CORONAVIRUS GUIDEBOOK

February 18, 2021

Approval of vaccines for prevention of Covid-19 is generating enthusiasm and pushback. I've summarized my present thoughts about the

The Covid-19 pandemic has brought the world to a standstill for 3 reasons:

1. It is highly contagious, spreading readily within groups of people[1] (https://www.harvardmagazine.com/2020/05/r-nought).
2. Covid-19 is often spread by people who have no symptoms[2] (https://pubmed.ncbi.nlm.nih.gov/32218546/) or have just developed very mild sympt
3. Although 80% of infected people experience a trivial illness or have no symptoms at all, about 3.5% develop a catastrophic disease requiring hospitalization ar

Unusual and mysterious manifestations of Covid-19 are increasingly common. Many people who recover from the acute illness are left w

I began posting this guide to Covid-19 in February 2020, to organize my research into the emerging science and to cut through the delug

THE VIRUS

Corona viruses are a family of viruses made from RNA instead of DNA. There are many species that produce respiratory and gastrointest

SARS-CoV-2 is almost identical to a corona virus that has inhabited bats for about 70 years, but had never been identified as a cause of d

Since its appearance in Wuhan, the virus has continued to mutate. The dominant mutation called G614D, which was first noted in Europe

TRANSMISSION

SARS-CoV-2 is readily transmitted from person to person through respiratory droplets. Large droplets produced by a cough or sneeze m

The role of airborne aerosols in the spread of Covid-19 has been controversial, in part because the viral load of the smallest droplets is n

Air conditioning can increase transmission by keeping the virus airborne longer through two mechanisms: (a) creating currents on which

Respiratory droplets absorb moisture from humid air to become larger and heavier, precipitating on to surfaces more quickly. Harvard r

Individuals vary in the number and quality of respiratory droplets they exhale. Researchers suspect that people who emit more droplets

SARS-CoV-2 is mostly but not exclusively spread indoors. Open outdoor spaces allow dilution of viral particles, aided by wind. Summer su

THE KEY ROLE OF THE NOSE

The principle site of entry of SARS-CoV-2 is the lining of the nose. Here the virus replicates, increasing in number before aspiration into th
(https://www.inquisitr.com/6219367/coronavirus-nasal-spray/) [33] (https://www.forbes.com/sites/williamhaseltine/2020/11/10/this-nasa

Airborne virus will settle on solid surfaces and air vents and remain viable on these surfaces for varying periods of time[35]. This does nc

SARS-CoV-2 can attach to cells of the small and large intestines[37], appearing in bowel movements. Flushing a toilet with the lid open m

A small study demonstrated that when found in stool the virus is not only viable but infectious[42] (https://wwwnc.cdc.gov/eid/article/26/

STAGES OF INFECTION

The incubation period from exposure to illness is 2 to 14 days, with an average of 5 days. Unlike the flu, Covid-19 often starts gradually a

LOSS OF SMELL EXPLAINED

Loss of smell and taste occurs frequently with Covid-19, often without nasal congestion. A European study found loss of smell in 86% of p
and borage seed oils[50] (https://pubmed.ncbi.nlm.nih.gov/19887043/). (More on alpha-lipoic acid in ACE-2 ENHANCEMENT)

People recovering from loss of smell (a condition called *anosmia*) sometimes develop a distorted sense of smell that varies and fluctuate

Additional early symptoms of Covid-19 can include mouth and tongue spores, diarrhea, skin rashes or skin mottling, a purple discoloratic

For 20%, there is a Phase Two with increasing cough, shortness of breath, fever, worsening fatigue, brain fog, dizziness and mood instabi

A small percent of people with Phase Two illness become sick enough to require hospitalization. I call this Phase Three. Sometimes the tr

Almost all the clinical research on Covid-19 has been done with people suffering from Phase Three illness. The major indicators for hosp

As global experience with Covid-19 increases, it has become clear that many people who are sick, even those with minor illness, do not e

Most people remain infectious for about 9 days after the onset of symptoms[59] (https://www.inverse.com/mind-body/covid-19-when-ar

Present CDC guidelines are that someone with symptomatic Covid-19 who does not require hospitalization remains in quarantine for 10

IMMUNITY

Three important questions about immunity impact prevention and treatment of Covid-19:

- What aspects of the immune system can prevent serious infection?
- How does the immune response affect people who are sick?
- After recovery, are you immune from repeat infection?

The answers to each of these are complex and subject to change. The good news is that people who have experienced symptomatic Cov

Although it makes sense that a "weakened' immune system should increase susceptibility to the virus, that fact has never been proven. A
(https://www.medscape.com/viewarticle/939022?src=WNL_clfoc_201116_MSCPEDIT_TEMP2&uac=372244BT&impID=2673826&faf=1)

What is certain is that most people who enter Phase 3 of Covid-19 have a hyperactive immune response (the so-called "cytokine storm"),

A QUICK OVERVIEW OF IMMUNE FUNCTION

Optimal immune function depends on the balance and coordinated flow of every part of the immune system as it relates to every other

The first division separates the innate and the adaptive components of the immune system. As its name implies, the innate immune syst

The adaptive immune system, in contrast, must be educated. It learns to recognize specific proteins called antigens and acts to neutraliz

Antibodies are proteins designed to attack specific antigens; they are made under the direction of B-lymphocytes (B-cells). The cellular im

Working together, T and B lymphocytes organize a coordinated immune response that attacks pathogens while limiting collateral damag

ANTIBODIES IN COVID-19

Antibody responses have grabbed the most attention. Convalescent plasma, which is rich in antibodies to SARS-CoV-2, may speed recove

The new viral strains that emerged in South Africa and in the Amazonian city of Manaus contain a mutation in the viral spike protein calle

Some people with Covid-19 make antibodies that damage their own tissues. These are called "auto-antibodies" and many different types

T-LYMPHOCYTES AND COVID-19

The limited usefulness of antibody levels for diagnosis of Covid-19 and their lack of correlation with outcome has shifted attention to T-ly

DO COLDS PROTECT YOU FROM COVID-19?

Intriguing research on T-cells has received a lot of attention and, as usual, has led to unsubstantiated speculation. Apparently, people wh

When this speculation was reported, I found flaws in their logic, because there were critical questions that remain unanswered: What is t

THE INNATE IMMUNE SYSTEM AND COVID-19

The innate immune system plays a dual role in Covid-19, which is complicated by the ability of the virus to evade attack by innate immun

Some components of the innate immune system are able to prevent infection or reduce severity of disease[88] (https://science.sciencem

Two cell types of the innate immune system are related to increased severity of Covid-19: neutrophilsand mast cells. The ratio of neutrop

The bottom line: attempts to "strengthen" the immune system by broadly boosting innate immunity may help other viral infections but ca

A note on herd immunity: The government of Sweden attempted to create natural herd immunity by allowing the virus to spread among

CORONAVIRUS BIOLOGY

In order to cause disease, any virus must enter a human cell, replicate, and damage the cell, escaping to infect adjacent cells. Cell entry a

PART 1. Viral Entry, the Front Four

The entry of SARS-CoV-2 into human cells is a multistep process. For rapid spread, four steps seem to be essential. Addressing them is th

There are four human molecules that, working together, enable SARS-CoV-2 to quickly and efficiently enter your cells. I call them the Fror

- Step 1. Heparan is a complex sugar that coats the outside of all human cells. It is part of a structure called the glycocalix. A derivative
  - *The good news:* purified free heparin, an FDA-approved medication, binds to the viral spike protein as readily as membrane-bounc
  - Researchers have proposed administering heparin through a nebulizer, inhaled into the lungs, to limit viral spread in people who a
  - Because the main port of entry for SARS-CoV-2 is the nose, I designed a simple formula for a heparin nasal mist, with the goal of p
- Step 2. Furin, like heparan, coats all human cells[103], but unlike heparan, it is an enzyme. Its role in Covid-19 is to split the viral spike
- Genetic studies of the evolution of SARS-CoV-2 find that the predominant mutations separating SARS-CoV-2 from its relatives involve

The good news: Because furin plays a role in promoting cancer and certain well known infectious diseases, like anthrax, there has been a

- *Andrographis paniculata*, an herb used in traditional Chinese medicine and Ayurveda. (The active ingredients are called andrographol
- Luteolin, a bioflavonid found in celery, thyme, green peppers and chamomile tea, among other food sources.
- Both *Andrographis* and luteolin have anti-inflammatory and anti-viral effects that are separate from furin inhibition. Their anti-inflamn

The newest and even more transmissible strains of SARS-CoV-2, including those in the U.K., South Africa, Brazil and California, all share a

- Step 3. ACE-2, a protein embedded in the human cell membrane, is the centerpiece for viral entry, so it's called the cellular receptor. I
- ACE-2 is an enzyme that is vitally important for your health. It protects your blood vessels, your heart, your brain, your lungs, your kidr
- Some scientists are attempting to develop drugs that prevent the viral spike protein from attaching to ACE-2. There is a natural produ

- Ivermectin, an anti-parasitic drug, can also attach to the receptor binding domain of the viral spike protein, blocking its connection wit

- Step 4. TMPRSS2 ("tempress-2"), like ACE-2, is an enzyme imbedded in human cell membranes. Like ACE-2, it is only found in certain t

- Expression of TMPRSS2 in the cells that carry it is quite variable. Two factors that increase its expression are male hormones (androge
- *The good news:* Inhibitors of TMPRSS2 exist, although none are readily available in the U.S. The safest of these is a cough medicine ca
- There are several natural inhibitors of IL-13. IL-13 plays an important role in asthma and allergies. It is secreted by several types of ce

In people who are sick with Covid-19, inflammation may create additional pathways through which the virus spreads from cell to cell. For

The bottom line: Prevention of viral entry and protection of ACE-2 are rational and actionable approaches to thwarting Covid-19 that can be implemented now.

PART 2. After Entry : the Role of NSP's (non structural proteins)

Once inside your cells, the corona virus takes over the normal cellular machinery to replicate itself. Its first act is to create a large comple

- Andrographolides from the herb *Andrographis paniculata*, which has the ability to inhibit not only furin, but the coronavirus 3CL-prote
- Baicalein from *Scutellaria baicalensis*, which not only decreases synthesis of TMPRSS2, but can inhibit the corona virus 3CL protease.
- Polyphenols found in food, especially the flavonoids luteolin and quercetin. You've already met them both. Other flavonoids with pote
- Elderberry fruit (*Sambucus nigra*), which is a potent inhibitor of 3-CL protease in test tubes and in cells. Elderberry seems to be most
- *Houttuynia cordata* an herb that is widely used in traditional Chinese medicine. In addition to anti-microbial effects, it has also been s
- Melatonin. Best known as a sleep-inducing hormone, melatonin has well-studied immune-boosting and anti-inflammatory effects, in a

- Zinc. An essential mineral, zinc plays major roles in support of T-cell function and is frequently included in Covid-19 treatment protoc

- Probiotics. Spore-forming bacteria of the genus *Bacillus* produce at least 3 substances with the potential for inhibiting the Main Prote

Another non-structural protein, nsp14, is also essential for replication of SARS-CoV-2 once it enters cells[123] (https://www.ncbi.nlm.nih.g

ACE-2 ENHANCEMENT

The entry of SARS-CoV-2 into cells destroys the activity of its cellular receptor, ACE-2. Laboratory studies show that restoring ACE-2 dram

Many lifestyle factors influence ACE-2 activity in your body. Regular aerobic activity is good; high intensity interval training is even better. A

Vitamin D is essential for normal ACE-2 function. Vitamin D deficiency impairs ACE-2 and should be prevented by exposure to sunlight or

Natural substances shown to enhance ACE-2 function include curcumin (a set of flavonoids found in the spice turmeric), resveratrol (a pc

Resveratrol has a number of beneficial effects on corona virus infection beyond ACE-2 support. It inhibits the growth of SARS-CoV-2[126]

Estrogen also increases ACE-2 activity, which may be one reason that the prognosis of Covid-19 is better for women than for men. Testo

I began advocating ACE-2 enhancement for protection against Covid-19 early in 2020, as soon as it became clear that ACE-2 is the cellula

A QUICK DEEP DIVE WITH ACE-2

The most basic principle in biology is the balance of opposites: everything that happens triggers its opposite. Every stress response stimu

Whether bound to cells or circulating in blood, ACE-2 is an enzyme that destroys two chemicals that play major roles in increasing severit

In addition to breaking down substances that cause inflammation, blood clots, brain injury and circulatory problems, ACE-2 also produce

Let's dive a little deeper. The cellular benefits of Ang 1-7 occur because Ang 1-7 activates a protein called the Mas Receptor. There are sc

For a more technical scientific profile of ACE-2, please view my presentation to the American Nutrition Association at this site:

https://youtu.be/3hllO1dgUQA (https://youtu.be/3hllO1dgUQA)

A great deal has been written about balancing immune responses and controlling inflammation to treat Covid-19. Based on the known b

THE GUT MICROBIOME IN COVID-19

I have been researching the interaction of the gut microbiome with Covid-19 since the start of the pandemic. The science is complex, but

Your body teems with microbes, tens of trillions of them. Collectively they are called the microbiome. They include bacteria, viruses, fung

A lot's been published about the impact of gut bacteria on respiratory health[129] and on viral infections[130], so the early months of the

First, people hospitalized with Covid-19 show profound changes in the bacterial microbiome as measured in stool specimens. Some of th

Covid-19 decreases diversity and richness of bacteria in the gut microbiome, with depletion of some beneficial species and overgrowth o

To date, no one has studied the impact of fungi in Covid longhaulers, but I've been investigating, treating and teaching about yeast and fu

Some researchers have attempted to correlate specific bacterial disturbances with severity of Covid-19. Two provocative findings have ap

A study from the University of Massachusetts found that excessive growth of one species, *Enterococcus faecalis*, in fecal or oral specimer

Possible support for the importance of the oral microbiome in Covid-19 comes from a study done in Bangladesh[141]. In a randomized c

So, here's the good news:

If an unbalanced microbiome creates sickness in people with Covid-19, restoring balance should lead to milder disease. Overgrowth of *E*

Resveratrol, a polyphenol that enhances activity of ACE2, inhibits the growth of *Enterococcus faecalis*[142] (https://pubmed.ncbi.nlm.nih.

Ursolic acid is a dietary compound found in many fruits, vegetables, herbs and spices and is used as a muscle-building supplement by bc

Just as nutritional strategies can control colonization with the inflammatory organism *Enterococcus faecalis,* they can support growth of t

Although probiotics based on *F. prausnitzii* do not exist, two commercial probiotics can increase its levels, according to human clinical tri

The bottom line:

A protocol for building a Covid fighting microbiome fits seamlessly into the program I call INTEGRATED VIRAL MANAGEMENT, described b

MAKING SENSE OF THE MUTATIONS

SARS-CoV-2 has expressed about 4,000 ,mutations since its appearance in December, 2019. All but three are inconsequential. Including

- The initial mutation, which enabled the pandemic, placed a strong positive electrical charge on the spike protein immediately adjacen
- The next significant mutation, G614D, stiffened the spike protein so that the heparan binding site stayed exposed most of the time. T
- NELLY, the third significant mutation, is slowly taking over now. It defines the new U.K. strain (the strain is called B.1.1.7) and is also p
- The scariest new mutation, E484K, has appeared independently in South Africa and Brazil and has just been reported in the U.K. It ma

RISK ASSESSMENT

Know the rates of infection in your community. Are there clusters or hot spots? Know the habits and behaviors of people you engage wit

- If you have no symptoms, are you sheltered-in-place, exposed only to other people as careful as you are? Risk of exposure is minimal
- If you have no symptoms, but are possibly or probably exposed because your work or school or travel or social encounters bring you
- If you have symptoms that may be caused by Covid-19, you must isolate yourself from other people whom you might infect and imple
- If you are recovering from Covid-19, you need to understand that you may not have developed long-term immunity. Although rare, re

ANTI-VIRAL HYGIENE

The first step is to develop these habits: Wash your hands with soap and water for 20 seconds before eating, touching your face, after be

Use caution with objects or surfaces that are possibly contaminated. The following cleansers will kill most viruses, including corona viruse

https://www.fda.gov/drugs/drug-safety-and-availability/fda-updates-hand-sanitizers-methanol#products (https://www.fda.gov/drugs/drug

The FDA has cautioned against contamination of hand sanitizers with 1-propanol, which may cause sedation[166] (https://www.foxnews.

Studies of the anti-viral effects of cleansers have been done on hard nonporous surfaces, so alcohol, peroxide or bleach will work on cou

If you have concerns about the safety of letters or packages you receive, remember that direct sunlight inactivates 90 per cent of SARS-C

As for food, cooking kills the virus and microwave ovens can kill some strains of corona virus within 20 seconds at high heat. For helpful i

Ultraviolet light (UV-C, antimicrobial spectrum) kills most viruses, including SARS-CoV-2, although it may take 30 minutes of exposure to d

The use of face masks has become a major strategy in the fight against Covid-19 and numerous studies have shown that when the majo

- To offer any benefit, a mask must fit snugly over the bridge of your nose.
- The most environmentally friendly masks are cloth masks that can be washed daily and re-used. The more layers of fabric, the more e
- Professional masks are designed for specific purposes. For preventing your contamination of someone else, a surgical mask is superi
- Double masking has been advocated, because of the increased transmissibility of the new viral strains. There are advantages and disa
- Disposing of masks adds to the huge burden of waste we are already generating, and most professional masks are not biodegradable
  - Expose the mask to UV-C light for 30 minutes
  - Steam heat the mask for 3 minutes. To do this, place a bowl of water in a microwave oven and cover it with some sort of mesh. Pla

Here are links to some articles written to help you makes intelligent, personalized decisions about choice of masks:

https://www.wired.com/story/scientists-put-masks-to-the-test-with-an-iphone-and-a-laser/ (https://www.wired.com/story/scientists-put-m

https://www.popsci.com/story/diy/make-diy-face-masks/ (https://www.popsci.com/story/diy/make-diy-face-masks/)

https://www.aol.com/article/lifestyle/2020/03/24/how-to-make-a-face-mask-that-is-effective-against-coronavirus/23960274/ (https://www

https://www.nbcnews.com/health/health-news/making-your-own-face-mask-some-fabrics-work-better-others-n1175966 (https://www.nb

https://slate.com/technology/2020/04/comprehensive-guide-masks.html?v (https://slate.com/technology/2020/04/comprehensive-guide-

Face masks aside, the old rules still apply: If you are sick, stay home and wear a surgical mask (if possible) around other people. When co

AVOID THE HYPE ABOUT COPPER, ZINC AND SILVER. Copper and its alloys like bronze are the most potent of the anti-viral metals. Howe

MOUTH WASHES. Some commercial mouth washes may kill or disable SARS-CoV-2. In addition, povidone iodine (Betadyne) can be turne

THE HYGIENE HYPOTHESIS: A LOOK FROM BOTH SIDES

The Hygiene Hypothesis is a loosely formulated theory that the origin of modern diseases like allergies and autoimmune disorders derive

Historically, hygiene and health have been closely linked for about 5000 years. What's changed over the past 70 years is the increasing re

NUTRITIONAL STRATEGIES FOR EVERY STAGE

1. If you're living in isolation with low risk of exposure, use this time to enhance ACE-2 resilience and immune balance. Before symptoms begin:
    a. Supplement with vitamin D, 1000 to 6000 IU/day, and consume a whole foods diet, rich in vegetables, fruits, and spices to supply fiber, prebiotic carboh
    b. Supplement with flavonoids and other plant-derived polyphenols for 2 purposes
        I. Support ACE-2 activity
        II. Build up cellular levels to inhibit the action of 2 enzymes the virus relies on to enter your cells and spread through your tissues: Furin and 3CL-pro
2. If you are at higher risk of exposure use all these and add quercetin and Andrographis. This is also a good time to use an anti-viral nasal spray and to take a pr
3. If symptoms have already started, or once symptoms begin, continue to use or begin taking curcumin, resveratrol, and Andrographis. Also start *baicalein* and
4. If symptoms are severe or if they do not improve within 3 days, you must consult a medical professional.
5. If you have been diagnosed with confirmed or suspected covid-19 but continue to be sick, and you have not already followed steps 1-3 above, then start them

If you are a patient and want more specific recommendations for prevention or treatment, or if you are interested in the use of ivermect

VACCINES

I'll share my conclusions up front: All the vaccines are highly effective at preventing serious infection, the need for hospitalization, and de *People who are not vaccinated will continue to be at risk of severe disease*.

Once you are fully vaccinated, you will have great protection against severe infection but you may still be susceptible to mild or asymptor

USE OF PAIN MEDICATION

Most people will experience adverse reactions to the vaccine, consisting of a sore arm, headache, flu-like feelings, fatigue and possible fe (called paracetemol in the U.K.) did not impact antibody response to the AstraZeneca vaccine, but the data have not been published.

RISK vs BENEFITS

Many of my patients are concerned about the safety of the vaccines. As of this writing, over 40 million doses of the Pfizer or Moderna vac

If you want more information about vaccines and the reasons I reached my risk/benefit conclusions, please read on.

As of December 17, 2020, The New York Times Coronavirus Vaccine Tracker (https://www.nytimes.com/interactive/2020/science/coronav

J&J have as yet published only preliminary data from their clinical trial. The other 3 have published outcome data in peer-reviewed medic

Oxford: https://doi.org/10.1016/S0140-6736(20)32661-1 (https://doi.org/10.1016/S0140-6736(20)32661-1)

Pfizer: https://www.nejm.org/doi/full/10.1056/NEJMoa2034577 (https://www.nejm.org/doi/full/10.1056/NEJMoa2034577).

Moderna: https://www.nejm.org/doi/full/10.1056/NEJMoa2035389 (https://www.nejm.org/doi/full/10.1056/NEJMoa2035389)

HOW THESE VACCINJES WORK

The function of all vaccines is to introduce a foreign protein into your body, so that your immune system produces antibodies and activat

The four vaccines mentioned above use a different approach: they induce your cells to make the foreign protein. The Pfizer and Moderna

AstraZeneca and Johnson&Johnson use a different technology. They take a live non-pathogenic virus that normally infects chimpanzees a

These four vaccines work toward the same end, but m-RNA vaccines do so more directly. The next set of vaccines will mostly be protein-

There are 3 important questions we need answered about any vaccine:

- How effective is this specific vaccine at preventing or reducing the severity of the specific disease?
- How effective is this vaccine at preventing spread of the virus?

- What are the short and long-term adverse effects?

It appears that all available vaccines are highly effective at decreasing the severity of infection. We don't yet know how well they prevent v

HOW WELL DO THE VACCINES PREVENT MILD OR ASYMPTOMATIC INFECTION?

In the Pfizer trial, there were relatively small numbers of confirmed cases of Covid-19 in both vaccine and placebo groups, with almost 95

Unpublished data revealed by the FDA paint a somewhat different picture, however. In the Pfizer clinical trial there were several thousan

In the Moderna trial, each of the participants had a nasal swab for the virus performed just prior to receiving the second injection. The si

The Oxford/Astra trial had participants doing weekly home tests for SARS-CoV-2, the virus that causes Covid-19. Although their vaccine re

Here's why this is important:

If vaccination does not stop mild or asymptomatic spread, the virus will continue to circulate in communalities. It is even possible that the

WHAT ARE THE RISKS OF VACCINATION?

To evaluate side effects, you need the details about adverse events, which are rarely revealed. The media does report serious immediate

The other set of serious adverse reactions that are likely to be vaccine-related are autoimmune diseases, which may be triggered by the

In its clinical trial, the Moderna vaccine was given to about 15,000 people. There were 3 people in the vaccine group and 1 person in the

In the Oxford/Astra trial, the vaccine was administered only to healthy adults with no reported underlying medical conditions. Most were

Three patients out of about 13,000 developed a rare autoimmune disorder called transverse myelitis, which is inflammation of the spina

The bottom line: There are undeniable risks to vaccination and a clear need for greater transparency of data, which is unlikely to be met

NASAL SPRAYS FOR PREVENTION OF COVID-19

In my search for strategies that can limit Covid-19, I've discovered a potential role for non-toxic anti-viral nasal sprays. There are 15 differ

As I explained in the section on TRANSMISSION, The cells that line your nose are the main portal of entry for SARS-CoV-2 into your body.

Heparin

In July 2020 I designed a nasal spray containing low dose heparin, which is described below. It is safe, simple, and stable. A team from the

Information on 3 other sprays is listed at the end of this section and may be useful to people who do not have access to the heparin nas

HEPARIN MAY NEUTRALIZE COVID-19

Heparin is an anticoagulant, administered by injection to prevent and treat blood clots. It is also the derivative of a natural substance call

SARS-CoV-2, the virus that causes Covid-19, enters human cells through a multistep process in which a prong on the surface of the virus

Injected heparin is widely used to treat or prevent blood clots in hospitalized patients with Covid-19. Inhaled heparin, given at high doses

The goal of nasal heparin is to prevent attachment of the SARS-CoV-2 spike protein to ACE-2, neutralizing the virus. The dose needed for

Heparin nasal spray is only available by prescription. The nasal spray consists of a low dose of heparin dissolved in salt water. It should b

TECHNICAL DETAILS

The blood level at which heparin produces anticoagulation is 0.4 to 0.7 units/ml. The concentration in the spray is 10 units/ml, which sho

Commercial heparin is derived from pork intestine, so do not use the spray if you are allergic to pork. Pseudo-allergic reactions to hepari

Commercially Available Anti-viral Nasals Sprays

(1) Carragelose,Marinomed Biotech, Vienna. Nasal spray, throat spray ,lozenges containing iota-carrageenan, derived from seaweed. C

https://www.carragelose.com/en/portfolio/launched-products (https://www.carragelose.com/en/portfolio/launched-products)

Carregelose appears to produce a non-specific coating of the nasal lining and may have some general anti-viral activity. Carragelose has

(2) Taffix, Nasus Pharma, Tel Aviv. Nasal powder containing hypromellose and citric acid, commercially available in Israel, U.K. and Europe

https://www.nasuspharma.com/taffix/ (https://www.nasuspharma.com/taffix/)

Taffix creates a diffuse coating of the nasal lining. Its acidic pH of 3.5 is allegedly anti-viral, however SARS-CoV-2 is stable at pH as low as 3

(3) Halodine, Halodine LLC, Spring House PA, nasal solution and mouthwash containig povidone iodine, commercially available in the U.S

https://halodine.com/ (https://halodine.com/)

Povidone iodine has general nonspecific virucidal activity, with a relatively short duration of action. Duration of action is 2-3 hours, metho

LUTEOLIN

In laboratory studies, luteolin stops the growth and spread of many different viruses by inhibiting enzymes these viruses need to invade

- Influenza A[187] (https://pubmed.ncbi.nlm.nih.gov/30758716/)
- Hepatitis B[188] (https://pubmed.ncbi.nlm.nih.gov/26656210/)
- SARS corona virus[189] (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC521800/)
- Epstein Barr virus (EBV)[190] (https://pubmed.ncbi.nlm.nih.gov/27185626/)
- Chikungunya virus[191] (https://www.sciencedirect.com/science/article/pii/S1995764514603436?via%3Dihub)
- Japanese encephalitis virus[192] (https://pubmed.ncbi.nlm.nih.gov/27126774/)
- dengue virus[193]. (https://pubmed.ncbi.nlm.nih.gov/28389141/)

Luteolin's effect on dengue virus is due to its ability to inhibit an enzyme called furin. Furin exists on the outside of all human cells and is

In addition, luteolin can damp down the inflammatory response to viral infection, which may decrease severity of disease[197] (https://pu

Because of its anti-viral and anti-inflammatory effects, luteolin has been proposed as a treatment to mitigate the effects of Covid-19[199

The anti-inflammatory effects of luteolin are synergistic with those of curcumin[203] (https://pubmed.ncbi.nlm.nih.gov/31665675/).

CURCUMIN

Like luteolin, curcumin has shown anti-viral and anti-inflammatory effects in many laboratory studies. Most important is the ability of curc

In the lungs, curcumin reduces tissue damage and severity of pneumonia caused by influenza virus[204] (https://www.ncbi.nlm.nih.gov/p

Curcumin also protects the heart from coxsackie virus infection[207] (https://pubmed.ncbi.nlm.nih.gov/24057864/) and genital tissue fro

The beneficial effects of curcumin are synergistic with those of luteolin[210] (https://pubmed.ncbi.nlm.nih.gov/31665675/) and thymoqu

Curcumin has been proposed as a treatment for reducing the severity of Covid-19 by multiple mechanisms, including its anti-inflammato

THYMOQUINONE

Black cumin seed has been used throughout the Middle east for centuries to treat different conditions that we now know are caused by

Exciting new research has shed light on a unique mechanism by which TQ may modify responses to viral infection. Many viruses, includir

Higher levels of IL-13 increase susceptibility of human respiratory cells to viral infection [227] (https://www.ncbi.nlm.nih.gov/pmc/articles/

ANGIOTENSIN 1-7 AND COVID-19 (technical description)

Covid-19 is associated with inflammatory, autoimmune, cardiovascular, and neurologic complications, which include pulmonary vasocons

Several research teams have attributed the pleiotrophic manifestations of covid-19 to a virally-induced deficit in the activity of the ACE-2

The actions of angiotensin II and angiotensin 1-7 are opposite. Angiotensin II is a vasoconstrictor that promotes inflammation, fibrosis an

Angiotensin 1–7 has been studied for its anti-inflammatory properties in several disorders, especially obesity and diabetes, which are sig

Enhancement of angiotensin 1-7/Mas receptor signaling is therefore a promising strategy for reducing disease burden and post-infectiou

Angiotensin 1-7 is available for pharmacologic use, although its short plasma half-life is considered an impediment[262] (https://pubmed

Human clinical trials of angiotensin 1-7 administration have shown no toxicity or adverse reactions:

1. In women receiving chemotherapy for breast cancer, a daily dose of angiotensin 1-7 (100 mcg/kg) reduced thrombocytopenia, anemia and high grade lympho
2. At 100 mcg/kg/day, angiotensin 1-7 injection attenuated the thrombocytopenia and neutropenia induced by chemotherapy among women with ovarian cance
3. In a double-blind, placebo-controlled clinical trial, an orally absorbed preparation of angiotensin 1-7 was shown to have significant anti-inflammatory activity, r

Elderberry (Sambucus nigra),

Elderberry flavonoids inhibit the coronavirus 3CL-protease (described in AFTER ENTRY, THE ROLE OF NSPs). If taking elderberry, make su

ZINC

I have used zinc therapeutically for over 40 years and routinely measure blood levels when evaluating patients. The most meaningful test

Some physicians have proposed that zinc works best when combined with either quercetin or hydroxychloroquine, which bind to zinc an

RATES

There is so much controversy around the statistics related to Covid-19, especially mortality rates. The most fundamental fact is that rates

At the end of January, 2021, when the CDC estimated that over 82 million people in the U.S. had been infected with SARS-CoV-2, there ha

If you're interested, here's is a closer look at mortality rates that I created early in the pandemic, when the 0.5% rate had been suggested

The clearest data for mortality among ambulatory, well-fed individuals comes from epidemics at sea, in which everyone onboard was test

The crew of the USS Theodor Roosevelt was mostly healthy young seamen. Although the rate of infection was the same as on the cruise

An outbreak of Covid-19 interrupted a cruise to Antarctica during March, 2020. Although the crew and passengers were carefully screene

In the Skagit County choir (almost all women), one person spread SARS-CoV-2 to 52 of 61 people (attack rate of 86%) and 2 people died (

In the middle of June, 2020, the daily number of reported new cases of Covid-19 in the U.S. began a steady, dramatic increase. By mid-Ju

The bottom line: there is marked variability in infection fatality rates, which is the percentage of infected people, including those without s

These rates have major implications for the scope of the pandemic and its consequences. First—and most important–everywhere it is st

WHAT LIES AHEAD?

It is highly unlikely that SARS-CoV-2 or the disease it creates will disappear. Much more likely that it will become endemic, that mutations

A note about references: parts of this document are heavily filled with endnotes and citations and parts are not. The format for the refer

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