was suggested that melatonin could also control a variety of physiological functions and have pleiotropic effects on the immune system.²² Recently we proposed the possible role of tryptophan and melatonin on COVID-19.⁹ Finally, other studies have shown that the omega-3 fatty acids, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), could stimulate immune health by improving the function of immune cells, and promoting the growth of both T and B cells in various tissues.^{23,24}

In conclusion, even though these nutrients are known to have beneficial effects on the immune system and general physiology, a direct link between these nutrients and the severity of COVID-19 symptoms is still lacking. Further studies will undoubtedly confirm whether these nutrients have a significant effect on the disease.

Conflicts of Interest; None.

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