

Immunity Booster against Corona Virus (COVID-19)

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Abstract: Virus responsible for SARS disease, Spread during 2003. SARS-COV, Primarily binds to Heparan Sulphate Proteoglycan (HSPG) sites of human cell membrane. Lactoferrin has the ability to pre-bind HSPG Sites & block SARS-COV interaction on human respiratory tract. Novel Coronavirus(SARS-COV2) has certain close similarities with SARS-COV. Based on the available literature, it is hypothesized that human colostrums & dairy products, Ginger, Garlic, Honey, Turmeric, Sour Cabbage, Tomato, Flax Seeds, Blueberries, Olive, Onion, Carrot and Spinach can boost immune system to fight against Novel Coronavirus.

Keywords: Novel Coronavirus, COVID-19, Lactoferrin, Colostrum, Heparan Sulphate Proteoglycan, Dairy Products, Ginger, Turmeric, Honey, Garlic, Sour Cabbage, Tomato, Flax seeds, Blueberries, Olive, Spinach, Onion, Carrot.

1. Introduction

According to UNICEF, COVID-19 is forcing the parents to skip kid's vaccinations. Many people around the world are forced to skip immunizations for their kids. Some governments might even have to postpone mass immunization campaigns as a way of showing the disease spread. UNICEF recommended the governments to begin planning now to boost immunization campaigns once the coronavirus is under control.

As there are many people looking for immunity boosters in the absence of vaccines or treatments. Natural products like Dairy Products, Ginger, Turmeric, Sour Cabbage etc. for boosting immunity needs to be studied.

2. Corona Virus Disease-2019 (COVID-19)

COVID-19 is caused by a novel coronavirus named SARS-COV-2 (Severe Acute Respiratory Syndrome Virus-2), which has close similarities with SARS-COV, the virus responsible for SARS disease outbreak during 2003. Both SARS-COV and SARS-COV-2 emerged in China, probably originated from Bats.

The whole genome of SARS-COV-2 has 70% to 80% similarity with SARS-COV. Both of the viruses use same cellular receptors for human cell entry.

In spite of some genetic similarities with SARS-COV, SARS-COV-2 has its own genetic and clinical features. The epidemic trajectory of both looks different in terms of transmissibility, clinical severity, extent of community spread.

Coronavirus entry into the cell is a complex process, first step being virus bind to the attachment receptor. In the following step virus interact with fusion receptor thereby making cell membrane permissive.

Heparan Sulphate Proteoglycans (HSPG's) provide the first anchoring site on the cell surface and helps the virus to make primary contact with the host cell.

In further step, virus utilizes the fusion receptor Angiotensin-converting enzyme-2 (ACE-2) to make the cell permissive. Both HSPG's and ACE-2 are found on the lower respiratory tract of human beings.

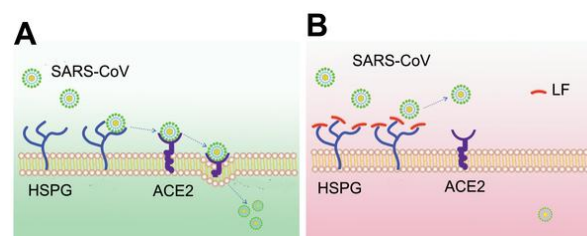


Figure 1: SARS-CoV cell entry and protective role of Lactoferrin.

3. Properties of Natural Products

3.1 Dairy Products

Lactoferrin or **Lactotransferrin** is a globular glycoprotein belonging to transferrin family. Transferrins are iron binding blood plasma glycoproteins that control the level of free iron in biological fluids. Human colostrums has the highest concentration of lactoferrin followed by human milk and then cow milk.

Several studies showed that lactoferrin displays antiviral activity against both DNA and RNA viruses.

It is scientifically shown that Lactoferrin has the capability to bind on the HSPG sites, i.e Lactoferrin is able to prevent the virus interaction with the cell membrane by pre binding the HSPGs thereby exhibiting a protective role against the SARS-COV infection.

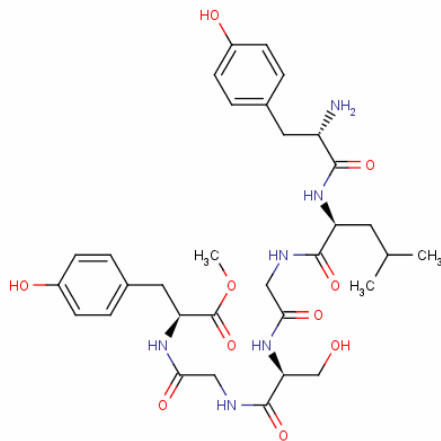


Figure 2: Structure of Lactoferrin

3.2 Ginger and Garlic

Ginger and Garlic have the characteristic features to heal inflammatory cells of lungs. It shows expectorant action on lungs.

Garlic have been used in traditional medicines around the world. The main ingredient in garlic is **Allicin**.

It contains oxygen, sulphur and other chemicals that give anti-bacterial and disease fighting property.

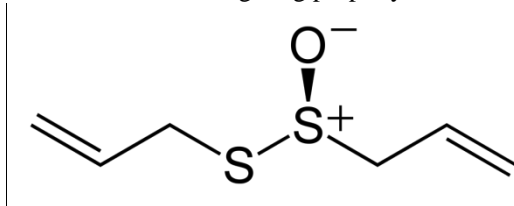


Figure 3: Structure of Allicin

3.3 Honey

Honey has also been used in traditional medicines around the world. It is naturally high in antioxidants called **Flavonoids** and **Polyphenols**.

This can help to balance the immune system and prevent certain illness. It has an anti-viral property that helps to prevent and treat Cold, Flu and other illness caused by viruses.

A lab study found that "Manuka Honey", native to New Zealand, able to stop the flu virus from growing. It acts as anti-viral drug against virus.

3.4 Sour Cabbage

Sauerkraut (Sour cabbage), is finely cut raw cabbage that has been fermented by various lactic acid bacteria.

It is a high source of vitamin C and vitamin K. The fermentation process increases the bio availability of nutrients rendering sauerkraut even more nutritious than original cabbage.

A study in 2002 states that, the Finnish researchers found that isothiocyanates produced in sauerkraut fermentation

inhibit the growth of cancer cells in test tube and animal studies.

Sauerkraut is high in the antioxidants **Lutein** and **Zeaxanthin**.

3.5 Turmeric

Aids in making our immunity stronger, the main life saving ingredient in turmeric is **Curcumin**, which is about 3% to 5%. It has photo derivative, which contains healing properties.

- It helps the body to naturally cleanse the respiratory tract and also helps to fight the infection.
- Its anti-inflammatory properties relief individuals from the direct impact of cold and flu.
- It is useful in treatment of bronchial problems, sinus, asthma, cough, chronic inflammatory damage to the lungs.

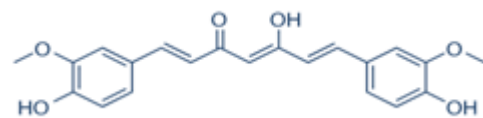


Figure 4: Structure of Curcumin

3.6 Tomatoes

It is rich in natural vitamins and minerals.

- **Lycopene** is reported to control the growth of cancer cells.
- **p-Coumaric acid** protects cardiac function against lipopolysaccharide induce acute lung injury by attenuation of oxidative stress.
- **Chlogenic acid** regulates apoptosis and stem cell marker related gene expression in A549 human lung cancer cells.

3.7 Olive

Olive leaf extract (OLE) is an over the counter supplement that contains **Polyphenols**, **Notable oleuropein** and **Hydroxytyrosol**, that have antiviral, antibacterial, anti-inflammatory and anti-oxidant properties that may reduce upper respiratory illness (URI).

Extra Virgin Olive Oil (EVOO) can also be used to reduce the upper respiratory illness (URI).

3.8 Black Seed (Nigella Sativa)

Also known as Black Cumin or Kalonji, Habbat Al-Barakah or Seed of Blessing. It boosts the immune system by stimulating the body's energy.

It is a good source of energy to detoxify and rejuvenate the body.

Its inflammatory properties for conditions such as rheumatism.

Black seed oil and it's derivative **Thymoquinone** has anti-inflammatory agent with all the benefits of black seeds. It should be incorporated into an overall holistic approach to one's everyday health to build body's immune system over

the time supplying it with optimum resources it needs to helps to prevent and fight illness.

3.9 Blue Berries

It contains **Flavonoids**- a type of anti-oxidant that reduce damage to the cells and boost the immune system. Foods rich in **Flavonoids** protect the lungs.

3.10 Flax Seeds

- It is rich source of **Omega-3** and **Omega-6** fatty acids.
- It protects the human body from bacteria and viruses, improving immunity.
- Its anti-inflammatory properties protects from asthma.
- Its anti-oxidant properties regenerates and repairs the body cells.

3.11 Onion

Onions are packed with immune boosting nutrients like **Selenium, Sulphur Compounds, Zinc and Vitamin C** in addition they are the best sources of **Quercetin**, a potent flavonoid and anti-oxidant and has histamine regulating effects.

It is high in vitamin C, a nutrient involved in regulating immune health, collagen production, tissue repair and iron absorption.

It is also rich in Vitamin B including Folate(B9) and Pyridoxine (B6), which helps in metabolism, RBC production and nerve function.

3.12 Carrot

It is an excellent source of vitamin, nutrients and fibres which helps in increased metabolism by secretion of bile juice.

It helps to strengthen the immune system and helps the body to fight off infections. It contains Anti-oxidants, which helps the body to fight free radicals, cell damage and inflammation.

It contains bio active chemical for treating **Leukemia**.

While immune system needs proteins and lipids that aren't found in large quantities in vegetables, it also relies on vitamins and minerals that are abundant in carrots.

3.13 Spinach

With an abundance of Vitamins and minerals it's obvious that spinach will boost the immune system.

It has a high dose of Vitamin A, Vitamin C and Vitamin E which helps to replenish the blood cells to give a boost to the immune system.

It also has other nutrients like Beta-Carotene, Folate, Magnesium and Potassium, that contributes to the cardiovascular health.

It prevents oxidation of cholesterol as well as reduce the level of amino acids homocysteine.

4. Conclusion

Relying on the genetic similarities between SARS-COV and SARS-COV-2, Dairy products, has an element having the ability to bind and block the adhesion sites of virus on human cell membranes can be considered as dietary inhibitor of coronavirus. Ginger and Garlic contains many beneficial components with enhancing effects on respiratory ailments, immune system and killing the pathogens. Honey contains healing properties but manuka honey is not only anti-bacterial but also an anti-microbial. Use of Turmeric enhances immunity by its anti-inflammatory properties. Tomatoes has chlorogenic acid, which regulates apoptosis and stem cell marker related to gene expression A549 human lung cancer cells. Olive has the Anti-viral properties that reduces upper respiratory ailments (URI). Black Seeds stimulates the body's energy. Blueberries contains flavonoids that reduce the damage to the cells. Flax Seeds with its anti-oxidant properties helps in regeneration and repair of body cells. Onions has the immune boosting nutrient like selenium. Carrot helps in increasing the metabolism. Spinach is super low in calories and provides all essential nutrients. Hence, usage of these products is suggested, As various countries around the globe have started working on immunity boosters to combat novel coronavirus. However this hypothesis needs to be scientifically confirmed and clinically proven through specific studies on SARS-COV-2's interaction on human cell membrane. In the current scenario of COVID-19 outbreak and vaccines are in clinical evaluation.

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