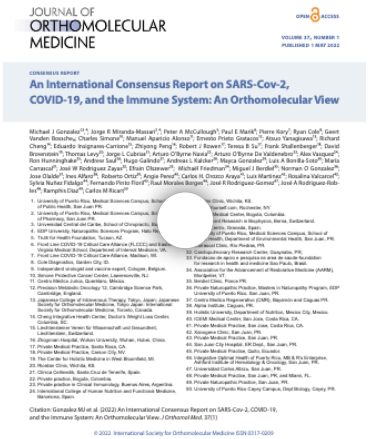
An International Consensus Report on SARS-Cov-2, COVID-19, and the Immune System: An Orthomolecular View



JOURNAL OF ORTHOMOLECULAR MEDICINE

Volume 37, Number 1, 2022

Article Type: Consensus Report

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Date of Publication: 1 May 2022

Citation: Gonzalez MJ et al. (2022) An International Consensus Report on SARS-Cov-2, COVID-19, and the Immune System: An Orthomolecular View. *J Orthomol Med.* 37(1)

Author(s): Gonzalez, M., Miranda-Massari, J., McCullough, P., et al.

Date of Publication: 2022

Abstract

An unprecedented worldwide situation has taken place due to the pandemic related to the SARS-CoV-2 virus. In addition to a novel infectious disease and an unparalleled global response, COVID-19 also initiated an unparalleled course of action of vaccine research, production, testing, and distribution. The sense of urgency around combating the viral pandemic has led to public health decisions based on incomplete and non-evidence-based information. Many issues in relation to the virus SARS-Cov-2, the disease COVID-19, and the immune system need to be addressed, clarified, and put in a proper perspective in order to bring this pandemic to a more objective assessment. This analysis may help manage its many challenges more efficiently, in addition, to providing a true opportunity to reduce complications, deaths, and iatrogenic side effects of either the infection or the vaccination, or both. The present consensus report has taken this necessary task to provide a common ground to effectively manage this global situation.

Introduction

An unprecedented worldwide situation has taken place due to the pandemic related to the SARS-CoV-2 virus. In addition to a novel infectious disease and an unparalleled global response, COVID-19 also ignited an unparalleled course of action of vaccine research, production, testing, and distribution (Shaw, 2021). The sense of urgency around combatting the viral pandemic led to the creation, in March 2020 of the Operation Warp Speed (OWS) program to make a vaccine against COVID-19 available as quickly as possible (Jacobs and Armstrong, 2020).The convergence of these unique events brought to public awareness the promise and potential of mRNA and other vaccines as a new tool against infectious diseases. At the same time, events without precedent are, by definition, without a history and context against which to fully assess risks, benefits, safety, and long-term effects as a positive contribution to public health. Under pressure from the spreading pandemic and mounting numbers of deaths, fear-lowered critical thinking, modified the standards, and shaped decisions. The exceptionally rapid development of these COVID-19 vaccines through experimental trials into mass deployment raises potential safety concerns. Acute (including death) and long-term pathologies, such as blood disorders, neurodegenerative and autoimmune diseases have been reported in people receiving the vaccine (inoculation). We present a rational, integrative, science-

based analysis to identify the strengths and limitations of the strategies related to the pandemic and present recommendations for improving health outcomes.

SARS-Cov-2: The New Virus

SARS-CoV-2, a member of the *Coronaviridae* of the *Nidovirales* order, is the virus that causes the disease called coronavirus disease 19 (COVID-19, Pal et al .2020). SARS-CoV-2, short for "severe acute respiratory syndrome coronavirus 2", is a member of the class of positive-strand RNA viruses it codes directly for the proteins that the RNA encodes, rather than requiring a copy to an antisense strand prior to translation into protein (Dehority et al. 2020). The virion consists primarily of the single-strand RNA molecule packaged up inside a nanoparticle protein coat, consisting of the virus's structural proteins, most notably the spike protein, which facilitates both viral binding to a receptor (mainly ACE2 receptors) and virion fusion with the host cell membrane (Dubrau et al. 2017). The SARS-CoV-2 spike protein is the primary target for neutralizing antibodies and at the same time seems to be the most toxic viral component. The virus is transmissible through respiratory droplets released when an infected person coughs, sneezes, sings, whispers, or talks. It may also be spread b touching a surface contaminated with viral load and then touching one's mouth, nose, or eyes.

SARS-Cov-2 Components

The SARS-Cov-2 has the following components:

E Protein

The E-protein or envelope protein is a transmembrane protein common to Coronaviruses (CoVs) and many other viruses. The E protein is the smallest of the major structural proteins.

M Protein

The M protein, also known as E1 membrane glycoprotein or matrix protein, is one of three major membrane proteins of the coronavirus together with the S and the E proteins. The M protein is the most abundant structural protein and defines the shape of the viral envelope. It is also regarded as the central organizer of the CoV assembly, interacting with all other major coronaviral structural proteins.

S Protein (Spike Protein)

The S or spike protein is the most extensively studied membrane protein of the SARS-CoV-2 virus. The spicular protein (S) is a type I transmembrane trimeric protein with between 1,160 and 1,400 amino acids, depending on the type of coronavirus. This protein forms the coronavirus corona; It is composed of three repeating peptides and is highly glycosylated, which facilitates its binding to proteins and sugars. Each peptide is made up of two domains called S1 and S2. In beta coronaviruses like SARS-CoV-2, cleavage of the S1 and S2 subunits occurs during fusion between the membranes. The S1 domain has two subdomains, one N-terminal (NTD), which ends with an amino acid that has a free amino group (-NH2), and another C-terminal (CTD), which ends with a carboxyl group (-COOH); both bind to the host cell's ACE2 receptor, then they are receptor-binding domains (RBD). The S2 domain is C-terminal in type and is highly conserved among all coronaviruses, which differ much more in the S1 subunit. The S2 domain contains two regions, HR1 and HR2, in which groups of seven amino acids (called heptides) repeat, in abcdefg form, that contain a and d hydrophobic residues that

participate in the fusion between the membranes. The HR1 and HR2 domains are therapeutic targets, since drugs are known that inhibit their action, preventing or hindering fusion (Insignares- Carrione et al., 2020).

SARS-CoV-2 has serious effects on the vasculature in multiple organs, including the brain. The spike protein facilitates entry of the virus into a host cell by binding to ACE2 in the plasma membrane. ACE2 is a type I integral membrane protein that cleaves angiotensin II into angiotensin, thus clearing angiotensin II and lowering blood pressure. The spike protein, in addition to being responsible for many of the deleterious effects of the virus, is also the specific protein coded in the RNA vaccines being used in the USA. Some clinicians and scientists are concerned that RNA vaccines may induce autoimmune disease, on the grounds that certain amino acid sequences coded by the spike protein have been found to be identical to sequences in human proteins, including proteins found in the CNS (Lyons-Weiler, 2020). The identification of amino acid sequence homology between viral/vaccine antigens with self-proteins helps explain the rise in autoantibodies in patients recovering from COVID-19 infections (Amiral, 2020).

Upon injection of the mRNA nanoparticle lipid product into the deltoid muscle, there are several possibilities that can take place that can potentially produce unwanted outcomes. Once inside the muscle tissue, nanoparticles enter the cells and release the mRNA, which couples with the ribosomes to synthesize S protein out of the available amino acids from the cytosol. Most people will produce the S protein at a speed and amount that allows dendritic cells to capture the S protein (antigen) and migrate to the lymph nodes where dendritic cells present the antigen to the T-cells. When the T cell binds to the antigen, it becomes a helper T cell. Immature B cells (B lymphocytes) pick up and process the antigen, which is hence expressed on the surface of the B cell. When the T-cell binds into the surface of the B cell it releases cytokines that stimulate the B cell. Once stimulated, the B cells undergo rapid proliferation and differentiation into plasma and memory B cells. This raises the antibody concentration in serum providing greater immunity to immediate infection, while memory B cells remain in the bone marrow and lymph nodes to reactivate, if necessary, in future infections.

In response to the injection, some people may happen to produce much more protein than others and/or at a faster speed. People creating too much S protein too fast might suffer adverse reactions due to its inflammatory and thrombotic effects. Also, there is a possibility that an incorrect vaccination technique might lead to intravascular injection which increases the risk of adverse effects. Animal studies have revealed that intravenous injection of the mRNA vaccine produced myopericarditis in the mouse. The histological changes of myopericarditis after the first intravascular priming dose persisted for 2 weeks and were markedly aggravated by a second IM- or IV-booster dose. Cardiac tissue mRNA expression of IL-1β, IFN-β, IL-6 and TNF-α increased significantly (Li et al., 2021).

The authors propose that if the person receiving the injection produces a high amount of protein S at a speed that exceeds the capacity to produce neutralizing antibodies, the S protein may spread to various tissues throughout the body, including the brain with the potential of causing inflammation, mitochondrial damage, and coagulopathies.

The spike protein serves as a hapten (antigen) which can trigger an autoimmune (antibody or antibody-like) response to the cell itself. Finally, the spike protein appears to be highly toxic on its own. This intrinsic toxicity, along with the apparent ability of the spike protein to replicate indefinitely within the cells, represent a possible long-term complication issue.

The S1 subunit is responsible for receptor binding (Watanabe et al., 2020), with subunit 2 (S2), a carboxyl-terminal subunit, responsible for viral fusion and entry (Flores-Alanis et al., 2020). Spike protein can however be shed, and it has been detected in multiple organs. Spike protein has been shown to play a major role in hypercoagulability, as seen in COVID-19 patients.

Vascular endothelium can be infected by SARS-CoV-2, especially by the S protein, which can trigger mitochondrial reactive oxygen species production and glycolytic shift. The S protein alone can damage endothelial cells by downregulating ACE2 and consequently inhibiting mitochondrial function. SARS-CoV-2 infection directly induces endothelial inflammation, leading to endothelitis (Varga et al., 2020).

There is evidence that the viral genetic material and the spike protein generated by the vaccines penetrate ovaries, testes, brain, spinal cord, nervous system, heart, lungs, intestines, kidneys, and cross the placenta in pregnant women (Blaylock, 2021). At present, the possible risks and side effects that may arise are simply not known, nor how long the adverse effects may last. If the recipient's cells become permanent spike protein factories this could lead to life-long autoimmune issues. Moreover, the spike protein inhibits DNA damage repair which is required for effective recombination in adaptive immunity (Jiang and Mei., 2021). To this, we should add that the spike protein is subject to frequent and profound mutational changes which reduce the efficiency of vaccine-induced neutralizing antibodies (Arora et al., 2021). Spike protein has been found in exosomes 4 months after the second vaccine injection (Bansal et al. 2021). This long persistence raises the prospect of sustained inflammation and damage to organs.

N Protein

The N protein or coronavirus nucleocapsid protein is a structural and multifunctional protein that forms complexes with genomic viral RNA. It is the most abundant protein in CoV. The N protein is a highly immunogenic phosphoprotein also involved in viral genome replication and modulation of cell signaling pathways. The N protein, together with the S, E, M, is a potential target for the development of new vaccines.

COVID-19 and Comorbidities of the Host

COVID-19 was first reported in late 2019 in Wuhan, China, and has since spread extensively worldwide. COVID-19 is a highly transmissible biological trigger that magnifies and intensifies preexisting chronic diseases and comorbidities. Obesity has been found to be one of the most common comorbiditiy related to COVID-19 (Mohammed et al. 2021). Most COVID-19 victims suffer from serious preexisting chronic diseases or medical conditions (CDC, 2022). The common thread connecting nearly all the covid19 comorbidities seems to be insulin resistance (Finucane and Davenport,2020). Insulin resistance is an underlying condition for metabolic syndromes, including type 2 diabetes, which impairs insulin signaling pathways affecting metabolic and cardiovascular homeostasis (Roberts et al. 2013). A high concentration of circulating insulin shifts the balance to mitogen-activated protein kinase (MAPK)-dependent signaling and causes endothelial cell damage (Na et al. 2018). The phosphatidylinositol 3 kinase and MAPK dependent signaling pathways maintain a balance between nitric oxide-dependent vasodilator and endothelin-1 dependent vasoconstriction actions of insulin (Na et al. 2018). Vascular smooth muscle cell dysfunction is responsible for inflammation and blood coagulation leading to microvascular and macrovascular complications in diabetes (Gangadharan et al. 2021). Hyperactivity in the renin-angiotensin system is implicated in the development of islet oxidative stress and subsequent β-cell dysfunction, as it alters the islet blood

flow (Gangadharan et al. 2021). These deleterious effects of insulin resistance involving altered blood pressure, vascular dysfunction, and inflammation could be associated with increased severity in COVID-19 patients. Clinical and/or biochemical markers of insulin resistance should be included as prognostic markers in the assessment of acute COVID-19 disease (Gangadharan et al. 2021).

Insulin resistance produces metabolic and inflammatory derangements; also contributes to neurological symptoms associated with COVID-19, such as headache, nausea and dizziness, encephalitis and fatal brain blood clots which are all indicators of damaging viral effects on the brain (Gangadharan et al. 2021). Evidence has emerged of deaths steaming from Inflammatory Thrombotic Response (ITR) precipitated by the viral infection. Reducing inflammation and blood clotting (ITR) caused by the immune response to the virus especially in people with comorbidities is, therefore, an important concern (Fleming & Fleming, 2020).

The Interaction with ACE2 …The Complicated Scenery

ACE2 is a protein on the surface of many cell types. It is an enzyme that generates small proteins by cutting up the larger protein angiotensinogen that regulates many cell functions. ACE2 is present in many cell types and tissues including the lungs, heart, blood vessels, kidneys, liver, and gastrointestinal tract. It is present in epithelial cells, which line certain tissues and create protective barriers. ACE2 is a vital element in a biochemical pathway that is critical to regulating processes such as blood pressure, wound healing, and inflammation; called the renin-angiotensin-aldosterone system (RAAS) pathway. ACE2 is present in all people but the quantity can vary among individuals and in different tissues and cells. Some evidence suggests that ACE2 may be higher in patients with hypertension, diabetes, and coronary heart disease, and the number of receptors (density) is positively correlated with the severity of the disease (Furuhashi et al. 2021).

Elevated glucose and elevated insulin levels seem to be the underlying metabolic driver of increased ACE2 expression (Finucane and Davenport, 2020). Insulin resistance and hyperinsulinemia drive increased ACE2 expression in lung epithelial cells and aggravate disease severity (Finucane and Davenport, 2020). Accumulating evidence has revealed that increased angiotensin II signaling (a consequence of the activation of the renin-angiotensin system (RAS) is strongly correlated with insulin resistance (Zhou et al., 2021).

Traditional and mRNA Vaccines

For a vaccine to work, the immune system needs to be stimulated to produce neutralizing antibodies, as opposed to non-neutralizing antibodies. A neutralizing antibody is one that can recognize and bind to a region (epitope) of the virus, which subsequently results in the virus either not entering or replicating in the host´s cells. Overall, this results in the inactivation of the viral particle. A non-neutralizing antibody is one that can bind to the virus but fails to neutralize the infectivity of the virus. If a vaccine cannot prevent/reduce infection and/or transmission, then its contribution to eliminating or minimizing the risk of infection or symptom severity is limited.

A vaccine is a biological preparation that provides active acquired immunity to a particular infectious disease. A vaccine typically contains an agent that resembles a disease-causing microorganism and is often made from weakened or inactive forms of the microbe, its toxins, or one of its surface proteins. The agent stimulates the body's immune system to recognize the pathogen as a threat, destroy it, and to further recognize and destroy any of the microorganisms associated with that agent that it may

encounter in future exposure or infection. Vaccination, or immunization, offers a way to create immunity and prevent serious illness without ever being exposed to the pathogen or suffering the actual disease. There are, however, "leaky" or imperfect vaccines that fail to make their recipients totally immune to the disease (Read et al. 2015). Leaky or imperfect vaccines that may reduce disease but do not prevent infection, replication, and transmission could create selective pressure, allowing for more virulent and proficient strains to circulate such as vaccines developed to combat Marek's disease.

Traditionally, ingredients of a vaccine include: the antigen – a killed or weakened form of a virus or bacteria, which trains our bodies to recognize and fight the disease if we encounter it in the future; adjuvants – added to help to boost immune response; and preservatives, which are non-reactive substances that ensure a vaccine stays functional.

mRNA

Messenger RNA (mRNA) is a single-stranded RNA molecule complementary to one of the DNA strands of a gene. The mRNA is an RNA version of the gene that leaves the cell nucleus and moves to the cytoplasm where proteins are made. During protein synthesis, the ribosome moves along the mRNA, reads the code to make a specific protein.

The substitution of methyl-pseudouridine for all the uridine nucleotides in vaccines stabilizes RNA against degradation, allowing it to survive long enough to produce adequate amounts of protein antigen. This form of mRNA utilizing methyl-pseudouridine delivered in the vaccine is never seen in nature, and therefore has the potential for unknown consequences (Seneff et al. 2022).

Because the mRNA molecule is large (104–106 Da) and negatively charged, it cannot pass through the anionic lipid bilayer of cell membranes (Li et al. 2022). Moreover, inside the body, it is engulfed by cells of the innate immune system and degraded by nucleases. *In vivo* inoculation, however, requires the use of mRNA delivery vehicles that transfect immune cells without causing too much toxicity or unwanted immunogenicity.

The Pfizer-BioNTech and Moderna mRNA vaccines are based on very similar technologies, where a lipid nanoparticle encloses an RNA sequence coding for the full-length SARS-CoV-2 spike protein. As of Dec 2021, lipid-based nanoparticles (LNPs) are a novel way of manufacturing mRNA delivery vehicles. LNPs offer numerous benefits for mRNA delivery, including ease of formulation, modularity, biocompatibility, and large mRNA payload capacity (Chaudhary et al. 2021). Aside from the RNA drug, LNPs typically include four components: an ionizable lipid, cholesterol, a helper phospholipid, and a polyethylene glycol (PEG) conjugated lipid, which together encapsulates and protect the fragile mRNA core (Chaudhary et al. 2021).

The PEGylated lipid component of LNPs consists of polyethylene glycol (PEG) conjugated to an anchoring lipid. The hydrophilic PEG stabilizes the LNP, regulates nanoparticle size by limiting lipid fusion, and increases nanoparticle half-life by reducing nonspecific interactions with macrophages (Stepniewski et al. 2021).

Current mRNA vaccines work by introducing a piece of mRNA that corresponds to a viral protein, usually a small piece of a protein found on the virus's outer membrane. Using this mRNA blueprint, cells produce the viral protein (Kowalzik et al. 2021).

As part of a normal immune response, the immune system recognizes that the protein is foreign and produces specialized proteins called antibodies. Antibodies help protect the body against infection by recognizing these viral proteins as part of the individual viruses or other pathogens, attaching to them, and marking the pathogens for destruction. Once produced, antibodies remain in the body, even after the body has rid itself of the pathogen, so that the immune system can quickly respond if exposed again.

mRNA vaccines give our cells instructions for how to make viral a protein. The immune system responds by creating neutralizing antibodies and producing T-lymphocytes and B-lymphocytes that will retain memory about how to fight the virus that causes COVID-19 if we are infected in the future.

The genetically modified version of the spike protein produced by the human host cell following instructions from the vaccine mRNA lingers in the plasma membrane, bound to ACE2 receptors because of impaired fusion capabilities.

It has been reported that different forms of eukaryotic and prokaryotic RNA serve as promoters of pathological blood coagulation and thrombus formation. Extracellular RNA promotes the activation of coagulation proteases (Kannemeier et al., 2007).

The alteration of mRNA in order to increase the speed of protein synthesis may be a source of errors. Mistranslation by alteration of tRNA can lead to neurodegenerative diseases (Schaffer et al. 2021). This mRNA technology has become commoditized and can be done at large-scale, with relatively low cost. Codon optimization, a common term for a set of recombinant DNA techniques in which multiple codons within a gene sequence are replaced by synonymous ones, aims to increase the rate and efficiency of protein translation. Several inappropriate optimizations can affect protein conformation and function, increase immunogenicity, and reduce efficacy. Protein misfolding has been linked with neurodegeneration in Alzheimer and Parkinson disease, and many other pathologies (Hartl, 2017). The data confirm that protein misfolding can result in intracellular pre-amyloid oligomers (PAO) accumulation is sufficient to cause cardiomyocyte death and heart failure (Pattison & Robbins, 2008). Codon optimization can lead to elevated GTT, and elevated GGT is linked to increased risk to a multitude of diseases and conditions, including cardiovascular disease, diabetes, metabolic syndrome, and all-cause mortality (Koenig and Seneff, 2015). It is possible that the present variants and current mRNA vaccines may result of the misfolding of the spike protein, which can be a result of the codon optimization technology utilized; resulting in possible autoimmune issues.

Vector vaccines use a modified version of a different virus (Adenovirus/viral vector) to deliver SARs-CoV-2 spike protein DNA to host cells. Once the viral vector is inside our cells, the genetic material gives cells instructions to make the spike protein that is unique to the SARs-CoV-2 virus that causes COVID-19. It is unknown how much spike protein will the recipient produce and for how long.

Biodistribution of mRNA vaccines

mRNA distributes from the injection site to the liver and spleen via the lymphatic system, ultimately reaching the general circulation. Alterations in autophagy pathways are emerging as a hallmark of the pathogenesis of many respiratory viruses, including influenza virus, MERS-CoV, SARS-CoV and SARS-Co-2 (Limanaqi et al. 2020). Autophagy is surely critical in the clearance of spike protein produced by immune cells programmed to produce it through the mRNA vaccines.

Route of Administration

An issue that may be questioned, from the authors' perspective, is the particular route of administration of this inoculation by intramuscular injection into the deltoid muscle. Since SARS-CoV2 is mainly a respiratory virus, a more effective manner to neutralize the virus would be to have a vaccine stimulate secretory mucosal Ig-A in the respiratory tract. A vaccine given by intramuscular injection will mainly induce IgG antibodies in the blood but will not stimulate secretory mucosal Ig-A production. For this purpose, a nasal vaccination method would be more effective.

COVID Vaccine Ingredients

Adjuvants are known to cause a plethora of different adverse events. Aluminum for example can cause chronic inflammation (Gherardi et al. 2001).

There are two COVID-19 messenger-ribonucleic acid (mRNA) vaccines currently authorized for emergent use in the United States: the Pfizer-BioNTech and the Moderna vaccines. A third vaccine developed by Johnson & Johnson (J&J) Janssen uses a viral vector platform. Conventional vaccines, rely on weakened and inactivated pathogens or a fragment of the pathogen to trigger an immune response. In contrast -as per the manufacturer´s specifications- the COVID-19 mRNA vaccines use a new approach by which mRNA is delivered into our cells to provide the genetic instructions for our own cells to "temporarily" make a "specific" viral protein (the coronavirus spike protein) in order to trigger an immune response. The J&J COVID-19 vaccine is a type of "replication-incompetent vector vaccine." This vaccine also contains the genetic instructions to express a stabilized coronavirus spike protein, but instead of mRNA, these instructions are delivered via DNA stored inside a modified vector virus (Adenovirus 26). This adenovirus has been engineered to enter the human cells and deliver the desired genetic information without replicating itself or causing illness. Once inside the cells, the DNA encoding for the coronavirus spike protein can be read by the cell and transcribed into mRNA. At this point, the J&J vaccine acts similarly to the mRNA vaccines.

The Pfizer-BioNTech COVID-19 Vaccine

The Pfizer-BioNTech COVID-19 vaccine is made of the following ingredients:

mRNA, lipids ((4-hydroxybutyl) azanediyl) bis(hexane6,1-diyl) bis(2-hexyldecanoate), 2 [(polyethylene glycol)-2000]-N, N-ditetradecylacetamide, 1,2-Distearoyl-sn-glycero-3-phosphocholine, and cholesterol), potassium chloride, monobasic potassium phosphate, sodium chloride, dibasic sodium phosphate dihydrate, and sucrose.

mRNA– Also known as messenger ribonucleic acid, mRNA is the only active ingredient in the vaccine. The mRNA molecules contain the genetic material that provides instructions for our body on how to make a viral protein that triggers an immune response. The immune response is what causes the organism to make the antibodies needed to protect us from getting infected if exposed to the coronavirus.

Lipids – Their intended role is to protect and stabilize the mRNA and provide an external lipid-soluble coat that helps the mRNA slide inside the cells.

- ((4-hydroxybutyl) azanediyl) bis (hexane-6,1-diyl) bis
- (2-hexyldecanoate), 2 [(polyethylene glycol)-2000]-N, N-ditetradecylacetamide

- 1,2-Distearoyl-sn-glycero-3- phosphocholine
- cholesterol

Salts – The following salts are included in the Pfizer vaccine and help balance the acidity in within the organism

- potassium chloride
- monobasic potassium phosphate
- sodium chloride
- dibasic sodium phosphate dihydrate

Sugar –Sucrose, this ingredient helps the molecules maintain their shape during freezing.

Moderna COVID-19 Vaccine

The Moderna COVID-19 vaccine contains the following ingredients: messenger ribonucleic acid (mRNA), lipids (SM-102, polyethylene glycol [PEG] 2000 dimyristoyl glycerol [DMG], cholesterol, and 1,2-distearoyl-sn-glycero-3-phosphocholine [DSPC]), tromethamine, tromethamine hydrochloride, acetic acid, sodium acetate trihydrate, and sucrose.

mRNA– Like the Pfizer BioNTech vaccine, Moderna's also uses mRNA technology intended to elicit antibodies against COVID-19.

Lipids – The Moderna vaccine also requires lipids to help deliver the mRNA to the cells.

- SM-102
- 1,2-dimyristoyl-rac-glycero3-methoxypolyethylene glycol-2000 [PEG2000-DMG]
- cholesterol
- 1,2-distearoyl-snglycero-3-phosphocholine [DSPC]
- The remaining ingredients (below), including acids, acid stabilizers, salt, and sugar all work together to maintain the stability of the vaccine after it's produced.

Acids

- Acetic acid
- Acid Stabilizers
- Tromethamine
- Tromethamine hydrochloride

Salts –Sodium acetate

Sugar – Sucrose

Johnson & Johnson Janssen COVID-19 Vaccine

The Johnson & Johnson Janssen COVID-19 Vaccine is made of the following ingredients:

Recombinant, replication-incompetent adenovirus type 26 expressing the DNA to make mRNA for the SARS-CoV-2 spike protein, citric acid monohydrate, trisodium citrate dihydrate, ethanol, 2-hydroxypropyl-β-cyclodextrin (HBCD), polysorbate-80, sodium chloride.

Recombinant, replication-incompetent adenovirus type 26 expressing the SARS-CoV-2 spike protein: a modified and harmless version of a different virus (Adenovirus 26) is used as a vector to deliver. The DNA gene sequence to produce the coronavirus spike protein. Once the modified adenovirus vaccine enters the cells, the body of the virus essentially disintegrates and the DNA material within it travels into the nucleus of the host cell where it is transcribed into mRNA. The coronavirus spike protein is then produced and displayed on the cell's surface, prompting the immune system to begin producing antibodies and activating T-cells to fight off what it interprets is an infection.

Acids

- 3-citric acid monohydrate
- Salts
- 4-trisodium citrate dihydrate

Sugars

- 5-2-hydroxypropyl-β-cyclodextrin (HBCD)
- 6-polysorbate-80, sodium chloride

Other ingredients

- 7-ethanol

Adverse Events Summary of mRNA Vaccines

Cases of myocarditis and pericarditis in adolescents and young adults have been reported more often after getting the second dose than after the first dose of one of the two mRNA COVID-19 vaccines (Towbin, 2021; Sun et al., 2022). There seems to ba an increased risk of heart inflammation in the mentioned populations.

Vaccines or Genetic Modulation Technique?

Traditional vaccines have decades of real-world data to evaluate their safety and efficacy (Han, 2015). These novel SARS-CoV2 mRNA and DNA "vaccines" can be more accurately described as a genetic *transfection* technique to induce the synthesis of a protein, to which we will develop antibodies to neutralize it, thus combatting the actual infection of SARS-Cov-2. Because the manufacture of these vaccines requires genetically modified human tumor cell lines (Seneff and Nigh, 2021), there is the potential for human DNA contamination as well as many other potential contaminants.

mRNA Vaccines Issues and Uncertainties

The gene-based vaccines are delivered via a DNA or RNA vector to host cells where they will be expressed to produce corresponding antigens and induce an immune response in the host. The first advantage of mRNA vaccines is the ability to rapidly manufacture a large number of vaccines. Second, an mRNA vaccine expresses target protein (antigen) via translation from the mRNA rapidly after its transfection. mRNA is intrinsically unstable and prone to degradation due to the omnipresence of RNases in the serum and plasma (Houseley and Tollervey, 2009).

Several molecular pathways can potentially enable the vaccine mRNA to be copied and permanently integrated into DNA. The retrotransposon (LINE -1 element) is needed for this retro-integration to occur. SARS-Cov-2 RNA can be reversed transcribed in human cells by reverse transcriptase. A recent study demonstrated that the Pfizer BioNTech COVID-19 mRNA Vaccine is reverse transcribed intracellularly into DNA as fast as 6 h upon BNT162b2 exposure on the human liver cell line Huh7 in vitro (Aldén et al. 2022).

As previously stated, the RNA of the vaccine is artificially engineered to avoid rapid degradation. Increasing the stability of the RNA increases the probability of integrating into the host DNA while enhancing translation efficiency increases the amount of protein translated from RNA. Therefore, if the mRNA from the vaccine (or subsegments thereof) were to make its way into a transcriptionally active region of our genome through a retro-integration process, it may cause the cells to produce an over-abundance of Spike protein (Zhang et al. 2021, Aldén et al. 2022).

The RNA – DNA Dilemma

The initial conversion of RNA to DNA goes in reverse of the central dogma of molecular biology, it is called reverse transcription. Retroviruses use a specialized polymerase, reverse transcriptase, that uses RNA as a template to synthesize complementary and double-stranded DNA molecules. Around 8% of the genome is derived from sequences with similarity to infectious retroviruses (Griffiths, 2001). The existence of human endogenous retroviruses represents the remnants of ancestral retroviral infections that became fixed in the germline DNA (Lander et al. 2001).

It is well known that RNA can be reverse transcribed into DNA. Residing in our cells are enzymes called reverse transcriptases. These enzymes convert RNA into DNA. Multiple sources for this class of enzymes exist within our cells. These endogenous retroviruses (ERVs), now permanently embedded into our DNA seem to have played a very important evolutionary role. The relationship between our genome and ERVs constitutes an intricate and multifaceted co-evolution spanning hundreds of millions of years throughout vertebrate evolution. Endogenous retroviruses can play an active role in shaping genomes. These ERVs have instructions to produce reverse transcriptase. In addition to ERVs, there are mobile genetic elements residing in DNA (LTR-retrotransposons) that also code for reverse transcriptase enzymes. Moreover, a reverse transcriptase (telomerase) is utilized by cells to offset telomere erosion associated with cell replication, reconstruct the terminal segment of chromosomes.

These endogenous reverse transcriptase enzymes can take single-stranded RNA and convert it into double-stranded DNA. This DNA can then be integrated into the DNA in the nucleus through DNA integrase enzyme. A variety of specific conditions need to be present at the same time for this to occur, but it is possible if the right convergence occurs. Over 40% of mammalian genomes comprise the products of reverse transcription (Mager and Stoye,2015).

Untimely vaccination can lead to the production of non-effective neutralizing antibodies in the host, which can exacerbate the pathological symptoms by triggering the harmful immunological cascades to facilitate the viral entry and produce excess amounts of cytokines and complements (Arvin et al. 2020).

There are at least two concerns that we have regarding this worldwide experiment, in relation to the mRNA vaccines. The first is the concept of the COVID-19 vaccines being leaky vaccines. A leaky vaccine will not prevent infection or transmission and can contribute to viral mutation, potentially

resulting in more lethal and/or infectious strains. A published study by researchers from Pfizer has shown that vaccine effectiveness is reduced for many of these variant strains (Cohn et al. 2021).

Researchers from MIT and Harvard published a disturbing paper in 2021, where they provided strong evidence that the SARS-CoV-2 RNA can be reverse transcribed into DNA and integrated into human DNA (Zhang et al., 2021). They were led to investigate this idea after having observed that many patients continue to test positive for COVID-19 after the virus has already been cleared from their bodies. The authors found chimeric transcripts that contained viral DNA sequences fused to cellular DNA sequences in patients who had recovered from COVID-19.

Adenovirus Vector Vaccines

Adenoviral vector vaccines against COVID-19 have many of the same potential risks as mRNA vaccines as well as having their own unique risks. The unique risks of these adenoviral vector vaccines result in part from their potential to recombine genetically with DNA from other viruses infecting the recipient or human host DNA, and from their potential to mutate (Classen, 2021). There is also risk of shedding of the adenovirus based COVID-19 vaccine and the potential for contamination of animals in the food supply (Classen, 2021). The adenovirus vector apparatus facilitates mRNA production which is translated to spike protein. The risks of mRNA and spike protein are discussed above. The adenoviral vector vaccines lack adjuvants or other related excipients present in the protein and mRNA vaccines but the adenoviral based COVID-19 vaccines pose unique health risks due to the presence of the adenovirus.

Three approved and widely used adenoviral based COVID-19 vaccines include the Johnson and Johnson vaccine, the AstraZeneca vaccine and the Russian Sputnik V vaccine. These vaccines were created from strains of the adenovirus where the DNA sequence of the spike protein was added to the adenoviral genome and genes needed for replication were removed from the adenoviral genome (Classen, 2021). The nucleic acid sequences coding for the spike protein are similar in the three vaccines.

The risk of genetic recombination and mutation have been acknowledged by manufacturers but the risk is simply downplayed. This lack of concern is not scientifically founded as evidenced by the fact that adenoviral vectors have been documented to integrate in liver cell DNA in vivo (Classen, 2021).

Lipid Nanoparticles

Lipid nanoparticles (LNPs), also known as liposomes, can encapsulate RNA molecules, protecting them from enzymatic degradation by ribonucleases, and thus they form an essential ingredient of a successful delivery method. These artificial constructs closely resemble exosomes, the extracellular vesicles normally secreted by cells. The lipid nanoparticles (LNPs) in these vaccines are composed of ionizable cationic lipids, phospholipids, cholesterol, and polyethylene glycol (PEG). Together, this mixture assembles into a stable lipid bilayer around the mRNA molecule.

The small nanoparticles that comprise some of the new purified spike protein COVID-19 vaccines have an increased potential to cross the blood-brain barrier (Abramczyk, 2022). The concern is the nanotechnology used in the vaccines may increase spike protein penetration into the brain which could then lead to chronic neurological damage, given that endothelial cells of the brain express ACE-2.

Graphene in Vaccines Liposomes?

A recent technical report claims that the COVID-19 vaccines contain graphene (Campra, 2021). Graphene is a form of carbon consisting of a single layer of atoms arranged in a two-dimensional honeycomb lattice (Geim, 2007). Graphene is modified with PEG for higher biocompatibility and LNPs stability. Graphene nanomaterials are used in biomedical applications and may exhibit various degrees of toxicities. The toxicity of graphene materials is determined by factors such as the lateral size, surface structure, functionalization, charge, impurities, aggregations, and protein corona effect. These materials have a high free surface charge which can easily form "coronas" with proteins in biological systems. These proteins corona has been suggested to disturb circulation, distribution, clearance, and toxicity of nanoparticles (Dell'Orco et al., 2010). Some of the known underlying toxicity mechanisms of graphene nanomaterials include physical destruction, oxidative stress, DNA damage, inflammatory response, apoptosis, autophagy, and necrosis. (Ou et al., 2016). Graphene nanoribbons can damage cell membranes mechanically, stimulate ROS production, fragment DNA, produce chromosomal aberrations (Zakharova et al., 2021).

D-dimer

D-dimer is a fibrin degradation product that is released from blood clots in the microvasculature and is highly predictive of disseminated intravascular coagulation. Elevated serum D-dimer has been reported among both COVID-19 sufferers and vaccinated individuals (Scully et al. 2021).

Antibody Dependent Enhancement (ADE)

Antibody-dependent enhancement (ADE), also known as paradoxical immune enhancement, is an immunological phenomenon first described in 1964 (Hawkes et al., 1964). ADE has been observed in SARS, MERS and other human respiratory virus infections (Lee et al. 2020). ADE is a special case of what can happen when low, non-neutralizing levels of either specific or cross-reactive antibodies against a virus are present at the time of infection. The issue of ADE is a major reason why many previous vaccine trials for other coronaviruses failed. These antibodies might be present due to prior exposure to the virus, exposure to a related virus, or prior vaccination against the virus. Upon reinfection, antibodies in insufficient numbers to neutralize the virus nevertheless bind to the virus. These antibodies then dock at the Fc receptor on cell surfaces, facilitating viral entry into the cell and subsequently enhancing the infectivity of the virus. ADE has been observed with coronavirus vaccines tested in both in vitro and in vivo models (Eroshenko et al., 2020). The possibility of triggering ADE may be related to either future SARS-CoV-2 infection or booster injection. This can possibly manifest as either acute or chronic autoimmune and inflammatory conditions. It is not possible to distinguish an ADE manifestation of disease from a true, non-ADE viral infection. In this light, it is important to recognize that, when diseases and deaths occur in temporal relation to vaccination with an mRNA vaccine, it lends more credibility that the vaccine is responsible. Nevertheless, ADE is one possible explanation to current clinical manifestations observed in infected vaccinated patients.

A major trigger for ADE is viral adaptation through mutation (Lee et al. 2020). Changes to the amino acid sequence of the spike protein (the epitope on the virus that facilitates entry into our cells via the ACE2 receptor) can cause antigenic drift, rendering a neutralizing antibody that was once can

become a non-functional entity due to structural changes of the antigenic determinant. Mutations in the spike protein that naturally occur with coronaviruses could result in ADE. Declining concentrations of the antibody over time would also contribute to this shift towards non-neutralization. When previously vaccinated people are infected with a mutated strain of SARS-CoV-2, they could experience a much more severe reaction to the virus.

Anti-SARS-Cov-2 antibodies could exacerbate COVID19 severity through ADE (Lee et al. 2020). ADE pathways can occur when non-neutralizing antibodies or antibodies at sub-neutralizing levels bind to viral antigens without blocking or clearing the infection. This action may enhance and accelerate infection and worsen disease outcomes.

Another pathway related to ADE is governed by Th2 immunopathology, in which a defective T-cell response initiates an allergic inflammation reaction. A second pathway is based on the development of faulty antibodies that form immune complexes, which then activate the complement system a consequently damage the airways. These pathways are also potential risks for SARS-CoV-2 (Ricke et al., 2021).

Pathogenic Priming, Multisystem Inflammatory Disease, and Autoimmunity

Pathogenic priming is a concept that is similar in outcome to ADE, but different in the underlying mechanism. Lyons-Weiler coined the phrase "pathogen priming" because he believed the more commonly used "immune enhancement" fails to capture the severity of the condition and its consequences (2020). Prior inoculation could initiate an antibody production that targets different endogenous proteins which may play a role in the development of more severe disease. In this case, the pre-existing antibodies act to suppress the adaptive immune system and lead to more severe disease. This may occur by overlapping peptides that potentially drive many types of autoimmune reactions, simultaneously. Antibodies with a high binding affinity to SARS-CoV-2 spike protein have a high binding affinity with several endogenous proteins. Autoimmunity is becoming much more widely recognized as a sequela of COVID-19. Autoantibodies are very commonly found in COVID-19 patients (Wang et al. 2021). The autoantibodies created in response to SARS-CoV-2 exposure may lead to at least some portion of the neurological complications documented in COVID-19 patients. Such antibodies can contribute to the high incidence of coagulopathies in these patients. A potential side effect~~s~~ of mass vaccination could be an increase in autoimmune diseases, especially in individuals who are genetically prone ~~for~~ to autoimmunity. The Sars-CoV-2 spike protein is a potential epitopic target for biomimicry-induced autoimmunological processes (Wallukat et al. 2021). Chronic autoimmune disease, as described previously, can be a consequence of excessive antibody production in response to the vaccine. Vaccines have been associated with chronic immune-mediated disorders that may not develop for years after immunization.

Immune System and COVID-19

The adaptive immune system is essential for SARS-CoV-2 virus clearance, in contrast the innate immune cells, such as macrophages, may contribute, to the disease progression. Macrophages produces IL-6, that may contribute to the excessive inflammation in COVID-19. Macrophage Activation Syndrome may explain the high serum levels of CRP in COVID-19.

Administered antibodies can accelerate the mutation rate in the virus, because the patient was unable to fully clear the virus due to a weak immune response. This allowed a "survival of the fittest"

program to set in, ultimately populating the patient's body with a novel antibody-resistant strain. Prolonged viral replication in the patient can lead to "viral immune escape," and similar resistant strains could potentially spread very quickly within an exposed population (Ahmad, 2021).

The adaptive immune system is divided in two arms: humoral immunity (B cells) and cell mediated immunity (T cells). Exposure to other coronaviruses that cause the common cold may confer immunity against SARS-Cov-2.

The Cytokine Storm

Sepsis is a life-threatening condition triggered by a systemic infection that causes your body to overreact and launch an excessive and highly damaging immune response. COVID infection-related extreme oxidative stress is often referred to in the literature as a cytokine storm and is associated with a host of serious adverse effects as well as death (Cron et al. 2021).

Prion Diseases and Neurodegeneration

Prion diseases are a collection of neurodegenerative diseases that are induced through the misfolding of important bodily proteins, which form toxic oligomers that eventually precipitate out as fibrils causing widespread damage to neurons.

It is believed that many neurodegenerative diseases, including Alzheimer's, Parkinson's disease, and amyotrophic lateral sclerosis (ALS) may be prion diseases, and researchers have identified specific proteinaceous infectious particles linked to these diseases. When considering that the SARS-CoV-2 spike protein is a transmembrane protein, it is extremely plausible that it could behave as a prion (Seneff and Nigh, 2021). The spike protein in the mRNA vaccines could cause prion-like diseases, in part through its ability to bind to many known proteins and induce their misfolding into potential prions (Seneff and Nigh, 2021). The spike protein's S1 component is prone to act as a functional amyloid and form toxic aggregates. S1 has the ability to form amyloid and toxic aggregates that can act as seeds for further aggregation of many misfolded brain proteins and can ultimately lead to neurodegeneration.

The spike protein from the virus that causes COVID-19 has prion regions that are not found in the spike proteins from other coronaviruses. The aforementioned vaccines were all created before the risk of the spike proteins was known so this concern was most likely not addressed before the development and marketing of the vaccines.

Children and COVID-19

Two mechanisms may protect children from COVID-19 infections: (1) cross-protective antibodies from multiple upper respiratory tract infections caused by the common cold-causing alpha coronaviruses, and (2) fewer ACE2 receptors in their lower respiratory tracts to attract the binding S proteins of the beta coronaviruses (Diaz, 2020). These immunological and molecular observations support the clinical observations of mild COVID-19 infections in children compared to more frequent COVID-19 infections in adults, especially those with comorbid conditions.

The Delta Factor

The delta variant of SARS-CoV-2 is capable of inducing infection even in fully vaccinated individuals and a significant proportion of vaccinated individuals with breakthrough infections can transmit the virus to others. Despite high vaccine coverage, a high percentage of vaccine breakthrough infections with high viral loads have been detected (Riemersma, 2021).

Real Prevention (Correcting Modifiable Nutritional Risk Factors)

Early during the pandemia, the prevention measures included hygiene measures, face masks and physical distancing. Many places instituted lockdowns as a precaution and sometime later, vaccines were announced as the key element to defeat the pandemic. Nine months later, in record time the vaccines were going into the arms of people. It is remarkable, that two years into the pandemic, there has been no visible effort from the government, the Universities or any Health Professional Associations to promote and educate about the importance of nutrition, supplementation, rest, exercise, and autonomic balance to promote health, improve quality of life, optimize the immune system and reduce risks. All these measures can positively impact overall health, improve the immunologic response, and reduce mortality.

Eating an unhealthy diet will predispose to comorbidities such as obesity that worsen outcomes in COVID-19. Common dietary intakes are abundant in refined carbohydrates, artificial and hydrogenated refined fats, micronutrients insufficiencies, and lack valuable phytonutrients and fibers necessary to support good health. It has been established that an elevated proportion of the USA population suffers from nutrient insufficiencies or deficiencies such as vitamin C (46%), vitamin A (45%), vitamin E (84%), magnesium (52%), iodine (60%), and vitamin D (95%) (Reider et al., 2020). In a study with 50 hospitalized patients undergoing COVID-19, it was observed a vitamin D deficiency in 76% and in selenium in 42% of the patients. Among those with respiratory distress, 91.7% were deficient in at least one nutrient (Im et al., 2020). In addition, an observational study in COVID-19 critically ill patients revealed that about 82% had low vitamin C values (Tomasa-Irriguible & Bielsa-Berrocal, 2021).

Furthermore, a number of studies point to the direction that there is a synergistic physiologic effect that results from supplying multiple micronutrients. Numerous nutrients, including vitamin D, magnesium and zinc are important in the modulation of the immune system and interferon (IFN) signaling pathway. The synergistic action of vitamin D, magnesium and zinc in IFN signaling has been recommended as a treatment option for COVID-19 involvement (Nabi-Afjadi et al., 2021). Important micronutrients such as C, D, E, zinc, selenium and the omega 3 fatty acids have well-established immunomodulatory properties, with benefits in infectious disease. Some of these nutrients have also been shown to have a potential role in the management of COVID-19 (Shakoor et al., 2020). A 20-week study with 100 patients divided into a control group and supplemented patients (zinc, quercetin, vitamin C, D3, vitamin E and lysine) found that only 4% of patients in the supplemented group had symptoms of influenza and while that in the control group was 20% (Margolin et al. 2021). Additionally, none in the experimental group had positive COVID test results compared to 15% in the control group (Margolin et al. 2021).

Another study found that supplementation with vitamins A, B, C, D, and E could improve the inflammatory response and decrease disease severity in COVID-19 patients (Beigmohammadi et al. 2021). Furthermore, positive responses in COVID-19 patients were found with oral supplementation of vitamins A, C, D, and iodine (Brownstein et al., 2020). Some studies have provided direct evidence

on associations between zinc, selenium, vitamin D, and COVID-19. Adequate supply of zinc, selenium, and vitamin D is essential for resistance to other viral infections, immune function, and reduction of inflammation (Alexander et al., 2020).

Early Intervention Saves Lives

An exaggerated inflammatory response produces a cytokine storm causing damage to critical organs. An exaggerated blood clotting response leads to multiple thrombi in the lungs, brain, kidneys, intestines, and other organs. Treating early with prescription medicines and supplements targeted to the specific problems COVID-19 causes has the best chance of success. Medicines to decrease inflammation, anticoagulant therapy, over the counter (OTC) treatments with vitamin C, vitamin D, vitamin A, iodide, magnesium, zinc, NAC, quercetin, and others. High dose vitamin C in all its available forms may be the most useful intervention when there is a large amount of circulating toxic spike protein present (Toro et al., 2021). Vitamin C deficiency is common among patients with acute and chronic illness (Carr, 2020). A recent placebo-controlled pilot study of high dose intravenous ascorbate in critically ill COVID-19 patients showed significantly reduced mortality. The trial was conducted in two Hospitals located in Wuhan, China and used a daily dose of 24 grams of ascorbate divided in 2 doses. The ICU mortality rate was 22% (6 out of 27) in the ascorbate group and 38% (11 out of 29) in the placebo. This difference did not reach statistical significance because of the small number of patients. However, in the most critically ill (SOFA >3) the difference in hospital mortality was even bigger, 18.5% in the ascorbate group vs 38% in placebo, achieving statistical significance (Zhang et al. 2021).

In a group of 107 patients diagnosed with COVID-19 received ambulatory care with oral orthomolecular supplements that included vitamins A, C, D and iodine. In addition, they also received inhaled, intravenous or intramuscular oxidative therapies. All patients recovered uneventfully. There were no deaths (Brownstein et al. 2020).

Rowen and Robins (2020) proposed ozone therapy as an inexpensive very directed treatment to directly attenuate the virus (oxidizing its cysteine rich vulnerable spike proteins), and modulating the immune response (attenuating inflammation), reducing cytokine storm, and aiding circulation and oxygen delivery, all of critical importance in COVID-19 disease. Their team had previously shown high efficacy of ozone therapy in the rapid resolution of 100% of 5 cases of Ebola in Sierra Leone in the West Africa epidemic of 2014, which also kills by cytokine storm (Rowen, 2019). FDA prevented Florida's Larkin Hospital from doing studies (IND) on this novel therapy for COVID-19 in 2020, demanding expensive animal safety studies on a therapy used worldwide for over 100 years. Shah et al. (2020) concluded that ozone therapy, when integrated with standard of care improves the clinical status with rapid reduction of viral load compared to standard of care alone, enhancing early recovery and reducing the need for advanced care. Ozone therapy cannot be patented for profit. By February 2022, Rowen and Robins have collectively treated well over 100 acute COVID cases with ozone therapy with only 5 hospitalizations and no deaths (private communications).

An international consensus report proposed an early multifaceted ambulatory COVID-19 targeted treatment protocol to support the immune system, reduce viral load and reduce the complications of the intense inflammatory response and coagulation abnormalities. This protocol included micronutrients, antimicrobials, anti-inflammatory drugs, antiplatelets and anticoagulants (McCullough et al., 2020). A clinical study in 869 patients with COVID-19 treated with this protocol showed an 88% reduction in hospitalizations and a 76% reduction in mortality when compared with

an estimated risk of hospitalization and deaths from Cleveland Clinic COVID-19 Hospitalization Risk Calculator (Procter & McCullough, 2021).

Novel Vaccines Issues

Safety pharmacology, genotoxicity and carcinogenicity studies have not been conducted in accordance with the 2005 WHO vaccine guideline on these vaccines. Breakthrough Delta variant infections are associated with high viral loads, prolonged PCR positivity, and low levels of vaccine-induced neutralizing antibodies.

Long-haul COVID syndrome seems to represent a low-grade unresolved COVID-19 infection–with a spike protein persistence bearing clinical impact in many individuals after their COVID-19 vaccinations.

The growing subpopulation of boosted vaccinated people becoming ill with SARS-CoV-2 indicate that repeated vaccination is not providing the desired results (Kampf, 2021). Furthermore, there is evidence that repeated vaccination may be causing ADE by the failure to produce a significant amount of neutralizing antibodies (Yegorov et al. 2021).

Another perturbing issue is the widespread censorship of vaccine-related information especially related to orthomolecular interventions that may help reduce complications and save lives.

Conclusion

In general, it is unethical to recommend much less force anyone to have a procedure without properly informed consent as to the potential benefits and risks. Since the COVID-19 vaccinations were approved for use in the population before it was possible to establish the potential side effects, it was also impossible to give patients informed consent. This is a violation of the Nuremberg Code.

Experimental mRNA vaccines have been heralded as having the potential for great benefits, but they also harbor the possibility of potentially tragic and even catastrophic unforeseen consequences. The mRNA vaccines against SARS-CoV-2 have been implemented with great fanfare, but there are many aspects of their widespread utilization that merit concern. We have reviewed some, but not all, of those concerns here, and would like to emphasize that those side effects are potentially serious and might not be evident for years. In order to adequately rule out the potential adverse events described in this paper, we recommend, at a minimum, supplementation with Vitamin C, D, Zinc, Quercetin, NAC, Melatonin, Omega 3, Turmeric and Bromelain, we are preparing a manuscript to detail this subject.

Finally, as an obvious but overlooked suggestion, the government should also be encouraging the population to take safe and affordable steps to boost their immune systems naturally, such as getting out in the sunlight to raise vitamin D levels and eating mainly organic whole foods rather than chemical-laden processed foods. Also, eating foods that are good sources of vitamin A, vitamin C and vitamin K2 should be encouraged, as deficiencies in these vitamins are linked to poor outcomes from COVID-19.

Live attenuated vaccines are particularly attractive as they activate all branches of the host immune system (humoral, innate, and cellular). Also, a vaccine that can present all SARS-CoV-2 antigens to the host is optimal because it can both induce a broad immune response and is less likely to lose

significant potency due to the antigenic drift that is already apparent in the rapid appearance of variants. A vaccine containing the complete genes for all three proteins (S, M, E) would elicit a more complete and robust immune response.

These novel and very specific types of vaccines will only elicit antibodies that recognize the portion of the virus which is present in the vaccine, in other words the specific Protein S contained in the original strain of the virus. The other portions of the virus (Protein N,E,M) are not represented in the antibody pool. In this scenario, it is much more likely that the vaccine-induced antibodies can be rendered non-neutralizing antibodies, because the entire virus is not coated in antibodies, only the portion that was used to develop the vaccine (Weidenbacher et al. 2022). In a real infection, the immune system is exposed to the entire virus, and therefore, develops an array of antibodies that recognize different portions of the virus, with a higher chance to neutralize it. Early intervention is a must since the occurrence of progressive inflammatory reactions (aka cytokine storm) and coagulation dysfunction may become severe and fatal. Intravenous administration of sodium ascorbate seems to be the most potent inhibitor of acute inflammatory complications and fatality (Gonzalez et al. 2020; Toro et al. 2021).

Dedication

This article is dedicated to Dr. Luc Montaigner for his bravery, insight and commitment to the truth.

Acknowledgment

Thanks to Dr. Steve Hickey, Roberto Perez, and Eliza Llenza for their assistance in the preparation of this manuscript.

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