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To Whomsoever It May Concern

Under the present circumstances of a global threat that has arisen by the prevalence of the Corona Virus, Shreis Scalene based in Gaithersburg, USA and technology partner Dr. Rajah Vijay Kumar D.Sc., Chairman of the Organization de Scalene, Bengaluru, India are committed to providing a solution to contain the spread of the virus.

Attached is a white paper by Dr. Kumar that provides a brief description of the Scalene Hypercharge Corona Canon (SHYCOCAN) - induced S-Protein Inhibition of COVID-19, as a method to reduce infectivity and prevent its air and surface borne transmission.

We believe that this can be one alternative to containing the pestilence. If the concerned authorities find this solution useful, we will be too glad to assist and help. Together we can make this happen.

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Scalene Hypercharge Corona Canon (SHYCOCAN) induced S-Protein Inhibition in COVID-19, as a method to reduce Infectivity and prevent its air and surface borne transmission.

A proposed solution to the current coronavirus pandemic

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There is an urgent need for simple, portable and sensitive methodology to prevent outbreaks and spread of the Coronavirus COVID-19. Thousands have already lost their lives and many, many more already infected. As we understand it today, COVID-19 is spread by droplets or aerosols caused by coughing, sneezing, vomiting etc. [1, 2] and through close, physical contact and contaminated clothing, discarded tissue paper, used masks etc. Knowledge of aerosol transmission mechanisms are limited for most pathogens, although spread by aerosol is an important transmission route for many pathogens including COVID-19. Coronavirus (CoVs), is an enveloped positive-sense RNA virus, characterized by club-like spikes that project from their surface, with an unusually large RNA genome, and a unique replication strategy.

Coronavirus virions are spherical with diameters of approximately 125 nm as depicted in recent studies by cryo-electron tomography and cryo-electron microscopy [1, 3] The most prominent feature of coronaviruses is the **club-shaped spiked projections** emanating from the surface of the virion. These spikes are a defining feature of the virion. Within the envelope of the virion is the nucleocapsid. Coronaviruses have helically symmetrical nucleocapsids, which is uncommon among positive-sense RNA viruses, but far more common for negative-sense RNA viruses. See Fig.1* for the genomic alignment of the COVID-19 in relation to other beta-corona viruses.

Coronavirus particles contain four main structural proteins. These are the spike (S), membrane (M), envelope (E), and nucleocapsid (N) proteins, all of which are encoded within the 3' end of the viral genome. The S protein (~150 kDa), utilizes an N-terminal signal sequence to gain access to the endoplasmic reticulum (ER), and is heavily N-linked and glycosylated. Homotrimers of the virus-encoded S protein make up the distinctive spike structure on the surface of the virus [4]. The trimeric S-glycoprotein is a class I fusion protein [5] and mediates attachment to the host receptor [6]. In most, but not all coronaviruses, S is cleaved by a host cell furin-like protease into two separate polypeptides known as S1 and S2 [7, 8]. S1 makes up the large receptor-binding domain of the S protein while S2 forms the stalk of the spike molecule [9].

Angiotensin-converting enzyme 2 (ACE 2) is the cellular receptor for the new coronavirus (COVID-19) that is causing the serious epidemic of COVID-19. Although ACE2 is hijacked by some coronaviruses, its primary physiological role is in the maturation of angiotensin, a peptide hormone that controls vasoconstriction and blood pressure [10]. A recent study indicates that ACE 2 is highly expressed in renal tubular cells, Leydig cells and cells in seminiferous ducts in the testis of infected patients. Therefore, COVID-19 might directly bind to such ACE 2 positive cells and damage the kidney and testicular tissue of patients. This could cause long term kidney failure and male infertility in young surviving patients in the reproductive age-group [11].

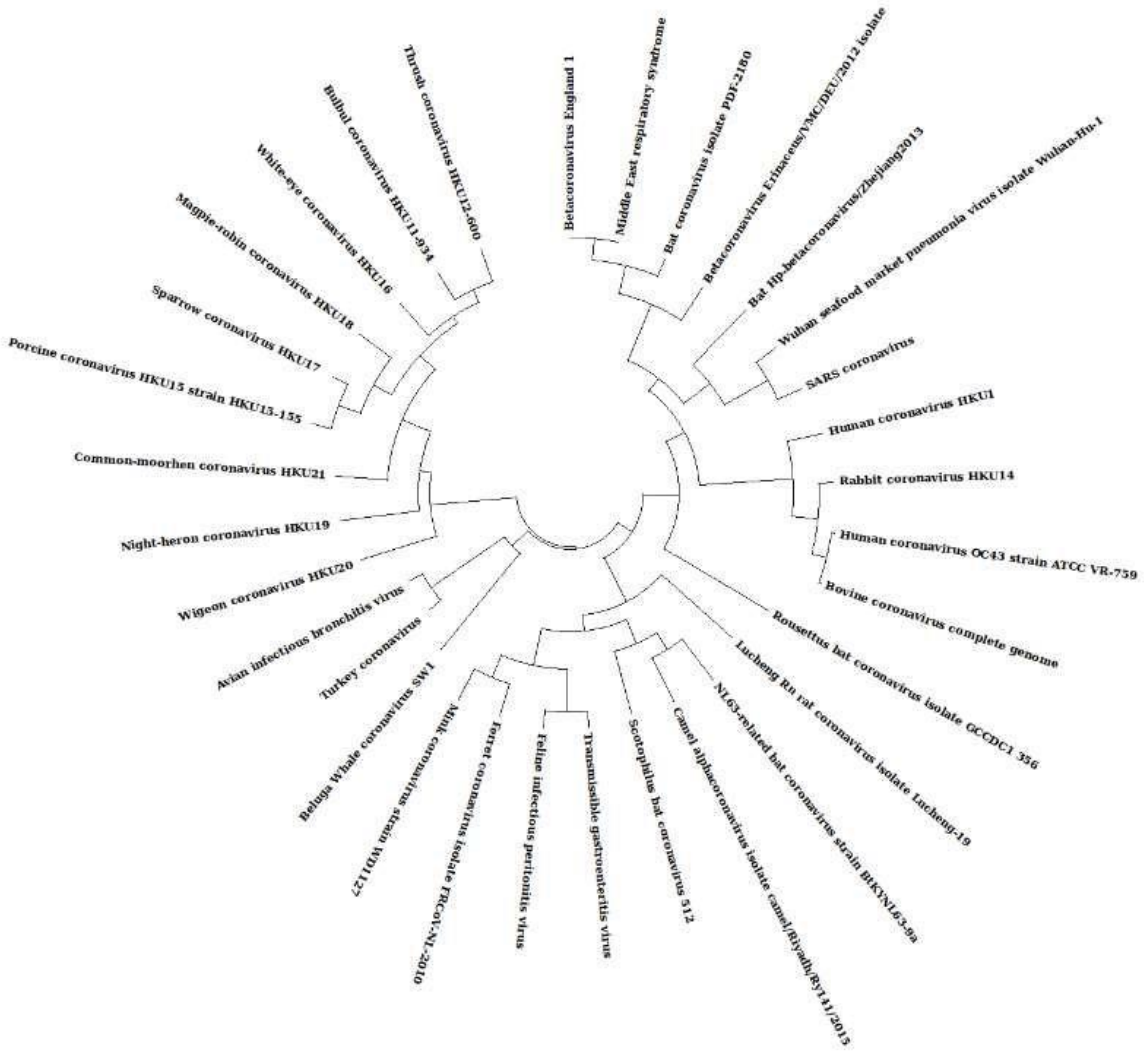

Fig. 1 Phylogenetic tree of COVID-19 [12]* This reference is no longer in Pubmed, so another phylogenetic tree is referenced below)

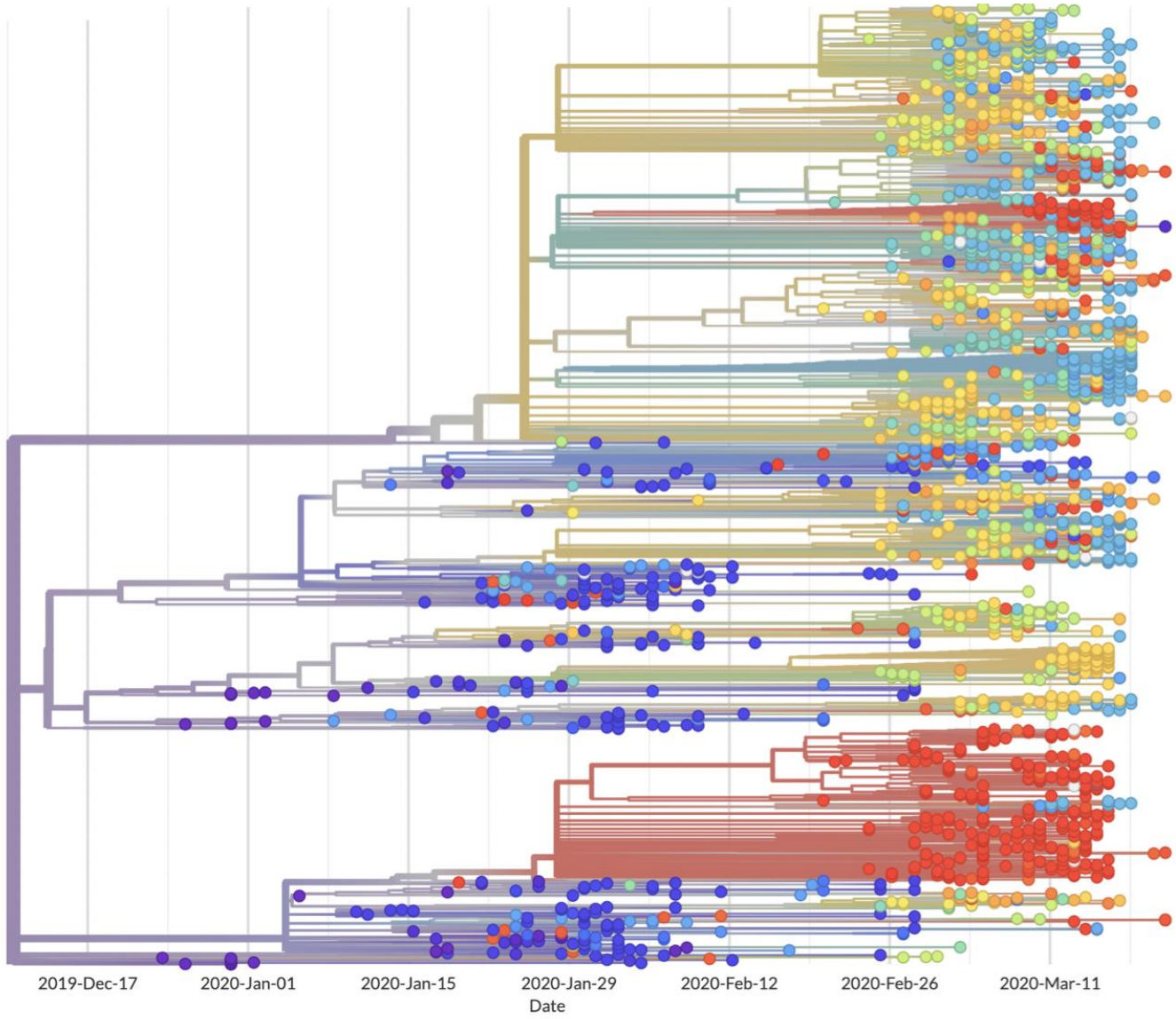

Fig. 1 Phylogenetic tree of COVID-19 [13, 14]

The initial attachment of the virion to the host cell is initiated by interactions between the S protein and its receptor. The sites of receptor binding domains (RBD) within the S1 region of a coronavirus S protein vary depending on the virus. The S-protein/receptor interaction is the primary determinant for a coronavirus to infect a host species and governs the tissue tropism of the virus. Further mechanisms are not the scope of this report. However, the end result is the fusion and release of the viral genome into the cytoplasm.

If negative charge-seeking is the guidance mechanism of the Spike Protein, attracted by the transmembrane potential of the host cells, then breaking this mechanism would block the Coronavirus infectivity and dispersion.

Earlier studies have shown that effective prevention of airborne transmitted influenza A (strain Panama 99) virus infection between animals and inactivation of virus (>97%) by use of Active

Ionization of the infected environment was possible. Active ionizer prevented 100% (4/4) guinea pigs being infected [15].

We propose that to reduce infectivity and air and surface borne propagation of COVID-19, we need to build a device that pumps out a large number of hyper-charged electrons (and negative ions) into the atmosphere, in homes, shopping malls, hospitals, restaurants, airports, and human transport systems like trains and airplanes and wherever possible; leading to S-protein neutralization that would disable the virus' infectivity. This kind of transmission-jamming mechanism is easily achievable and cost-effective.

The mechanism of inactivation was not explicitly investigated, but inactivation mechanisms may include reactive species and/or increased protein charge levels, which could inactivate the virus as previously described [16, 17]. Reduced infectivity has been proposed to be due to reactive oxygen species, through lipid and protein peroxidation reactions that may cause damage and destruction to the viral lipid envelope and protein capsid [16]. In particular, protein peroxidation may play a key role in the inactivation of the spine protein in the COVID-19. The cytotoxicity of ozone produced in such systems, however, creates a major obstacle for wide scale application. The exact mechanism of negative ion inactivation of viruses has not been well understood. In a study using the generation of negative and positive ions, the influenza virus was inactivated while the ozone level was negligible (0.005 ppm or less) [17]. Our Proposed canon design should release a steady-state ozone concentration not exceeding the limit of 0.002 ppm.

However, reactive radicals such as O- may be generated, which may also contribute to inactivation through damage to either the protein or the nucleic acid structure of the viruses [17].

The Proposed Device

The device is a Scalene Hypercharge Corona Canon (SHYCOCAN), that could at least produce 10 to 100 trillion ions per second. It should be able to provide an electron density of a minimum of 6 trillion per cubic centimeter at a distance of at least 12 centimeters from the canon. The operating current should not be more than 50 milli amperes for safety reasons but should be able to accelerate more than 1,500,000 eV. The device should not produce any harmful levels of ozone so it can be safely used in all environments. The switching frequency can be between 20KHz and 60KHz.

We, at CARD have designed three versions of the device, one for a covered area of < 20 M2, < 50 M2 and another for a covered area < 100 M2. The device consists of an airflow system and a Hypercharge Corona-based electron cloud generator and radiating antenna.

What can we do?

Considering the pattern of the propagation and infectivity, it looks like COVID-19 is here to stay for quite a while. Once infected, there is nothing much we can do, however, if we could use concepts and technologies like what we propose as preventive measures by containment, we think we can do a significant amount of short- and long-term damage control. None of us are yet aware of the post-infective, non-fatal long-term etiology of this virus' infection.

Fig. 2 Prototype of the device **Scalene Hypercharge Corona Canon (SHYCOCAN)** for reduction of Infectivity and prevention of air and surface borne transmission of COVID-19 – Installed at our Campus Security department.

Implementation

We have already implemented the Scalene Hypercharge Corona Canon (SHYCOCAN) in our campus. We have wired this device in all places where there are visitors, like the front office, security and production areas and laboratories.

Fig. 3 SHYCOCAN at our front office, where there are many visitors

With the above specifications, any interested organizations can partner with us to design and manufacture the device and distribute it. However, we can also provide, the design and engineering to mass manufacture these devices. We will provide all designs and assistance and our engineers and scientists can assist and guide prospective manufacturers if required.

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