



Research Article

Coronavirus (COVID-19): A protocol for prevention, treatment and control

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Abstract

Coronavirus Disease 2019 (COVID-19), caused by severe acute respiratory coronavirus-2 (SARS-CoV-2), is an extremely infectious disease and has already infected almost three million persons in more than two hundred countries. Based on our current knowledge of this virus and in the absence of a vaccine, this article is an attempt to propose ways to prevent, treat and control COVID-19 virus, using linear lipid molecules such as sodium stearate (a major component of ordinary bar soap) for hand sanitization, mouth wash, gargling, steam inhaling and as lungs inhaler along with zinc and copper to trap and inactivate COVID-19. Sunbathing will boost desperately needed a good immune system. The ancient Indian techniques of Yoga (Developing inherent power in a balanced manner), Pranayama (Retention and Extension of the breath), Jal-Neti (Nasal irrigation by saline water) and Havan (Holy fire ritual) will also help in controlling this epidemic (COVID-19) of gargantuan proportions.

Keywords: Coronavirus, COVID-19, Lipids, Sodium stearate, Zinc

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INTRODUCTION

COVID-19 is a spherical (~50-200 nanometer in diameter) or pleomorphic virus containing a single-stranded RNA (Mousavizadeh and Ghasemi, 2020). Like other coronaviruses, SARS-CoV-2 has four structural proteins, the S (spike, glycosylated), E (envelope), M (membrane), and N (nucleocapsid) proteins, the N protein holds the RNA genome, and the S, E, and M proteins along with phospholipid bilayer create the viral envelope (Schoeman and Burtram, 2019).

Enveloped viruses like the Coronavirus acquire their envelope from the host cell membrane, which is a bilayer of phospholipid interspersed with cholesterol molecules and proteins (Shrestha, 2020). However, in spite of our best efforts, we did not come across a reference which categorically stated that cholesterol is present in the lipid envelope of SARS-CoV-2 virus. It is well known that enveloped viruses need a body to survive and multiply, and do not survive for a long time on their own. Besides, it should be easier to inactivate enveloped viruses by stripping or damaging the outer fragile lipid layer (Fig. 1).

Linear fatty acid lipids like sodium stearate, have a polar hydrophilic head and a hydrophobic non-polar hydrocarbon chain, sometimes unsaturated.

These hydrophobic and hydrophilic ends disrupt the lipid bilayer of the coronavirus cell. The Coronavirus has a lipid membrane, basically a layer of fat protecting the virus from the outside world. The hydrophilic, polar "head" of the linear lipid makes hydrogen bonding with water molecules, and the serpentine tail of the linear lipid latches into the phospholipid membrane that envelops a coronavirus cell, causing severe disruption which leads to its eventual inactivation and death (Fig. 2). The outer envelope is a kind of a fat itself, and so linear lipids will dissolve it, and an induced increase in temperature will exponentially hasten the process. We are being told ad nauseam in social media to wash hand with soap for minimum twenty seconds to in order to get rid of the virus, we have just extrapolated the same, with suitable modifications, for destroying the outer envelope of COVID-19 virus. UNESCO also recommends the washing of hands with soap so as to get rid of any virus present on the hands (UNESCO, 2020).

Cyclodextrins, the cyclic oligosaccharides of α -(1-4)-linked glucose units, are excellent carriers of hydrophobic chemicals by virtue of having a hydrophobic cavity which may encapsulate various hydrophobic molecules. β -cyclodextrins have very good affinity for trapping cholesterol, whereas α -Cyclodextrins are most efficient in extracting phos-

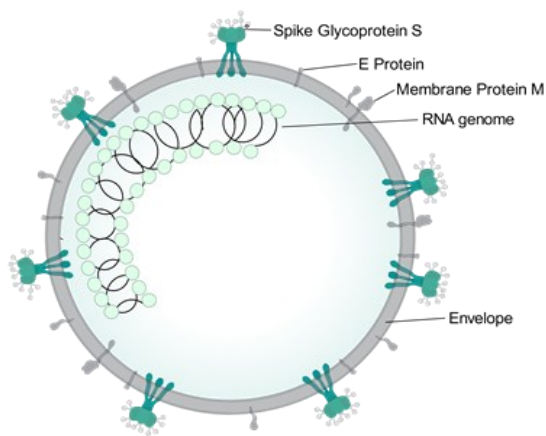


Fig.1. Schematic representation of Coronavirus showing outer thin lipid layer (~5 nanometer) (Source: Anonymous, 2020a).

pholipids. It was observed that methyl β -cyclodextrin removes not only cholesterol but phospholipids also (Zidovetzki and Levitan, 2007). Zinc is a d block element, 3d level is fully occupied so it can't change its oxidation states like other transition elements. Therefore, it is not an antioxidant by itself, but it induces antioxidant behaviour in many biological processes. Zinc is an inhibitor of NADPH oxidase leading to a decreased generation of reactive oxygen species. Zinc is also a co-factor of the enzyme superoxide dismutase (SOD), which is responsible for the dismutation of oxygen free radical (O_2^-) into hydrogen peroxide (H_2O_2). Zinc competes with iron (Fe^{2+}) and copper (Cu^{2+}) ions for binding to cell membranes and proteins by displacing these redox-active metals. Zinc also induces the formation of metallothioneins which are very rich in cysteine and are excellent scavenger of OH radicals. Zinc binds to sulfhydryl (SH) groups of bio-molecules protecting them from oxidation. Zinc increases the activation of antioxidant proteins, molecules and enzymes such as glutathione (GSH) catalase (Prasad, 2014).

Zinc is present in thousands of proteins, by binding to histidine and cysteine among others. It is part of hundreds of enzymes and several hundreds of transcription factors and is part of zinc fingers. It induces the formation of metallothioneins which are very rich in cysteine amino acids which in turn are excellent antioxidants. Zinc is unique in imparting near covalent behaviour into molecules it binds with. We used to extract from the aqueous medium, zinc salts of substituted phenyl aliphatic acids with toluene, a nonpolar solvent (Marwah *et al.* 1995). Zinc is unique indeed.

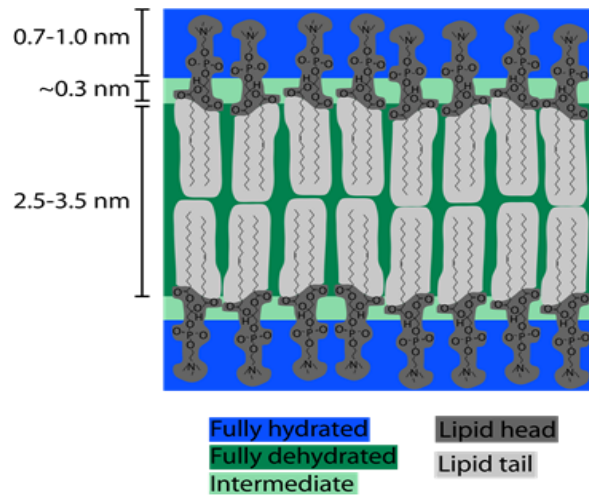


Fig. 2. Coronavirus lipid envelope is made of phospholipids (Anonymous, 2020 b).

It has been recently reported that COVID-19 attacks the 1-beta chain of haemoglobin and captures the porphyrin to inhibit human heme metabolism. Conserved domain analysis, homology modelling, and molecular docking studies showed that surface glycoprotein could bind to the porphyrin. At the same time, orf1ab, ORF10, and ORF3a proteins could attack the heme at the 1-beta chain of haemoglobin to dissociate the iron to form the porphyrin (Wenzhong and Hualan, 2020). It has been observed that haemoglobin values are essentially reduced in COVID-19 patients with severe disease (Lippi and Mattiuzzi, 2020). A recent study on COVID-19 showed the prevalence of elevated aminotransferases and bilirubin in severe cases, but the clinically significant liver injury was uncommon (Bangash *et al.* 2020).

These observations do raise a few doubts of their own. It is not clear whether corona proteins are stripping iron (Fe^{2+}) from porphyrin ring system or they are blocking (chelating with) the iron so that oxygen is unable to reach the haemoglobin or may be both factors are the contributors. The normal catabolic pathway of haemoglobin leads to the formation of bilirubin (the infamous yellow color pigment) via greenish coloured pigment biliverdin. However, we do put forward a hypothesis that S protein binds with Fe^{2+} present inside porphyrin rings of the haemoglobin and this S-protein Fe^{2+} bond is stronger than bond of Fe^{2+} with oxygen, thereby making haemoglobin unavailable for oxygen transportation.

In the case of Coronavirus, the viral entry is mediated by the Receptor-Binding Domain (RBD) of its spike (S) glycoprotein, which binds to the host cell receptor Angiotensin-Converting Enzyme-2 (ACE2) (Prabakaran *et al.*, 2006;

Adedeji *et al.*, 2013). and contributes to tissue tropism and pathogenesis (Millet and Whitaker, 2015). This coronavirus S-protein consists of 1273 amino acids consisting of forty cysteine and seventeen histidine residues. Our hypothesis is that in the presence of abundant supply of zinc in the system S-Protein may likely bind with zinc leaving haemoglobin intact to do its job.

Based on the above scientific discussion, we very strongly feel that solution to coronavirus problem is right in front of our eyes: the attack on the outer lipid layer of the virus, and we may be able to save at least 95% of the infected population. We propose to destroy the outer lipid layer of Coronavirus using commonly available lipids, and a lipid (outer envelope) will be destroyed by another lipid (fatty acid salt) making coronavirus inactive and incapable of multiplication. Salts of long-chain fatty acids such as stearic acid, oleic acid, palmitic acid etc. can be used for this purpose. Fatty acid salts are permitted food additives as well. As per Code of Federal Regulations (US FDA) aluminium, calcium, magnesium, potassium, and sodium salts of the fatty acids may be safely used up to 2% in food and in the manufacture of food components (eCFR 2020). Therefore, it can be safely concluded that sodium stearate can be safely used in the prevention, treatment and control of COVID-19 at concentrations below 2%. We, hereby, propose the following action plan to prevent and control COVID-19 epidemic and treat coronavirus patients.

The Protocol: As a first step towards prevention of COVID-19 virus, we propose an alcohol-based (~70% isopropyl alcohol) corona hand sanitizer containing about 0.05 to 0.1% (w/v) Sodium Stearate or similar linear fatty acid sodium salt (ordinary bar Soap), 1% sodium chloride and 0.0001% to 0.001% copper sulfate (w/v). When applied alcohol will evaporate leaving behind a microlayer of sodium stearate (soap) and a nanolayer of copper sulfate. This micro-nano layer of sodium stearate and copper ions (Cu^{2+}) will protect the hands, and Coronavirus if contacted will not survive for long. Alternatively, hand sanitizers can also be prepared by replacing sodium stearate with methyl β -cyclodextrin and α -cyclodextrin (0.01% w/v, 0.1g/L) each).

These simple and extremely effective sanitizers will work till hands are washed again, and can be applied as often as required. Sodium stearate at 0.1%, methyl β -cyclodextrin and α -cyclodextrin at 0.01% and copper sulfate at 0.001% concentrations are completely harmless and safe to use.

Our next concern was to get rid of any coronavirus present in the mouth, for this we propose a mouth wash solution containing sodium stearate, (0.01%, w/v), sodium chloride (1%, w/v) menthol, thymol, methyl salicylate (oil of wintergreen) and

eucalyptus oil 0.01% each (w/v) and 0.0001% (w/v) of copper sulfate. Sodium stearate will strip Coronavirus of its viral envelope, rendering it useless. We recommend a usage frequency of twice daily for the general public, thrice daily for high-risk population and four times or more for corona infected patients.

Having taken care of any coronavirus present on hands or in mouth, we recommend gargling with lukewarm (~50°C) mouth wash solution. This will kill any coronavirus sitting in the throat prior to its migration to the lungs. We recommend a usage frequency of once daily for the general public, twice daily for high-risk population and three times or more for corona infected patients but under medical supervision.

To get rid of any COVID-19 that may be present in the nose, throat and lungs (initial stages), we propose soap-steaming. For this purpose, powdered cumin seeds (100 g), carom seeds (50 g), sodium stearate (15 g), sodium chloride (175 g) coconut oil 10 ml containing 1 ml eucalyptus oil are thoroughly mixed and stored in an airtight container. About 10 g of this mixture should be added to the steam inhaler or about one litre of boiling water and steam inhaled through the mouth as well as a nose for 5-10 mins. Volatile ingredients of cumin and carom seeds (terpenes, thymol, cumin aldehyde etc.) are soothing to throat and lungs and exert disinfectant action. Cuminaldehyde, we hypothesize, will inactivate coronavirus by reacting with NH_2 groups of surface proteins. Micro quantities of stearate and essential oils inhaled as well as the high temperature of the steam will dissolve outer envelope of the COVID virus, embedded proteins may fall like ninepins and the dreaded virus will have a peaceful death. This should clear the nose and throat of corona infection, if any, and incapacitate the virus in the lungs as well. The essential oil used for steaming can be a mixture of one or more of the essential oils of Rosemary, Chamomile, Walnut, Lemongrass, Eucalyptus etc. We recommend a usage frequency of twice weekly for the general public, once daily for high-risk population and three times or more for corona infected patients, but under medical supervision. Understandably, the concentrations of the salts of fatty acids may have to be adjusted depending upon the medical exigencies.

Based on the scientific reasoning offered above, it is our firm belief that the above protocol will go a long way in preventing and controlling COVID-19 virus and even in treating non-serious cases which constitute more than 90% of the all infected patients. For hospitalized patients, we recommend additional treatment with sodium stearate aerosol inhaler. The aerosol inhalers should release about 25 to 50 microgram of sodium stearate per inhalation. We recommend a usage frequency of three times or more for corona infected patients but un-

der medical supervision.

We also recommend zinc supplements and zinc homeopathy medication. In golden olden times, we used to cook food in brass utensils periodically coated with a thin layer of zinc, and incidence of cough and cold were almost unheard of zinc proven to be effective at slowing the rate of multiplication of similar viruses such as SARS and the common cold.

The benefits of the ancient Indian practices of yoga, pranayama and meditation are well understood (Sengupta, 2012). Yoga breathing (pranayama) protocol was found to improve lung function (Kupersmidt and Barnable, 2019) and effective in asthma control (Yüce and Taşçı, 2020). We have found the practice of yoga and pranayama to be highly scientific (Marwah and Marwah, 2020). We advise daily sessions of yoga, pranayama and meditation to boost the immune system. The yogic practice of Jal-Neti (Luetzenberg and Wei, 2020). (nasal irrigation with lukewarm saline water) will prevent corona from reaching the lungs.

Since time immemorial, the sun has been regarded as and is the ultimate source of energy for planet earth. Vitamin D and its active derivatives are synthesized from cholesterol by the action of UV component of sunlight. In addition to classic actions related to mineral homeostasis, vitamin D has novel actions in cell proliferation and differentiation, immune system regulation, preventive effects on cardiovascular and neurodegenerative diseases, and even anticancer and antiaging effects (Gil *et al.* 2018). In view of the involvement of vitamin D in boosting the immune system, we strongly propose daily sunbathing for high-risk group and corona patients wherever possible. We strongly feel that sunlight is as necessary for corona patients as ventilators are. Today at the time of writing this article, there are report emanating from the White House press briefings that coronavirus is destroyed by sun light. Several Ayurvedic herbal medicines like Ashwagandha (*Withania somnifera*), Giloy (*Tinospora cordifolia*), Tulsi (holy basil, *Ocimum tenuiflorum*, synonym *Ocimum sanctum*) etc. are said to boost the immune system, but their complete discussion is beyond the scope of this work.

Havan (holy fire ritual) refers to ancient Indian ritual of burning herbs, medicinal plants and cow ghee (clarified butter) in a fire ignited into an inverted pyramid-shaped pit preferably made with copper, and is accompanied by chanting of mantras. The controlled burning of herbs and medicinal plants leads to release of essential oils and their further oxidation products in the environment. Simple organic compounds such as methyl and ethyl alcohol, formaldehyde and acetaldehyde and formic and acetic acids have been identified. Formaldehyde is well known to be a reactive anti-

microbial agent as it reacts with amino groups of peptides and proteins (formation of Schiff's base) in microorganisms and destroys them (Nair *et al.* 2017; Bansal *et al.* 2015). Therefore, we postulate that aldehydes such as formaldehyde produced during the process of conducting a Havan will react with amino groups present in the S-protein of COVID-19, thereby inactivating the virus. Therefore, we recommend that Havan should be conducted periodically for sterilization and sanitizing purposes.

Understandably in the advanced stages of infection, we may need a combined approach consisting of sodium salts of lipids (sodium stearate), zinc and vitamin D supplements, zincum muriaticum homeopathy, erythropoietin injections, sunbathing, blood and plasma infusion, ventilators etc. as medically required.

Conclusion

COVID-19 (SARS-CoV-2) is spreading faster than uncontrolled bush fires. Since COVID-19 is an enveloped virus; destruction of its outer lipid layer will incapacitate the virus and help us in controlling this epidemic. We postulate that salts of linear lipids will damage and destroy the lipid layer of the virus. We propose a protocol consisting of sodium stearate hand sanitizer, sodium stearate mouth wash and gargle solution, sodium stearate steam inhaling and sodium stearate lungs inhaler along with judicious use of copper compounds and zinc supplements to prevent, treat and control coronavirus. Ancient Indian practices of Yoga, Jal-Neti, Pranayama and Havan will provide an additional shield. Last but not the least regular sunbathing will boost immune system via vitamin D, which will also help the body in fighting this lurking virus.

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