VESID: Viral Entry Structural Integrity Disruption – Considerations for "Long COVID", post-COVID, and comparable comorbidity-consequences of infectious diseases and inflammatory response, with special attention to cardiomyopathy and extended dysautonomic and arrhythmic disease

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Extended Abstract

This is combination of a research paper and a review paper combined in order to present results of research, active work in progress, clinical findings, and a concise set of recommendations for future fast-track directions in both research and clinical studies.

[1]

VESID is a new approach in virology and antiviral medicine. Its purpose is twofold: (1) to develop a theoretical model for viral architectural evolution and function that is based upon topological biomolecular dynamics (TBD), and from that theoretical basis, (2) to develop a new method of preventive, prophylactic medication for certain classes of respiratory-onset viral disease including COVID-19 and potentially influenza and others, and specifically where oral/nasal ingestion is the common pathway of the infectious agents. VESID is not intended to produce a vaccine nor any therapeutic agent suitable for advanced, progressed infections. The goal of VESID is to minimize concentration-intensities of nasal and oral exposure to a wide class of viral agents and to maximize the opportunity for the immune system to curtail a serious infection and spread of the virus, regardless of the host-person's immunization or antibody strength from any prior infection. The VESID approach has been a research investigation since spring of 2020 with focus upon SARS-CoV-2, the COVID-19 virus.

The basis of the VESID approach is a topological dynamics model that concentrates upon the structure of surface protein constructs such as the SARS-CoV-2 (and related coronavirus) spike protein arms, and their molecular binding to the underlayerment of the viral envelope. The VESID strategy is based upon the biomechanical-pharmacological model of the virus as a topologically-describable entity that is subject to mechanical tensions and stresses during the process of entry by endocytosis or other means into host cells for subsequent replication of viral nucleic acid and subsaequent construction and release from the host cell into the bloodstream and other pathways of the host organism.

VESID's mode of operation is to employ pharmaceutical agents (administered orally or nasally) that are suitable for ingestion in a manner consistent with the common use of sprays, syrups and lozenges and with appropriate ranges of concentration that minimize to near-zero any side-effects from the drug agent. The biomechanical process involves the disruption of the virus structure in such a manner as to render effective and proper (for replication purposes) cell entry, by molecular weakening or over-tightening of specific bonds in the protein-lipid-carbohydrate "superstructure" of the virus.

[2]

Evidence is clear regarding the synchronous relationships between infection by SARS-CoV-2 and pathologies within a number of organ systems, notably heart, lungs, central nervous system and gastrointestinal tract. The exact etiologies of these destructive effects remain, for the most part, a subject of research, but there is no question regarding the significance in both numbers and effects of

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pathological consequences from the viral infection. There is evidence that inflammatory response may be specifically involved, and this gives rise to consideration regarding other prospects of inflammation, particularly the classic “cytokine storm” response, as having causal links to disorders that can include myocarditis, ileus, tachycardia including POTS, AFIB, and initial precursor conditions that are associated with subsequent outbreaks of well-known and statistically significant autoimmune diseases including multiple sclerosis, Alzheimer's, Parkinson's, and perhaps others.

These cross-systemic and long-term (emergence and duration, including terminal outcome) pathological causalities are from all indications not limited to COVID-19 nor to viral infectious diseases. However, viral diseases of many types, particularly involving viral agents that, like the broad class of coronavirus, influenza, adenovirus and ebola agents, are particularly indicated in such syndromic pathologies by the medical studies and the growing statistics. These viral diseases, moreover, share three important general characteristics: (1) potential for fast-moving, often-initially-ignored disease progressions, (2) easy potential pandemic infections across the entire human population, and (3) a general geometry, a topology of the virus, that is conducive to the VESID model of structural analysis and medically-practical structural integrity disruption of the type that constitutes the VESID approach.

The implications of a successful medicine for one virus point to the prospects of success with others. These are not vaccines, nor cures, but preventive aids, and prophylactic methods are certainly better than facing disease onset and relying upon therapeutic medicine which often bears adverse consequences from the disease progression and possibly from the medication.

[3]
VESID focuses upon early-stage disabling of viruses within the oral/nasal portions of the respiratory tract in order to reduce their replication and spread throughout the host organism. The topology of viruses involves physical components and functions such as knots and entangled strands at the molecular scale. Elements of the same mathematics and biophysics including specific wave mechanics that give rise to constructing the topological integrity models of viruses and the mechanisms for their disruption are also directly applicable to models of the cybernetic control-space involved within neural ganglia of the autonomic system and specific tissues of the heart and gastrointestinal complex. Turbulence in signaling and muscle action leads to arrhythmic and chaotic dynamics which affects neural and muscular tissue regions in manners that are analogous to inflammatory actions of viruses and other foreign biopathogens. Wave dynamics within the heart muscle, observable through non-invasive means, can potentially provide earlier indicators of developing conditions including tachycardia, POTS as a specific syndromic condition, and the future progression to AFIB and cardiac arrest. Comparable but “inversely”, administration of electro-acoustic wave dynamic signals, non-invasively, promise to offer the biomedical equivalent of “noise cancellation” for treatment of early-stage, emergent, or even post-operative and recurrent-risk arrhythmias and syndromic conditions such as POTS.

[4]
The primary objective of this report is to present what has been done within a highly interconnected and cross-disciplinary area of the medical sciences, and the findings which are early-stage in virtually all aspects. Additional objectives are to engender and catalyze creative thinking among a wide spectrum of specialists in order to refine methods for extending this work to the level required for establishing both theoretical foundations and promising solutions for clinical medicine.