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Different Vitamins and Minerals have Therapeutic Benefits on COVID-19 Patients through Various Molecular Processes

Jerry Albert*

Department of Vitamins, University of Memphis, Alumni Ave, Memphis, USA

Abstract

The angiotensin-converting enzyme on the cell surface is the transmembrane receptor that the SARS-CoV-2 spike glycoprotein attaches to and enters the host cell through. SARS-CoV-2 is spread via respiratory droplets, coughs, or contaminated hands from human to human and from animal to human. If it's dry, the virus can stay in the nasopharynx for three days before being found in the lung. The virus then passes spike and into the lung cells. Lung cells come in two different varieties: alveolar cells, which are involved in the gas exchange process, and macrophage cells, which function as surfactant providers and defensive barriers. The harms type 2 alveolar cells, and macrophage cells attempt to create tumour necrosis factors and cytokines. Alveolar cells are harmed by inflammatory substances including interleukins. Vasodilation happens close to, which raises capillary permeability. As a result, fluid builds up between the alveoli and blood vessels, disrupting gas exchange.

Keywords: Tumour • Macrophage • Virus

Introduction

When type two alveoli are damaged, the amount of surfactant diminishes, which causes the lungs to collapse. Fluid then enters the alveoli, which causes a cough or productive cough in the COVID-19 patient. acute respiratory distress syndrome with lung collapse. Interleukins are released when type 2 cells are injured in the central nervous system, forcing the hypothalamus to release prostaglandin. Prostaglandin increases metabolism to turn energy into heat. This alteration raises temperature and, more frequently in adults, can result in cerebral stroke [1]. Peripheral chemoreceptors may be activated by hypoxia, which could cause tachycardia. In COVID-19 individuals, the blood pressure would drop, causing a reduction in blood volume, a decrease in perfusion, and multisystem failure.

Discussion

As a result of the COVID-19 epidemic, which has spread throughout the whole planet, no globally recognised and readily accessible medications exist to treat the illness. Therefore, it is critical to identify a different treatment for this novel virus as there is no specific medication to treat it. The search for treatments must go beyond just medications and vaccinations; supportive measures can also help by alleviating symptoms, boosting immunity, and hastening recovery. Utilizing facial masks, practising good hygiene, and maintaining social distance are management strategies that support. Additionally, recent evidence has highlighted feeding may be beneficial for COVID-19 patients. Dietary changes and supplement ingredients can help the immune system. Therefore, for the immune system to work properly, proper diet is necessary. Two essential dietary components for the normal operation of the immune system are vitamins and minerals. The immune system is boosted and modulated by vitamins as well as minerals like zinc, lithium, magnesium, and selenium. Vitamins C, D, and zinc have all been extensively endorsed for their roles among them. According to reports, these elements are crucial for the effectiveness of the immune system [2].

The immune system is supported by trace metals. Their absence could also make a host more vulnerable to contracting infectious infections. It has been demonstrated that a higher intake of micronutrients particularly vitamins B12, C, D, and ironis inversely related to a higher incidence and mortality of COVID-19. This was more pronounced in people with a hereditary predisposition to low micronutrient status. Micronutrients and immunomodulatory drugs are some of the current treatments used in clinical settings for COVID-19. This page discusses how vitamins and minerals affect and strengthen the immune system, as well as their potential use in the treatment and/or prevention of study's main aim is to support the idea that diet can be a component in the treatment and prevention of viral disorders like order to achieve this, we evaluated the scientific literature on the effects of these elements as well as toxic metals and the contagiousness, growth, and prognosis of COVID-19. On the other side, research was done on how different vitamins and minerals affected immune system development and viral disease prevention [3].

The first fat-soluble vitamin is vitamin A, commonly referred to as retinol, retinal, and retinoic acid. The transportable form of vitamin A is retinol, which is stored in the liver and changed into retinyl esters. In terms of structure and functionality, vitamin A is also regarded as a key hormone and immune modulator. The pleiotropic modulators of the innate and adaptive immune systems are thought to be retinoic acid and its cognate retinoic acid receptors.

Due to its necessity for many immune system defences against infection, vitamin A is frequently referred to as an anti-infective vitamin. It has been demonstrated that a dietary deficiency in just one nutrient can compromise the immune system. Additionally, vitamin supplements have been demonstrated to reduce morbidity and mortality linked to a number of infectious disorders, such as influenza, diarrhoea, pneumonia linked to measles, HIV infections, and malaria infections. The active retinol derivatives aid in the production of IFN, the most effective antiviral mediator, during an acute infection. This will make it possible for the virus to be attacked by a long-lasting immune response been found to increase the expression of regulatory and other genes. In cell and animal models, the effects of on have been documented [4].

The largest enclosed single-stranded virus treated peripheral blood mononuclear cells from MS reinforced response and restored cell functioning, as well as clinical studies for cancer and multiple sclerosis therapy. Despite the fact that most viruses have genomes that are smaller than, possesses a genome. The pathway serves as the main mediator of the immune response against the genome's structure. This pathway depends on retinoic acid for

***Address for Correspondence:** Jerry Albert, Department of Vitamins, University of Memphis, Alumni Ave, Memphis, USA; E-mail: jerryalbert@gmail.com*

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its activity as an important immune system receptor that recognises virus as a ligand. It is a well-reviewed and well-characterized part of the congenital immune system. Factors including recent infections, high fevers, and increased catabolism cause this activation [5].

big viral genome or a high viral load The immune response mechanism changes to the TLR3, TLR7, TLR8, and TLR9 pathways when the pathway is inhibited as a result of retinoic acid depletion during viral illnesses like measles, as has been previously described. The adaptive immune system's neutrophils, macrophages, and dendritic cells contain these mechanisms. They work together to cause a cytokine storm through the arm by releasing too many cytokines. Acute clinical signs brought on by such excessive cytokine release include endothelial injury, hypoxia, necrosis, and multiorgan damage [6].

It has been demonstrated that the development of is strongly connected with the production of inflammatory cytokines and exudative aggregation of fluids in COVID-19 patients' respiratory problems binding to alveolar cell receptors causes an effect. The absence of retinol derivatives in the medium, such as lecithin, Colin, and inositol, as well as a potential disruption of surfactant synthesis brought on by retinoic acid degradation, are all important factors in the development of ARDS. Derivatives of retinol are essential to the structure of the surfactant. They are recognised as urgent problems that, given the condition's progression and seriousness, call for more research. Patients with severe COVID-19 frequently experience retinitis and other vision problems. They develop as a result of vitamin A deficiency-related necrosis and shrinkage of the retina's nerve cells [7]. Additionally, COVID-19 patients experience taste and olfactory problems as a result of retinoic acid insufficiency, which is created via retinoic acid receptors. The nervous system's observations found that the Retinoid receptors are widely distributed in COVID-19 patients. This distribution suggests that the adult cortex, amygdala, hypothalamus, hippocampus, striatum, and related brain regions may be physiologically dependent on retinoid signalling.

In the endoplasmic reticulum of liver cells, cytochrome is in charge of the metabolism and detoxification of poisons and medications. By limiting the metabolism of retinoic acid, it has been shown that inhibiting the liver's cytochrome P450 in COVID-19 patients may be an effective treatment. By preventing the excretion of retinol esters previously stored in the liver and gained from diet as well as by inhibiting the cytochrome oxidase process, serum retinoic acid levels are increased. The system uses nuclear receptors to support the initial immune response and is regulated by serum retinoic acids [8].

RAMBAs have lately been used in dermatological purposes and have the potential to increase endogenous retinoic acid levels. Additionally effective against COVID-19 patients, these consequences could be. Therefore, concentrating on drugs that increase the quantity of retinol in our bodies may have many benefits for both socioeconomic development and public health. Vitamin A therapies for measles and other viral illnesses have already shown these benefits. Water-soluble vitamins include the B vitamins. To keep physiological equilibrium in place, they function as coenzymes. Vitamin B reduces pro-inflammatory cytokine levels, improves respiratory function, maintains endothelium integrity, eliminates hypercoagulability, and may shorten hospital stays in addition to being crucial for cell function, energy metabolism, and correct immunological responses [9,10].

Conclusion

For instance, vitamin B1 is important for immunological reactions. It is linked to a lower occurrence of cancer, neurological diseases, type 2 diabetes, kidney ailments, aging-related diseases, and neurodegenerative disorders. The cardiovascular system is impacted, inflammation is brought on, and abnormal antibody responses are influenced by thiamine deficiency. Because antibodies are necessary for the destruction of the, thiamine shortage might result in insufficient antibody responses and cause severe symptoms. Therefore, having enough thiamine could help with the execution of the proper immune responses during the SARS-CoV-2.

Acknowledgement

None.

Conflict of Interest

None.

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