PLANT-BASED INTERVENTIONS FOR CORONAVIRUS (SARS-COV-2)

(And the Necessity for Sophisticated, Organ-Specific Treatments)

Stephen Harrod Buhner

The illness went on and on. The symptoms changed, it was like an advent calendar, every day there was a surprise, something new. A muggy head; acutely painful calf; upset stomach; tinnitus; pins and needles; aching all over; breathlessness; dizziness; arthritis in my hands; weird sensation in the skin with synthetic materials. Gentle exercise or walking made me worse – I would feel absolutely dreadful the next day.

Paul Garner, Professor of Infectious Diseases,

Liverpool School of Tropical Medicine

It's like nothing I've ever seen before.

Nick Caputo, MD

This article is going to go into quite a bit more depth than the one I posted the first of March, 2020 – nevertheless, it will not be nearly so complete as my work on the Lyme-group of organisms. And while I will list a number of journal papers and articles in the reference section, it will be far less comprehensive than those included in my medical herbals. Still, this should give a decent overview with better complexity about what is now known and how treatment can best be approached with herbal medicines. (Though, of course, things will continue to develop as

more is learned about SARS-CoV-2. . . . Btw, the virus that causes the infection is called SARS-CoV-2, the infection it causes is Covid-19, which I think is really stupid and confusing and serves no really useful purpose. However, Covid-19, as a number of ill-informed pundits have had it, does not mean that there were 18 Covids before 19. It refers to the **CO**rona**VI**rus **D**isease of 20**19**, usually written COVID-19.)

Note: I promised myself after I finished the last of the five highly technical medical herbals I wrote that I would never do another one. Regrettably, the coronavirus has necessitated a return to that world. When writing those books I spent six months, 6-10 hours a day, six days a week researching and integrating the research until I achieved a holistic gestalt of the organisms involved and the plants and protocols that could treat them. Given the state of things, I feel compelled to do things a bit more quickly with the coronavirus, as many in the medical community are doing, in order for people to have access to reality-based herbal protocols to help them through this pandemic we are experiencing. What you are getting here will lack the polishing and depth interconnectedness that is present in those other books. In essence, this is pretty much what those other books looked like two months into the research and writing. I will update this as I can and as more information and insight on the virus is available.

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As the coronavirus pandemic has extended its reach, much more has been learned about what it does and how it does it. What has been learned and what is being learned about the virus is presenting a far more frightening picture of what we, as a species, are facing than what was first

suspected. On a positive note, before I get further into how scary it is, herbal medicines (despite media hysteria on the subject) are quite capable of treating this virus and the damage it causes in the body – though of course, as is always true, technological medicine has a place in treating the virus as well, especially in its acute stages.

A Brief (and Frightening) Look at What We are Facing

This particular virus, it is becoming clear, is far more dangerous than first believed. It is also a great deal more aggressive than influenza, to which it has been erroneously compared. And further, it is far more complex and subtle in its actions and much more damaging to the human body during infection than any pandemic respiratory pathogen since the 1918 influenza. It combines the behavior of stealth pathogens and their associated systemic effects (similar to organisms such as *Borrelia*, i.e., Lyme disease) with that of some of the more deadly forms of influenza. While primarily thought of as a respiratory pathogen it is becoming clear that the nose/mouth/lungs are only the entry point for the organism. It often spreads outward from those locations, infecting and damaging a wide variety of organs in the body as it does so. This is especially true for those that show no symptoms of infection yet are positive for the virus.

At this point in time the lungs, kidneys, heart, brain, GI tract, skin, and the blood cells/circulatory system are the main organs affected. Twenty to fifty percent of people hospitalized for Covid-19 have some form of heart damage or arrhythmias. About twenty percent have skin rashes. Significant blood clotting is occurring throughout the body for many people – this is probably the most serious common problem. As Dr. Jeffrey Laurence, a hematologist at Weill Cornell Medicine in New York City commented, “The number of clotting problems I'm

seeing in the ICU, all related to Covid-19, is unprecedented. Blood clotting problems appear to be widespread in severe Covid." Worryingly, many people in their 20s, 30s, and 40s, without any other symptoms, have this kind of clotting but it is only being discovered after severe heart attack or stroke.

Damage to the endothelial cells (which are high in ACE2 receptors) which line blood vessels, veins, and arteries is far more common than suspected, even in those with mild or no symptoms. This is the main source of the clotting problems people experience . . . although the inflammatory cascade that the virus initiates plays a part as well, as it often does in many different types of microbial infections.

In consequence, it's clear that in addition to the testing necessary to determine if people are infected, a blood test for D-dimer levels is crucial. D-dimer is a fibrin degradation product that is present in the blood after clots are degraded by fibrinolysis in the body. Levels of D-dimer in the blood give a good indication of how pervasive clotting is, especially in those with no symptoms. (Without this, the only other test that can give an indication of problems is the use of an oximeter which measures blood oxygen levels. Healthy readings should run around 98%. If those levels begin to decrease it indicates problems in lung/blood oxygen exchange. (Oximeters are very inexpensive and can be ordered online – it is a very good idea to get one.)

Neurologists removing large clots from the brains of fairly young people infected with the virus have found that as fast as they remove the clots, more form. Many of those who have died from the virus have been found to have hundreds if not thousands of tiny blood clots throughout the lungs and, many times, in other organs such as the brain and the kidneys.

Damage to the blood vessels close to the surface of the skin is the source of the rash that

is now known to be relatively common in around 20% of those infected. Infection of the GI tract can present merely as mild gastrointestinal upset, transient or continuing diarrhea, or bloody diarrhea, vomiting and severe abdominal pain. However, it has recently been discovered that damage to the GI tract can be severe.

Diagnostic imaging of the GI tract of those infected with SARS-CoV-2 (even in those with no pulmonary symptoms) has found severe damage to the bowel in a number people who were admitted to hospitals. Extensive clotting has led to the loss of circulation to portions of the bowel (ischemia) with portions of the bowel becoming necrotic (dead) in consequence. As Rajesh Bhayana notes: “Some findings were typical of bowel ischemia, or dying bowel, and in those who had surgery we saw small vessel clots beside areas of dead bowel” (Palmer, 2020). This indicates that long term damage to the bowel may occur during infection. There is no way, as yet, to determine the percentage of people whose bowels are seriously affected as little diagnostic imaging of this sort has occurred with Covid-19 patients.

Half of the infected show signs of kidney damage with up to a third needing temporary or permanent dialysis; dialysis catheters often clog with clots during treatment, itself a worrying sign. Kidney failure is a common contributing factor to death from the virus.

In the brain, excessive clotting is the source of the mild to severe strokes which sometimes occur in people, often with accompanying slurring of speech and difficulty walking (some of the first signs). Serious strokes leading to necrotizing hemorrhagic encephalopathy, incapacitation, and death are also being reported. But the impact on the neurological system can be far broader.

Neurological symptoms can run the gamut from mild to severe. Somewhere between one

third and one half of the infected display some form of neurological effects. These can be as mild as loss of smell or taste, muscle weakness, headache, nerve pain, depressed levels of consciousness, dizziness, tingling/fizzing sensation, hair and scalp pain, confusion, a sense of not being one's self or as serious as encephalitis, seizures, and long term mental impairment.

This virus, like SARS-CoV-1, attaches to olfactory neurons in the nose. To infect neurons the virus doesn't utilize ACE2 but a different cellular receptor – CD147 – and from there spreads to the brain. (There is some confusion, aka argument, in the literature as to whether or not neurons express ACE2, some say yes, some say no, fisticuffs at 4 behind the playground.) It spreads outward from the olfactory bulb in the brain to regions closely affiliated with that initial site.

Portions of the brain, as well as the brainstem and cerebral spinal fluid all show viral infection. Autopsies have found damaged brain neurons and multi-focal lesions in the brain stem, cerebral white matter, and cerebellum. (Infection of the cardiorespiratory center in the medulla, which has been found to occur, is possibly the reason for sudden respiratory failure in a number of the infected. This may also explain the extremely odd circumstance where some of the infected present with blood oxygen levels as low as 50% – which should cause unconsciousness – show no signs of respiratory distress – aka "happy hypoxia".)

There is no evidence yet of demyelination of the neural structures of the brain, something that often occurs with acute viral infections but the research on neurological impacts is new. Such effects are often seen only weeks or months later. A number of specialists are suggesting neurological monitoring for some time, perhaps up to a year, after the virus is cleared from the body. Some of those who have recovered still show neurological deficits which seems likely to

be a continuing aspect of what is now becoming known as post-coronavirus syndrome (as are various forms of damage to the kidneys, GI tract, heart, and lungs).

Nearly all the infected show elevated liver enzymes and there is some evidence of infection of the ACE2 receptors in the gall bladder ducts. But the data on how damaging it is to the liver and gallbladder is very sparse at present; only two cases of severe hepatitis have yet been noted in the literature. However, many people, after infection, still show elevated liver enzymes. No one is quite sure why this is occurring. Post infection, the use of standardized milk thistle seed to protect the liver and normalize its functioning is probably a very good idea.

The virus does circulate through the spleen and lymph system but there is no data yet on whether it damages that system, or the bones, or pancreas, and so on. The virus has also been found in the testicles, which have a great many ACE2 receptors. Virus RNA has been found in semen but it is not known if it is infective. So, while there is some concern that it might also spread via sex, it has not yet been proven. Still, there is some speculation about possible long term damage to male fertility. Again something that will not be known for some time to come. It is important to note here that until recently it was not known to seriously affect the kidneys, heart, GI tract, blood, or brain.

Similarly to borrelial infections, early suspicions are arising that the virus may sequester itself in protected locations in the body only to re-emerge later, after treatment has ceased and the infected person considered cured. There have been a significant number of people who have recovered from infection only to later become positive for the virus, as yet no one knows why. (Nearly 200 people in South Korea who were considered cleared of the virus have tested positive once more; more are being found weekly.)

There are scores of people now, in the US and UK, who appear to have recovered only to "relapse" days or weeks later. Further, to make things worse, the symptom picture continually changes, sometimes with every resurgence. As Paul Garner, a professor of infectious diseases, comments in *BMJ:Opinion* (May 5, 2020), "Every day there was a surprise, something new. . . . I spoke to others experiencing weird symptoms, which were often discounted by those around them as anxiety, making them doubt themselves." (This is typical of those with recurring stealth-type infections – as many in the Lyme community have discovered. They seem better, the disease resurges, fatigue and other symptoms recur and everyone, including their doctors, default to "it's all in your head.)

As he goes on to say . . .

> *The least helpful comments were from people who explained to me that I had post viral fatigue. I knew this was wrong. There was a pattern in that period from two weeks to six weeks: feeling absolutely dreadful during the day; sleep heavily, waking with the bed drenched in sweat; getting up with a blinding headache, receding during the day, turning me into a battered ragdoll in the evening.*
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> *I joined a Facebook page (Covid-19 Support Group (have it/had it)) full of people with these stories, some from the UK, some from the US. People suffering from the disease, but not believing their symptoms were real; their families thinking the symptoms were anxiety; employers telling people they had to return to work, as the two weeks for the illness was up. And the posts reflect this "I thought I was going crazy for not getting better in their time frame"; "the doctor*

> *said there is zero reason to believe it lasts this long". And too, people report that their families do not believe their ever changing symptoms, that it is psychological, it is the stress.*

As Luke Harding reports in *The Guardian* (May 15, 2020), "According to the latest research, about one in 20 Covid patients experience long-term on-off symptoms. It's unclear whether long-term means two months, or three or longer. The best parallel is dengue fever, Garner suggests – a 'ghastly' viral infection of the lymph nodes which he also contracted. 'Dengue comes and goes. It's like driving around with a handbrake on for six to nine months.' Or, as Lynne Turner-Stokes, professor of rehabilitation medicine at King's College, London, puts it, for a percentage of those infected there is a "recrudescence of symptomatology."

Despite the increasing evidence for viral sequestering, some are suggesting that such may not be the reason; it may be reinfection after cure. (This is not uncommon with coronaviruses, the common cold is an example.) This would mean that previous infection does not confer immunity. (In late-April, the World Health Organization issued a statement that it should ***not*** be assumed that previous infection would confer immunity to repeat infections.) Neither is a good scenario; either way it is bad news. (A lessening number of people are still insisting that the resurgence is simply due to testing failures. This is unlikely to be the sole reason; many of the people who are again showing symptoms *had* symptoms, were then treated in the hospital, recovered, went home, only to develop symptoms again weeks later.)

Of additional concern, the virus quite often infects the conjunctiva of the eye (conjunctivitis) where it has been found (in one person) to continue to replicate, and be

infectious, up to four weeks after the infection was thought to have run its course. This indicates that the virus could use the eye as a possible source to spread further infections. (Rub your eye, touch somone, and on it goes.) And if all this were not enough, a great many people have been found to be asymptomatic for the disease and yet be silent carriers. People have been known to carry and spread the virus for weeks before symptoms arise (if they ever do) and for up to four weeks after infection is thought to have cleared.

The true rates of infection and death from the virus are not yet known and probably won't be known for one to two years. The reasons actual figures can't be known for so long is due to a variety of factors. Those are: early, erroneous beliefs about the virus and what it did in the body, very poor tests, low testing rates, and in the US, regrettably, the CDC criteria for both infection and death which nearly always are, and in this instance very much are, far too conservative and limited in scope.

Low testing rates (in the US and in a number of other countries) give a false picture of infection in the general population. Figures change weekly, often in response to complex research papers which are utilizing various forms of statistical analysis. Few of them agree. I have seen figures speculating that true infection rates are ten times official numbers; others insist it is one thousand times official numbers. Speculation about mortality rates runs from .01 percent to ten percent of the infected, sometimes more depending on the age group being examined. In truth, infection and death rates are much higher than the CDC and other sources (irrespective of the country) indicate.

While the elderly (due to simply aging of the body, its immune system, and its organs) and those with underlying conditions (obesity, diabetes, etc) or immune dysfunction are the most

likely groups of people to die from the virus, significant numbers of people in their late 20s, 30s, and 40s are also succumbing to the disease. Far more, in fact, than first thought. (Children of all ages are far more susceptible to infection than first believed and while rates are low death is occurring in this group as well. There is also a new syndrome emerging in children, especially in New York that is not yet understood enough for me to comment about intelligently.) There are two main reasons for death rates being far higher than is currently thought – though at root it comes down to the same thing, lack of testing.

The first is that, because if its system-wide impacts the virus is causing a great many heart attacks, strokes, and incidences of kidney failure. Unless those who die from causes other than respiratory failure are tested for coronavirus, the listed cause of death is going to be incorrect. Secondly, a great many people are dying at home. Few of them are being tested for coronavirus. In fact, until recently, unless they had previously been tested for coronavirus and found positive, a death at home was not considered coronavirus related.

It is helpful here to look at normal background deaths at home in New York City and deaths at home during the pandemic. Normal deaths at home in that city average around 25 per day. During this pandemic they have been as 250 per day – I have seen figures that run from 150 to 275, depending on the week and how diligently the national guard is checking apartments. The true death rate is much higher than believed (most likely 60% more than official figures), something that is now being widely recognized.

Coronaviruses are very stable and in that sense are much like bacteria. They are one of the few RNA viral groups that, unlike other RNA viruses, make identical copies of themselves. Researchers and reporters tend to say that most RNA viruses lack a “copy correct” function so

that their offspring are not identical but instead vary, sometimes, widely. (This makes them sound somewhat defective and stupid – poor things, can't even reproduce properly. This is a very bad metaphor as they are neither defective or stupid.) But this virus does have a "copy correct" ability, so. . . a slightly smarter virus. (Still, not as smart as us.)

Viruses are very old, they use patterns of behavior refined after long exposure to and experience with the world around them. Most viruses don't make identical copies of themselves because by making millions of variants their offspring will be more able to avoid effective immune responses as well as continually generate more complex and adaptable forms.

But SARS-CoV-2, rather than producing a multitude of variants as it reproduces, utilizes a different approach, one similar to that used by bacteria. It alters its genetic code by exchanging genetic material with other coronaviruses (there are always some of these among the people being infected) and – possibly – by altering itself, as resistant bacteria have done, by analyzing host immune responses and then rearranging its genome in response. (Yes, viruses are intelligent and yes, contrary to common belief, they are also alive.) Most researchers are using the term "mutation" for these altered forms, which I think misplaced since they don't really mutate *per se* but rather, like bacteria alter their genome in response to environmental pressures. They learn as they go and adapt to what they encounter. (Assuming that other forms of life, or simply different types of humans, are stupid rarely works out well in the long run – review French Revolution or dynamics of antibiotic resistance as examples.)

There is evidence that there are at least eight forms of the virus now in circulation (though I have seen one paper that indicates thirty). Recent studies note that the viral infections on the west coast of the US are apparently from the initial Chinese form of the virus while the

infections on the East coast of the US are from a European variant, spread to the US by travelers from the EU. It is currently thought that the European variant, which began in China, became more virulent as it moved through the EU countries and finally into the US.

While research is ongoing, the increase in transmissibility and pathogenicity seems a consistent strategy of this particular organism – at least at this time. As Kroeber, et al comment (2020), about their discovery of a more transmissible form:

> *To date we have identified fourteen mutations in Spike [the attachment organ of the virus] that are accumulating. . . . The mutation Spike D614G is of urgent concern; it began spreading in Europe in early February, and when introduced to new regions it rapidly became the dominant form. Also, we present evidence of recombination between locally circulating strains, indicative of multiple strain infections.*

Phelan, et al (2020) comment that

> *We used 3,958 SNPs to build a phylogenetic tree of SARS-CoV-2 diversity and noted strong evidence for the existence of two major clades and six-sub-clades, unevenly distributed across the world. We also noted that convergent evolution has potentially occurred across several locations in the genome, showing selection pressures, including on the spite glycoprotein where we noted a potentially critical mutation that could affect its binding to the ACE2 receptor.*

> *We also report on mutations that could prevent current molecular diagnostics from detecting some of the subclades.*

In other words, besides more pathogenic forms, there may possibly be variants emerging that cannot be detected by current tests.

Yao, et al, note that they have found alterations in variants that "show significant variation in cytopathic effects and viral load, up to 270-fold differences" during infection. As they go on to comment, "We provide direct evidence that the SARS-Cov-2 has acquired mutations capable of substantially changing its pathogenicity." That is, it is getting more virulent. While there has been speculation (hope?) that the virus would become less virulent as it moves through the human species, more researchers are doubting that it will occur – at least in the short term.

There is no other way to say this . . . what we are facing is serious. It is also a great deal worse than what we would have faced because of the ruinous (neoliberal and conservative) financial squeeze on working people (including the middle class) the past forty years, the takeover of American health care (supported by neoliberals and conservatives) by giant corporations (which have closed hundreds of hospitals the past ten years and reduced stocks of essential medicines and safety equipment), the offshoring by such corporations of essential medical supply manufacturers (including pharmaceutical) to China and India, the long term Republican assault on robust public health care and associated public health institutions in the US (including groups such as the CDC and state health services), Republican-initiated severe reductions in the social safety net (supported by neoliberals as well), and the very poor responses

to the pandemic by Republicans in congress, in the various states, and most especially the Trump administration.

If the emerging picture of what the virus is doing is borne out, and if it continues to develop more sophistication with the human body and its immune responses, not only will a vaccine be much harder to create, the human species is going to be in for a very bumpy ride.

> ***Note:*** *no successful vaccine has yet been created for* ***any*** *coronavirus, the common cold is a primary example. Further, immunity to coronavirus infections (again, see the common cold) typically only lasts a few months before it fades. That this might also be true for this coronavirus is the source of the fear that many virologists and epidemiologists have that the virus might become endemic and continually recur in the human population just as the cold virus does.*

There is little reason, at this point, to believe that this virus, as SARS did, will just fade away anytime soon. We will only discover what is true over time, perhaps only over several years. We are, in fact, in a hell of a mess.

Organism Entry into the Body

While my initial review of what this particular coronavirus does in the body was correct as far as it went, research since then has considerably broadened and deepened understanding of this virus and what it does. The same will be true of this look into the virus. In another six or eight weeks even more will be known and so on *ad infinitum*. Nevertheless, here is a pretty good view of

what is happening which gives a good deal of information about how best to utilize sophisticated herbal protocols to intervene in the process.

It is clear that during infection the virus utilizes ACE2, which is a receptor on many cells in the body, in order to attach itself to those cells. *Note:* There are about 40 trillion cells in the average human body, a great many of these have ACE2 receptors on them. Once the virus enters the body, it has millions of options for attachment.

The "spikes" on the virus (famous now from the many media representations of them) are the part of the virus which attaches to the ACE2 receptors on the cell. To facilitate this, the spikes utilize an enzyme found on our cells – transmembrane protease, serine 2 (TMPRSS2) – to "prime" the virus's spike protein so that it displays itself as a "fusion protein" to the cell via the ACE2 receptors. This allows viral attachment to the ACE2 receptor and subsequent entry into the cell. (The primary herb which can be used to protect TMPRSS2 integrity, and stop the priming, is *Salvia Miltiorrhiza*.) A number of the more infective influenza viruses also utilize TMPRSS2 in this way. (Another intelligent intervention is interfering with spike attachment to ACE2, discussed later in this article.)

Generally, the virus first enters the so-called upper respiratory system (beginning with the nose). There it attaches to ACE2 receptors on certain epithelial cells, specifically goblet secretory cells (which produce mucus) and ciliated cells (which have tiny hair-like extrusions i.e., cilia, which move mucus and particulate matter up and out of the respiratory system). (*Bidens pilosa* is protective of these cells.) The virus utilizes those cells' TMPRSS2 to prime the spike, allowing entry inside. These particular cells possess a large number of innate immune-associated antiviral genes which is leading to speculation that the virus may be using its access to these cells to

subvert a healthy immune response. (And, indeed, interferon production does seem to be inhibited early in the infection.)

Once it gains entry into the nasal cells, the virus begins to utilize those cells' structures in order to reproduce, creating more copies of itself. At this point in the infection there are often no symptoms. Then, for a week, sometimes longer, the virus releases copies of itself from the infected cells. (Tests of health care workers without sufficient protective equipment found that their noses and mouths were full of live viruses which they then exhaled onto every new patient they saw.) The viruses travel outward with the breath (and also spread to the hands when you rub your nose) enabling them to spread to other people thus passing the infection more widely into the species. (Evidence is mounting that exhaled aerosols, not just droplets, can possibly spread the virus, thus extending the range of infection far more than six feet.)

Note: The main purpose of masks is to protect others if we are infected. It is not to keep us from getting infected. And yes, *if* you don't cover your nose with the mask, you are still infecting people. Nevertheless, there are masks that will protect you from inhaling infectious viruses but very few people have them. In high exposure situations I use a 3M Paint Project Respirator, 6000 Series, with a gas and vapor double-filter cartridge attachment. And yes, I still feel silly.)

The viral infection of olfactory sensory neurons, located in a small area of specialized tissue high in the nose are the reason for the loss of smell (sometimes taste) that is one of the early signs of infection. Those neural cells connect directly to the brain and are one avenue the virus uses to infect the brain.

From the nose the virus begins to move deeper into the respiratory system, infecting

goblet and ciliated cells in the throat and bronchi. This is the point where the first symptoms generally appear: slight fever, dry cough, sore throat, head and body aches. It then begins to move deeper into the lungs (the so-called lower respiratory system) where its preferred cell is type II pneumocytes (aka, type II alveolar cells). (ACE2 receptors are also strongly present in type I cells as well, but the virus seems to prefer type II; I can't find anything on type I infection.) These cells are common throughout the lung's alveoli (and along with type I), exist in scattered pockets in the bronchioles, and as well in the alveolar ducts.

The alveoli are incredibly tiny, microscopic, grape-like sacs at the end of very tiny, also microscopic, bronchioles. Air travels through the bronchi which diverge into smaller and smaller and still smaller air passages at the end of which are the alveoli. The alveoli have an extremely thin exterior membrane which is covered by a network of incredibly tiny blood vessels. As we breathe in, the alveoli expand much like very tiny balloons, then oxygen (and other gases and volatiles) pass through the thin alveoli membranes into the blood stream, carbon dioxide (and other gases and volatiles) pass from the blood into the alveoli and are then breathed out. There are around 300 million alveoli so there are a great many ACE2 receptors in the lungs for the virus to attach to.

As the infection progresses, the immune system responds, white blood cells release activated molecules to fight the virus (cytokine is the general name for messenger molecules, chemokines are specialized cytokines that call immune cells to the sites of infection, but I just call them all cytokines). The alveoli fill up with fluid (edema) and dead cells which makes breathing more difficult (pneumonia). Coughing, fever (often high), rapid and slow respiration are common. (There are exceptions, some people never show respiratory symptoms.) Blood

oxygen content falls. Some people experience what is called acute respiratory distress syndrome (ARDS). This is generally accompanied by what is often called a cytokine storm, a massive inflammatory response throughout the body. The oxygen levels in the blood plummet, the alveoli are filled with pus, mucus, white blood cells, dead viruses, and destroyed lung cells. (These are the people most commonly put on ventilators. However, the majority of ventilated people, around 85% on average, die; there is growing recognition that ventilators may not be a proper intervention with this particular infection.) For many people, the damage to the thin cellular barrier between the alveoli and the blood vessels, results in scarring, aka fibrosis. This is one cause of what is commonly called COPD (chronic obstructive pulmonary disease) or sometimes idiopathic pulmonary fibrosis. This results in long term pulmonary problems. (Because of the scarring, the oxygen exchange is impeded so that oxygenization does not occur efficiently – thus during any event which demands the use of the muscles people run out of breath, often quite quickly. The scarring is often progressive over time.) It is not known how many people are developing this post-infection complication, but it is cause for concern.

It is particularly important to keep the lymph system working well during Covid-19 infection in order for the immune system to work most effectively. (*Salvia miltiorrhiza* – and cleavers, *Galium spp* – will help both spleen and appendix work well as well as helping lymph nodes more efficiently clear of infection debris.)

The lungs also possess an extensive lymph system with similar nodal structures which it uses to regulate interstitial fluid clearance. This system is impaired during Covid-19 infection, in part through the viral damage to lymphatic endothelial cells. (Lymph vessels are lined with endothelial cells just like blood vessels.) During pathological states where the lung's lymph

system is impaired, this loss of lymphatic function naturally leads to an inflammatory state. The alveoli are damaged, hypoxia, and a state very similar to emphysema occurs. (Protecting the cells from the induced hypoxia can help reduce the damage in the lungs. *Rhodiola* is specific for this. It prevents hypoxia-induced oxidative damage, increases intracellular oxygen diffusion, and increases the efficiency of oxygen utilization.)

Keeping lymph function in the lungs healthy is essential, especially with this disease, thus protecting the integrity of the endothelial cells of the lymph vessels and stimulating healthy lymph function is strongly indicated. Lymphatics have a long history in herbal medicine and there are some good ones. Given that *Ceanothus* (red root) does stimulate clotting I would suggest the use of cleavers (*Gallium spp*) as an adjunct instead. (This is *not* an issue for the people who have been using *Ceanothus* to this point. That herb is present in the initial protocol in relatively small quantities and that protocol contains, as well, a number of anticoagulatory herbs which would counteract any coagulant actions it has.)

Herbs of note: *Eleutherococcus senticosus* (aka, Siberian ginseng) has, among its many actions, the ability to stabilize lymphatic vessels by protecting and enhancing the endothelial cells of the lymph system. The use of the herb, in clinical trials, has been shown to stimulate lymph drainage to such an extent that edema of the lower limbs was "significantly" attenuated at 2 and 4 hours after ingestion." *Scutellaria baicalensis, Salvia miltiorrhiza,* and *Polygonum cuspidatum* are all highly protective of lymphatic endothelial integrity, interfering with cellular invasion by pathogens or the damaging impacts of cytokines. Additionally, both pleurisy root (*Asclepias tuberosa*) and inmortal (*Asclepias asperula*) can help stimulate lymph drainage from the lungs.

During viral infection of the lungs, the microbiome of the lungs is significantly disturbed. This can allow a bloom of what are normally quiescent pathogenic members of the microbiome. This is why during viral pneumonia, most physicians will also prescribe broad-spectrum antibiotics in an attempt to ward off pathogenic bacterial overgrowth. Additionally, coronavirus infection, which is common in the lower GI tract, will also affect *its* healthy microbiome. The lung/GI tract microbiome are, in essence, a single interconnected system – what happens in one affects the other. Disturbances of the microbiome in the GI tract has also been found to negatively affect heart function as well as the function of other organs, all of which contributes to various post coronavirus syndrome symptoms. (The daily use of a probiotic is strongly suggested. The cheapest good one is PB8, but those in the $40 to $60 range are better.)

At first it was believed that the virus was a typical, although unique, respiratory pathogen. It isn't. The virus can in many people become systemic, affecting many other organs in the body. This is because ACE2 is widely distributed throughout all the body's tissues. As Hamming, et al (2004) noted in their exploration of SARS and ACE2:

> *Since identifying the possible route of infection has major implications for understanding the pathogenesis and future treatment strategies for SARS, the present study investigated the localization of ACE2 protein in various human organs (oral and nasal mucosa, nasopharynx, lung, stomach, small intestine, colon, skin, lymph nodes, thymus, bone marrow, spleen, liver, kidney, and brain). The most remarkable finding was the surface expression of ACE2 protein on lung alveolar epithelial cells and enterocytes of the small intestine. Furthermore,*

> *ACE2 was present in arterial and venous endothelial cells and arterial smooth muscle cells in all organs studied. In conclusion, ACE2 is abundantly present in humans . . .*

Because ACE2 is present throughout the body, the virus can, theoretically, affect any location in which those receptors exist. Again, at this point in time, the lungs, kidneys, GI tract, heart, blood vessels, skin, the eyes and liver/gall bladder are known to be common infection sites.

ACE2 is ubiquitous in endothelial cells in all large and small arteries and veins in all the tissues of the body. Smooth muscle cells show them as do myofibroblasts (their infection is possibly the source of muscle weakness during and after infection) and the membrane of fat cells in the organs and everyplace that fat accumulates. The entire GI tract has large numbers of ACE2 receptors: the stomach, duodenum, jejunum, ileum, and the colon. (Viral infection of the GI tract is the source of the diarrhea that many people experience.) ACE2 receptors are present in the basal cell layer of the epidermis, hair follicles, in and around the sebaceous and sweat glands, and in all the blood vessels that lie close to the skin surface. (This is the source of the skin rash that about 20% of those infected report.) The brain has ACE2 receptors as do the bile ducts, lymph nodes, heart, and kidneys. More troubling, because ACE2 receptors are common throughout the entire circulatory system in vessel and arterial walls, blood clotting in the circulatory system has become a serious issue.

Blood Clotting

The blood coagulation problems seem to come from two main impacts of the infection. As the

virus spreads through the blood system of the body, it has access to a great many ACE2 receptors on the circulatory system's endothelial cells. Viruses attach to the receptors, enter the cells, reproduce, and blow the cells apart as their offspring exit. In essence, this is no different than a scrape to the surface of the skin. It's a wound. So, the internal version of a scab begins to form. Unfortunately, this is happening not to one cell but thousands.

Damage to the endothelial cells that line the vessels recruits platelets to that location where they begin to cluster at the point of damage. The platelets initiate the formation of fibrin which forms a kind of net that traps within it more platelets and red blood cells, essentially plugging the wound (i.e., creating a clot, aka the internal form of a scab) in the vessel wall. This is the initial, main cause of the massive clotting in the body – though as mentioned earlier certain inflammatory processes stimulate systemic clotting as well. Because so many cells are affected, there are hundreds to thousands of clots forming throughout the entire circulatory system and, potentially, in every organ of the body.

Given that coagulation (clotting) problems are so extremely common with this infection – as well as the fact that many people appear well but suddenly experience stroke or heart attack – the use of anti-coagulants is, I think, essential. A number of the herbs suggested for use in treating Covid-19 infections are anticoagulant and very specific for protecting endothelial cells from inflammatory damage and/or stopping clotting – *Salvia miltiorrhiza, Polygonum cuspitadum,* and *Scutellaria baicalensis* are some examples. However, I think the daily use of specific anticlotting agents is warranted – whether someone is infected or not. I suggest either lumbrokinase or nattokinase (and yes, serrapeptase will work, too).

Again, many people show no symptoms at all but are still experiencing severe

coagulation/clotting problems in their circulatory system. One of the ways to determine how much clotting is occurring is to check the blood for D-dimer levels. D-dimer is released during fibrin degradation; the more D-dimer, the more clotting. Again, all people who are tested for the virus should also be being tested for D-dimer levels . . . but they are not and most probably will not be. Thus the daily use of an anticoagulant such as lumbrokinase is strongly suggested as well as checking blood oxygen levels daily with an oximeter.

Immune Disregulation

Nasal goblet cells, which are some of the first cells infected, are involved with initial interferon responses to viral infections. But with this virus, there is considerable evidence that interferon responses are disregulated. During early infection, as soon as the nasal goblet cells are infected, IFN responses are delayed. Later on in the infection they are often overactive, initiating highly inflammatory cytokine cascades. In the latter situation, there is strong evidence that what is called GMP-AMP synthase (cGAS) and its down stream effector STING (STimulator of INterferon Genes) are overactive during Covid-19 infections. This same dynamic is the source of an unrelated but difficult and painful autoimmune disease called STING-associated vasculopathy with onset in infancy (SAVI). Unsurprisingly, the symptoms it causes bears a resemblance to some of the symptoms that occur during Covid-19 infections.

STING is an adaptor molecule which links sensing of foreign microbial pathogen DNA to the production of type 1 IFNs during the innate immune response. It is expressed in alveolar macrophages, bronchial epithelium, and type II pneumocytes – all SARS-CoV-2 infection sites. STING has a direct effect on endothelial cells, stimulating inflammation and initiating a

coagulation cascade. This is in addition to the dynamics already in play through viral attachment to endothelial ACE2 receptors. STING disregulation, caused by the SARS-CoV-2 virus, is at the root of many of the pulmonary, coagulation, and inflammation problems seen both in Covid-19 infections and SAVI.

SAVI is accompanied by abnormal inflammation throughout the body, especially in the skin, blood vessels, and lungs – idiopathic pulmonary disease is a common problem for children with SAVI. There are also continual problems with blood vessels (vasculopathy) and damage to the tissues that rely on these vessels for their blood supply. The condition causes a chronic vessel-endothelium inflammation which leads to the vasculitic rash common in SAVI . . . but seen also in Covid-19 infections. (This may be the dynamic underlying the unique symptoms being seen in young children in New York.) This often extends to the toes and fingers producing a condition which is very similar to what is being called Covid-toe. As with Covid-toe, the rash is not limited to the toes but extends to the sole, sides, and top of the foot and is sometimes accompanied by lesions. JNK inhibitors have been found to help quiet the STING-initiated, overactive IFN activity, reducing the systemic inflammation in the body. (Some plants that inhibit JNK are *Ailanthus altissima, Andrographis paniculata, Aster tartaricus, Eucommia ulmoides, Forsythis suspensa, Glycyrrhiza spp, Lonicera japonica, Magnolia officinalis, Paeonia suffruticosa, Polygonum cuspidatum, Sophora flavescens* – all of which have been found to be useful for treating pulmonary problems similar to those caused by this coronavirus.)

As with Lyme infections, interfering with the production of upstream cytokines during Covid-19 infections can significantly reduce the inflammatory cascades they initiate thus reducing the damage to the body. Xiaobing Deng, Xiaoyu Yu, and Jianfeng Pai (2020, preprint)

comment that control of upstream cytokines is a promising strategy in the treatment of Covid-19, with special attention paid to the disregulation of IFN-I which the virus causes early during infection. Stopping the virus-caused abnormal activity of cGAS-STING which is a main source of cytokine overactivation and inflammation is one potential upstream point at which to intervene. The plant-derived cyclopeptide Astin C is particularly potent in accomplishing this. It's a compound from the plant *Aster tataricus* which has been used in Chinese medicine for some two thousand years. The root is often used to treat lung and bronchial disease, especially chronic bronchitis and coughing. It is considered antibacterial and antifungal (with a good range of action against a number of pulmonary pathogens), antitussive (reducing coughs), expectorant (expressing mucus out of the system), and stimulant. (This is not an herb that I have previously used or have experience with but given its history of use and its ability to inhibit JNK and cGAS-STING its use with Covid-19 certainly should be considered.)

As noted, there are ACE2 receptors on macrophages, monocytes, and lymphocytes, including T-cells. This allows the viruses entry into those cells where they can then affect immune responses. There is growing evidence that like SARS-CoV-1, this virus can infect dendritic cells; it definitely interferes with their maturation. By infecting a wide range of immune cells, the virus can lower or inactivate some immune responses and significantly upregulate others. Similarly to Lyme borrelia, it is very sophisticated in modulating immune responses to infection. During early stages, it shuts down significant parts of a healthy immune response which allows the virus to spread and infect widely divergent parts of the body more easily. (As an example, during infection it is common for very low levels of lymphocytes to be present in the body, something called lymphocytopenia. *Houttuynia* is very good at correcting this as well as

being a specific antiviral for this organism.) Later on in the infection, it enhances immune action, creating more inflammation. (Inhibitors for the organisms' actions on the immune system is covered later in the article.) Some people have immune responses that do in fact quite easily stop the infection, others, apparently very healthy do not. No one knows why. (Reductionists continually fall back on GENETICS! which they use about the same way that our ancestors used "the gods did it" or "it's an imbalance in the humors." The truth is they don't know.) Some people have immune responses that do in fact quite easily stop the infection, others, apparently very healthy do not. No one knows why. (Reductionists continually fall back on GENETICS! which they use about the same way that our ancestors used "the gods did it" or "it's an imbalance in the humors." The truth is they don't know.)

CD147 and Cyclophilin A

The virus has also been found to attach itself to the CD147 receptor that is present on many cells in the body. CD147 is also known as neurothelin, basigin or, more descriptively, Extracellular Matric MetalloPRoteinase INducer (EMMPRIN) since it stimulates fibroblasts to secrete a range of matrix metalloproteases (MMPs) – themselves a source of inflammation and cellular breakdown. CD147 is regarded as a novel modulator of inflammatory and immune disorders and its disregulation has been linked to the pathogenesis of such things as asthma, lung inflammation, hepatitis, myocardial infarction, ischemic stroke, and, importantly, neuroinflammatory diseases – most of which have occurred with Covid-19 infections.

CD147 receptors are found on olfactory and brain neurons, red blood cells, epithelial cells, endothelial cells, leukocytes, monocytes, lymphocytes, neutrophils, and platelets. It is

highly upregulated on activated immune cells, neutrophils, T and B-lymphocytes, monocytes, macrophages, and dendritic cells. While the virus can use this receptor to gain entry to cells (and does do so), it appears that a more important aspect is the affinity of cyclophilin A (CyPA) for CD147 receptors.

Damaged epithelial and endothelial cells and macrophages tend to upregulate and release CyPA and CyPA has been found to stimulate CD147 surface expression on cells. CyPA has been shown to strongly facilitate viral replication, including that of SARS-CoV-1. CyPA, when released from cells, strongly binds to the upregulated CD147 receptors. By attaching itself to the CD147 expressed on the surface of cells and simply waiting, the virus gains access to the CyPA which, when released from damaged endothelial and epithelial cells, seeks out CD147 to bind with. When it does, the virus can utilize the CyPA to facilitate its reproduction. Viral load then increases substantially.

The cyclophilin inhibitor cyclosporin A has been found to inhibit the replication of coronaviruses. (*Magnolia officinalis* contains magnoloside A which has also been found to inhibit CyPA. It is a traditional Chinese herb used to treat, among other things, lung infections and inflammation.) As well, anti-CD147 antibodies tend to inhibit the virus from attaching to host cells or using that receptor to gain entry into them. (*Scutellaria baicalensis* accomplishes this as well, in part, by downregulating CD147 expression.) Blocking CD147/CyPA interactions during *in vivo* studies of induced acute lung inflammation by the use of anti-CD147 mAb has led to a 50% reduction of neutrophils in within the lung tissues and airways accompanied by a similar decrease in tissue damage (Zhu, et al, 2014).

CyPA is a potent proinflammatory molecule. The more that is released from damaged

cells, the more inflammation that occurs in the system. The binding of CyPA to CD147 activates MAPK pathways, stimulates leukocyte recruitment and specifically induces MMP-9 expression through ERK and NF-*k*B pathways, all of which play a role during Covid-19 infections. (Among other actions, *Polygonum cuspitadum* strongly downregulates MMP-9.) CyPA also induces the production of numerous cytokines, e.g., IL-1β, IL-6, and IL-8 in macrophages and monocytes and promotes the proliferation and migration of VSMC. It enhances platelet adhesion and thrombus (clot) formation and activates ERK1/2, NF-κB, Akt, JNK, and p38 MAPK, again, all of which play a role in Covid-19 infections.

Inflammatory Cytokines

Once the virus enters the body it initiates a rapid process of replication which causes massive endothelial and epithelial death (apoptosis) and, because of the endothelial cell damage, vascular leakage. This triggers the release of "exhuberant" (as they say) pro-inflammatory cytokines and chemokines (known hereafter as just plain old cytokines). These include TNF-a, IL-1β, IL-6, IL-8, VEGF, MCP-1, among others. The viral infection of macrophages and lymphocytes can result as well in a type of apoptosis or cell death called pyroptosis which is by its nature highly inflammatory when it occurs. The virus doesn't generally reproduce in white blood cells but it does actively interfere with their ability to fight off the infection. (See the section on smoking, later in the article.)

In addition to attaching to and infecting ACE2 receptors, the virus can also downregulate ACE2 and induce the shedding of "catalytically active ACE2 ectodomain" – as they say. What this does is initiate the loss of ACE2 function in the lungs which generally results in acute lung

injury. This loss of ACE2 function often causes dysfunction of the renin-angiotensin (RAS) system in the body. RAS is intimately involved in modulating a number of systems in the body needed for health. As soon as ACE2 reduction or loss occurs, general inflammation in the body increases and vascular walls become more permeable. In the lungs, loss of ACE2 results in more edema, leaking blood vessels, neutrophil accumulation, and diminished lung function.

Protecting and strengthening ACE2 receptors is, I think, essential. Herbs that block viral attachment to ACE-2 linkages are *Glycyrrhiza spp, Scutellaria baicalensis, Sambucus spp, Aesculus hippocastanum, Polygonum cuspidatum, Rheum officinale,* and plants high in procyanidins and lectins (e.g. *Cinnamomum*, i.e. cinnamon). Herbs that upregulate ACE2 are *Pueria lobata*, *Salvia miltiorrhiza*, and *Ginkgo biloba*. ACE inhibitors (in contrast to ACE-2 upregulators) will increase the presence of ACE-2 and help protect the lungs from injury: *Crataegus spp* and *Pueraria lobata* are specific for this. (This is part of the reason *Crataegus*, i.e. hawthorn, is good for heart health, it upregulates ACE2 by down regulating ACE, thus increasing ACE2 receptors in the heart, thus supporting heart health and vitality.)

Note: A number of people have expressed concern about upregulating and strengthening ACE2 since the virus attaches to that receptor. Wouldn't it be better, they say, to just inhibit ACE2 in the body completely? Why don't we just get rid of ACE2 entirely? Then we won't get infected. Won't upregulating and strengthening ACE2 lead to more attachment points and more infection? Well, no, it's not that simple. For one thing there are some 4 trillion cells in the human body, a significant number of which have ACE2 receptors on them – including fat cells. The more fat you have the more ACE2. (Needless to say, Americans have a *lot* of ACE2 receptors.) Getting rid of ACE2 receptors is simply not possible, which is a good thing since they are

essential for the body to remain healthy. Without them we die. Really really fast.

Secondly and importantly, *herbs are not drugs*. Nor are they even *raw drugs*, which some people erroneously call them. They are plants, which are, at root, only one thing: ecological modulators – both of large systems like the Earth and smaller ones like our bodies. They act to move systems, irrespective of size, back to health, to re-establish homeodynamis – what some people, incorrectly call homeostasis (there are no static states in nature only dynamic ones). And plants are extremely good at their job which they have refined over several hundred million years or so.)

Pharmaceuticals, which are a century old or so, are single molecules that force a change in the body of one sort or another. (They come out of a medical system whose approach to disease is based on cut, kill, or force – and now perhaps, to some extent, reprogram.) They don't usually perform multiple actions. Herbs often contain hundreds of compounds that act synergistically. *Pueraria lobata* (kudzu) does not simply upregulate ACE2. It is more accurate to think of its actions with ACE2 as performing a modulatory and regulatory function as part of a much wider range of actions in the body (such as downregulating overactive cytokines like TNF-a and IL-1β and supporting the health and maturation of dendritic cells). It is *not* a single-action stimulant that forces ACE2 expression, nor is it a straight suppressant, depressing ACE. You *can* compare apples and telephone poles, it just doesn't make any sense when you do.

To continue . . . the increase of TNF-a and IL-1β in the system stimulates the "shedding" of ACE2 which results in less membrane-bound ACE2 on the body's cells. This is a pervasive occurrence in the body; the more inflammation, the more shedding which occurs. No matter the organ, when this shedding occurs, organ function decreases. (Plants that can inhibit TNF-a

include *Andrographis paniculata, cordyceps spp, Eupatorium perfoliatum, Glycyrrhiza spp, Houtuyynia cordata, Pueraria lobata, Sambucus spp, Scutellaria baicalensis, Salvia miltiorrhiza,* and melatonin, not a plant but useful in this infection for a variety of reasons; IL-1β inhibitors include *Cordyceps spp, Eupatorium perfoliatum, Polygonum cuspidatum, Pueraria lobata, Salvia miltiorrhiza, Scutellaria baicalensis.*)

SARS-CoV-2 can, it seems, infect dendritic cells (DCs), both mature and immature. It doesn't kill them (as far as I know) but merely stops them from maturing and stimulating an effective adaptive immune response. DCs exist abundantly just under the epithelium layers in the lung tissue. The cytokine upregulation that infection causes makes the endothelium much more porous, allowing the virus to penetrate and infect the DCs. Upregulated IL-6 and IL-8 from epithelial and endothelial cells concentrate around the immature DCs and strongly inhibit their maturation and the priming ability that mature DCs have for the generation of active T cells. This inhibits the production of active T cells allowing the spreading of the infection. Stimulating DC maturation (*Cordyceps spp, Pueraria lobata*), along with inhibiting cytokines, can help prevent this.

Disregulation of the brain ACE2 and RAS system is intimately related to poorer cardiac function as well as dysregulated hypothalamic function, blood pressure, and autonomic system function. (This is a contributing element to the wide range of neurological effects that are being seen.)

Not to get into it too deeply, ACE2 (i.e., angiotensin converting enzyme 2) antagonizes the actions of angiotensin II (AngII). AngII is involved in modulating immune function. When not controlled by the presence and action of ACE2 it contributes to general and autoimmune

inflammation, hypertension, organ and ventricular hypertrophy, the decrease of endothelial progenitor cells which are necessary for vascular repair, and promotes organ damage and fibrosis in the body. The less ACE2, the more those effects occur. ACE2 is *very* important to healthy functioning. ACE2 is powerfully affected by the virus, so the use of ACE2 protectants and modulators that normalize function is, I think, crucial.

The extensive cytokine release in the body causes an ongoing inflammation which can attack most organs eventually leading to organ damage and collapse. Interfering with the generation of the cytokines, which can be accomplished through a variety of herbal interventions, can substantially help the course of infection. For example, some researchers have found that simply reducing IL-6 will reduce inflammation, making the infection less acute, and enabling long term resolution. That is why the arthritis drug tocilizumab, which inhibits IL-6, has been found of use in treating acute Covid-19 infections.

IL-6 and IL-8 are two of the more important cytokines to inhibit as part of Covid-19 treatment. IL-6 plant inhibitors include *Andrographis paniculata, Isatis spp, Pueraria lobata, Salvia miltiorrhiza, Scutellaria baicalensis,* and melatonin. IL-8 inhibitors include *Cordyceps spp, Isatis spp, Polygonum cuspidatum.* And just to note: melatonin has good application in this disease, not only as an anti-inflammatory but also because, among other things, it helps reduce anxiety and promote sleep.

The Heart

As mentioned earlier, the virus does infect cardiac cells via their ACE2 receptors and thus damages heart tissues, including its muscle tissue. Some of the people so affected have no

respiratory symptoms at all and present at the hospital solely with cardiac problems such as sudden heart attack. Perhaps ten percent of those infected with Covid-19 suffer cardiac complications. Permanent heart damage occurs in a small percentage of those.

During cardiac infection the initial manifestation is “an increase in high-sensitivity cardiac troponin 1 (hs-cTnl) levels” (Zheng, et al, 2020). As the damage spreads median creatine kinase levels rise to double the levels of those without cardiac infection. In a more perfect world everyone infected with this virus would be tested for those elevated cardiac biomarkers.

Herbal interventions are very specific for preventing this kind of damage during infection. The primary herb for this is *Salvia miltiorrhiza*. It is significantly more effective if combined in a one to one ratio with *Pueraria lobata* (Wu, et al, 2007). A combination of *Paeonia suffruticosa* and *Salvia miltiorrhiza* has also been found to be effective (Li, et al, 2016). *Salvia miltiorrhiza* is a truly important medicinal in the treatment of inflammatory diseases. It has a long history of use in China for the treatment of systemic disease, including reversing or treating adverse impacts in most organs of the body including the heart. It is effective for inhibiting increases in troponin and creatine kinase – again, not a suppressor but as a modulator of function. The herb promotes blood circulation, inhibits platelet aggregation, protects endothelial structures, is anticoagulant, anti-hypertensive, antithrombotic, anti-allergenic, strongly protective of the kidneys, is a potent cytokine adaptogen – reducing any cytokine levels that are too high, increasing any levels that are too low – another way to think of it is as an immune-response adaptogen. It is strongly anti-inflammatory, protects Golgi structures, is neuro-protective, restores mucosal integrity in mucosa-infected cells, is highly protective of the spleen – enhancing its immune functions, and has shown remarkable effectiveness in the treatment of lung disease. In short, a truly world class

systemic modulator for inflammatory diseases of any sort. The world's best herbal monograph (on *any* herb) is the three volume (1800 pages total) compilation by Xijun Yan (editor) on this herb: *Dan Shen (Salvia miltiorrhiza) in Medicine* (Springer, 2015). It covers every possible use of the herb and looks at both historical use, its outcomes in clinical trials, and in laboratory study. It makes any other herbal monograph in existence look paltry and rather shame-faced in comparison.

Scutellarin and baicalin from *Scutellaria baicalensis* are also particularly effective in treating and preventing heart damage from this organism. Scutellarin prevents the increase of cardiac troponin (by correcting or preventing the underlying damage). Baicalin inactivates creatine kinase. Specifically the herb has a broad range of cardiovascular actions including vasodilation, protection against ischemia/reperfusion, is anti-inflammatory, anticoagulatory, antithrombosis, protects endothelial integrity, protects the myocardia, stops cardiac remodeling, and is antiarrhythmia. It is also a strong systemic antiviral herb and very specific for this organism. It has a long use in China for treatment of blood circulatory problems and cerebral insufficiency. (Quercetin and *Polygonum cuspidatum* will also inactivate creatine kinase.)

One final thing: L-Malic acid has been found to be extremely low in the infected; levels become progressively lower as severity increases. L-Malic acid is an essential amino acid in the body when the immune system is struggling with any type of systemic inflammation. This amino acid is rapidly consumed during inflammatory states in order to provide energy and materials for the proliferation of and phagocytosis capacities of immune cells. Supplementing L-Malic acid is strongly suggested, especially during more serious infections.

A Brief Comment on Smoking and Covid-19

Despite a great many media articles early in the pandemic that insisted that smokers who contracted the new coronavirus would suffer worse outcomes than nonsmokers, such has not been the case. (Initiate hair pulling by prohibitionists.) As Lippi and Henry (2020) comment: "In conclusion, the results of this preliminary meta-analysis based on Chinese patients suggest that active smoking does not apparently seem to be significantly associated with enhanced risk of progressing towards severe disease in COVID-19." Some researchers are speculating that since smoking reduces macrophage activity it interferes with the systemic inflammatory processes the virus initiates. As Yang and Chen (2018) note . . .

> *A study by Chen et al demonstrated that in smoker's alveolar macrophages, there is a decrease of proinflammatory cytokines including TNF-a, IL-IB, IL-6, IL-8 and reduced TLR-2 and TLR4 signaling as a result of impaired activation of NF-KB.*

These are in fact some of the most active of the cytokines during Covid-19 infection which explains why smokers generally have a better outcome than non-smokers.

Other researchers speculate that because nicotine has definite effects on the RAS/ACE system (modulating its actions) that *that* is the reason for smokers' better outcomes during infection. As well, nicotine actually prevents acute lung injury in animal ARDS models and has immune modulating actions. (To stop the run on nicotine patches the French government prohibited the sale of over the counter patches until the pandemic subsides. Nevertheless at least

one hospital in the EU issued nicotine patches to all its medical workers. . . . always fun to see a prejudice defeated by a deeper prejudice or, in this case, a deeper fear.)

Post Coronavirus Syndrome

There has not been much in the literature on this as yet but many people who have recovered are reporting continual problems despite being free of active infection. The main symptoms in post-infection syndrome that I have read and heard about are: unremitting extreme fatigue; breathing difficulties (breathlessness episodes and poorer oxygenation); continual mucus buildup in the lungs; an emerging COPD/Idiopathic pulmonary fibrosis-like syndrome accompanied by damaged alveoli and/or severe scarring in the lungs; kidney problems including the need for dialysis; possible sterility problems from testicle infection; continual elevated liver enzymes and slow-developing liver damage; continuing GI tract disturbance usually ongoing diarrhea, cramping, abdominal discomfort; various degrees and types of heart damage (muscle damage, i.e. cardiomyopathy, with attendant poorer heart function, cardiac inflammation, fibrosis, palpitations, with attendant fatigue, shortness of breath, reduced ability to do physical activity); a sort of relapsing fever syndrome in which periodic bouts of fever, chills, and weakness recur, often with periods of feeling fine in between; neurological problems similar to that in Lyme disease: brain fog, difficulty thinking, poor memory, difficulty in focusing attention, poor concentration, confusion, dizziness, recurrent headaches, numbness, tingling, burning sensations, severe ongoing anxiety and/or panic attacks – and possibly, intermittent strokes. Some people with severe strokes during infection have lost the ability speak or lost partial bodily control. It is projected that as many as 20% of those infected will experience long term cognitive problems.

Recovery from mild infections may take weeks, or months, or years. Many of those who were asymptomatic suddenly find themselves developing symptoms of post coronavirus infection. Nearly 60% of the asymptomatic show what is called “ground-glass” opacities in their lungs, a sign of possible permanent lung damage. One third of those diagnosed with and who recovered from SARS or MERS suffered permanent lung damage . . . something that is apparently occurring with SARS-CoV-2 as well. There is speculation that the long-term effects of this latter infection might be worse. Those first two diseases most often infected only one lung, this one infects both.

A larger and more complete understanding of the range of post-infection symptoms will undoubtedly occur as time progresses. I include an extended protocol with suggestions for treating many of these post-coronavirus problems after the main protocol itself. And yes, herbal protocols can help, sometimes significantly, as they have for people infected with the Lyme-group of microorganisms.

Herbal Interventions

Here is the rationale underlying my suggested protocols:

My approach in the treatment of systemic inflammatory infections has always been to find plants that will counteract the actions of the organism involved – in this instance, SARS-CoV-2 – then to cross-correlate those with each other so as to find the plants that are active in the most categories that will inhibit the infection and its cytokine cascades, which also have effectiveness in the symptoms the disease cases, and which also have a long historical record of use for treating such conditions. To find these I extensively research hundreds, sometimes

thousands, of scientific and research journals and articles, then I look at both historical and contemporary use which also involves researching a great many sources. The herbs chosen also have to be relatively easy to find.

> *NOTE: As I always say, the herbs I suggest are not the only ones that can help during a Covid-19 infection; there are scores which will do so, many of which are listed in this article. However, that being said, I would strongly suggest that* Salvia miltiorrhiza *NOT be be eliminated from the protocol under any circumstances (unless you absolutely cannot fine a source for it). In my opinion, given its effects in counteracting so many of the actions and impacts the virus has, it is crucial to successful treatment of this pathogen.*

As you can tell from the list of herbs that will affect various aspects of the virus and its infection and inflammation strategy, there are a number that are active in multiple areas, such as *Andrographis, Houtuyynia*, and *Polygonum cuspidatum*. It is possible to mix and match to create your own protocols. Personally, I would not remove *Isatis, Salvia miltiorrhiza, Scutellaria baicalensis,* or *Pueraria lobata.* I feel they are just too important in treating this infection.

Please note: The initial SARS-CoV-2 protocol I originally outlined will still work, this one is just more specifically focused due to the research that has been done since the pandemic began. If you are using that older protocol, I would definitely add a separate formulation made of equal parts *Isatis* and *Houttuynia* tinctures to use during active infection: one tsp 3-6x daily depending

on the severity of the infection.

Also note: At this point, I don't have the time to go into all the herb/drug interactions that can occur with the herbs included in the suggested protocol. Please be aware that most, if not all, of the contraindications and herb/drug interactions are listed in one or more of my medical herbals, all findable on Amazon, used or new, or at the library (if it is a good one). Pharmaceuticals, while extremely useful for many things, are at root toxic molecules, ecologically disruptive, not easily biodegradable, and quite often possess deleterious side effects. They quite often don't share well with others, this includes herbal medicines as well as other pharmaceuticals. You will need to check your pharmaceutical medications and correlate with the herbs for any potential use problems (my books and google scholar are the best sources, regular google if you must). As well I am not going to go into contraindications here for these herbs (again, they are in the books). As an example: IF you are already on anticoagulants, well, then you probably don't need lumbrokinase. Many herbs and pharmaceuticals are contraindicated in pregnancy. And so on.

Finding the Herbs:

Some herbal companies are making up these blends, you will just have to look around or ask. Because several (insert *strong* expletive) herb companies utilized my name (without authorization) and quoted some of my comments on treating coronaviruses with herbs in order to increase their sales, the FDA and FTC began making house calls on them . . . to their dismay. So, despite a senior white house official touting unproven remedies (injecting or drinking bleach?) that are seriously dangerous, the government has made looking at herbal companies who make

claims a priority. Thus companies who are making up these blends have become, let us say, shy. The blends are out there, you just might have to ask if it is not listed on the website.

IF you cannot find the protocols pre-blended, you can blend them yourself. Just buy the individual herbal tinctures and mix them together. (If I say three parts of one, buy three ounces, if I say one part of another herb, buy one ounce, then blend them together in that ratio). You can generally find anything you need on the internet. Try amazon, google shopping, ebay, and etsy. Etsy is home to a good number of small herb companies which are selling herbal tinctures you will not find anywhere else. I highly suggest EarthAshram and Reverence Botanicals as a start. **Note:** I absolutely believe that avoiding the use of tinctures will NOT be beneficial with this infection. *I do not have an alternative protocol for those who wish to avoid alcohol intake.*

General Approach to Treatment:

Overall, in my opinion, the most effective herbal approach to SARS-CoV-2 would address three different situations: 1) reducing chance of infection; 2) treatment of active infections; 3) treating post-coronavirus syndrome. Here are my suggestions:

Reducing Chance of Infection

Besides all the endlessly cited (and now tiresome) admonitions about hand washing, masks, and self-isolation (and repeated *ad nauseum* by too many medical practitioners of various sorts), actively supporting a strong immune system is the best place to begin. Secondly, I think the daily intake of a systemic anti-inflammatory, an anti-coagulant, and L-malic acid will help the system be prepared if an active infection does occur. Thus:

Pre-infection Immune Formulation: *Eleutherococcus senticosus* (2 parts), *Astragalus* (2 parts), *Cordyceps* (1 part), *Rhodiola* (1 part), *Glycyrrhiza* (1 part). Dosage: 1 tsp 3x daily.

Systemic anti-inflammatory: The best I know of is a formulation of *Mangifera indica* standardized to 60% mangiferin. Its anti-inflammatory actions are *very* specific for the kinds of inflammation seen in damaged lungs and other organs. There are a great many very good studies on mangiferin and its actions in various organs for the treatment of systemic inflammation (see google scholar). The only good source in the United States is Green Dragon Botanicals in Vermont. Dosage: 1-3 capsules 3x daily.

Lumbrokinase: 1 capsule am and 1 capsule pm.

L-malic acid: 600 mg daily.

Treatment of Active Infections:

What is needed are plants that have the following actions:

1) Plants specifically antiviral for SARS-CoV group of viruses (the strongest found so far are *Scutellaria baicalensis* (root – a potent systemic antiviral herb), *Isatis spp* (root and leaf), *Houttuynia spp* (leaf), *Glycyrrhiza spp* (root), *Forsythia suspensa* (the fruit), *Sophora flavescens*, *Lycoris radiata* (extremely potent), and the essential oil of Bay Laurel (*Laurus nobilis*). *Lonicera japonica* and *Polygonum cuspidatum* are also effective as antivirals for coronaviruses as a group.

2) ACE2 interventions. **A)** Protect ACE2 by blocking viral attachment. Specific for this are *Glycyrrhiza spp, Scutellaria baicalensis, Sambucus spp, Aesculus hippocastanum, Polygonum cuspidatum, Rheum officinale*, plants high in procyanidins and lectins (e.g. *Cinnamomum*) and luteolin. **B)** Upregulate and protect ACE-2 expression, increase its activity

(esp in the aged), and lower Ang-2. Herbs specific for this are *Pueria lobata, Salvia miltiorrhiza, Ginkgo biloba*. **C)** Use of ACE inhibitors (in contrast to ACE-2 upregulators) to increase the presence of ACE-2 and help protect the lungs from injury: *Crataegus spp* and *Pueraria lobata* are specific. **Remember:** These are not drugs, they are *modulators* and they do many other things besides this.

3) Modulate cytokine responses in general (*Salvia miltorrhiza* – a cytokine adaptogen) and in specific: plants that can inhibit TNF-a, which include *Andrographis paniculata, Cordyceps spp, Eupatorium perfoliatum, Glycyrrhiza spp, Houtuyynia cordata, Pueraria lobata, Sambucus spp, Scutellaria baicalensis, Salvia miltiorrhiza,* and melatonin, not a plant but useful in this infection for a variety of reasons; IL-1β inhibitors include *Cordyceps spp, Eupatorium perfoliatum, Polygonum cuspidatum, Pueraria lobata, Salvia miltiorrhiza, Scutellaria baicalensis.* IL-6 inhibitors include *Andrographis paniculata, Isatis spp, Pueraria lobata, Salvia miltiorrhiza, Scutellaria baicalensis,* and melatonin. IL-8 inhibitors include *Cordyceps spp, Isatis spp, Polygonum cuspidatum*.

4) Protect endothelial cells (*Polygonum cuspidatum, Salvia miltiorrhiza, Scutellaria baicalensis*).

5) Protect spleen, lymph nodes, and strengthen lymph system *(Galium spp, Scutellaria baicalensis, Salvia miltiorrhiza, Bidens pilosa*).

6) Protect lungs, heart, kidneys, brain from damage. *Note:* the herbs already suggested will accomplish this for most of the organs without adding anything else. There will be additional suggestions for them in the extended protocol for treatment of post coronavirus treatment.

However: one note on the kidneys: during active infection, to protect the kidneys, regular

consumption of a strong nettle infusion and a tincture of nettle (*Urtica dioica*) seed is highly recommended. (Note: for years I was suspicious of occasional claims I heard about nettles being able to heal kidney damage. However, my partner Julie McIntyre has been suggesting it for some time and has reported significant healing of damaged kidneys, in one instance so much so that dialysis was avoided.)

To make: add 1-2 ounces of dried nettle leaf to a quart mason jar. Add hot water, let steep overnight, strain and drink throughout the next day. (Some people think the used herb can be used again at least one more time.) Do this every day. As well, take 1/4 tsp nettle seed tincture 3x daily, every day.

During active infection, continual use of standardized *Mangifera indica* at a higher dose, a higher dose of lumbrokinase (or nattokinase), and L-malic acid are all indicated to help protect the organs.

The use of an both a nebulizer and a steam inhalant is strongly suggested for infection in the lungs as well as the use of plants that can stimulate lymph drainage from that organ. Details follow.

Active Infection Protocol

This is to be taken at the first signs of infection. It is composed of three tincture formulations and some suggested supplements. **Note:** This should be continued for two weeks *after* the cessation of symptoms otherwise the symptoms may recur. Please note: there are a few suggestions for treating infection in specific organs as well which will follow the initial formulations.

1) Antiviral formulation: *Scutellaria baicalensis* (3 parts), *Isatis spp* (2 parts), *Pueraria*

lobata (2 parts), *Glycyrrhiza spp* (1 part). Dosage: 1 tsp 3x day at onset, if infection becomes acute (i.e., more intense) 1 tsp 6x day. The more serious the infection, the higher the dose.

2) Immune formulation: *Cordyceps* (3 parts), *Angelica senensis* (2 parts), *Rhodiola* (1 part), *Astragalus* (1 part). Dosage: Same as number one.

3) Cellular protection/cytokine modulation/spleen-lymph support: *Salvia miltiorrhiza* (3 parts), *Gallium spp* (2 parts), *Bidens pilosa* (1 part). Dosage: Same as number one.

4) *Urtica dioica* (i.e. nettle) infusion daily (make as outlined above) plus 1/4 tsp of nettle seed tincture 3x daily. (This is good for you for many reasons but with this infection it will help your kidneys stay healthier than they would without it. It may, under some circumstances, help prevent or allow recovery from dialysis.)

4) Standardized *Mangifera indica* capsules: three 200 mg capsules 3x daily (Green Dragon Botanicals brand).

5) Lumbrokinase (or nattokinase): 1-2 capsules 2-3x daily (and please use an oximeter to check blood oxygen levels daily)

6) L-malic acid: one 600mg capsule 3x daily.

7) Probiotic: one capsule daily

During Active Lung Infection:

Besides the general protocol, I suggest three things to treat infected lungs: 1) Bay laurel (*Laurus nobilis*) essential oil as a steam inhalant. 2) The use of a nebulizer as outlined below. 3) Mucinex table, 2x daily.

A. Bay laurel essential oil. This essential oil is strongly antiviral for SARS viruses, it can be used as an adjunct to kill the organism in the lungs.

Note: This is to be a very strong essential oil. You *can* add it to the nebulizer, as outlined below, **but** I have found it far too strong for that. To weaken it I sucked some up in a glass dropper, then squirted it back into the essential oil bottle, then I merely sucked up some of the nebulizer liquid itself and squirted the whole thing back in the nebulizer. This picked up enough of the essential oil still in the glass dropper to make it just about tolerable.

Bay laurel essential oil as inhalant steam: 1-2 drops in a pot of boiling water on the stove. Turn stove off (please don't set the towel on fire), remove from stove top, cover head and pot with towel, and breathe in for awhile. (More than 2 drops will probably be too strong.) People doing this have reported good success with reducing the impact of the infection on the lungs. (And no, they probably won't let you do this in the hospital or a nursing home.)

B. Nebulizer:

1) The use of a nebulizer will help a lot. These are available inexpensively through Amazon.com. All of them seem to work fine, I use a Leader brand, not sure it is the best but it works okay for me. The nebulizer cups that comes with these machines are not generally very good. You will need to get a different kind.

2. The nebulizer cup. Respironics is the brand I use. You can get them on the internet but not from the company that makes them without a prescription – which I find idiotic. They make two kinds (also idiotic). One is very cheap and is listed as disposable (don't get), the other is noted as re-usable. **Get the re-usable one.** Just wash it out after use with very hot water and

soap. The reusable one will stand up to essential oils if washed well after use. Mine last for a very long time, months. The disposable ones will begin to degrade from the essential oils within a few days and you will start inhaling microparticles of plastic. Very much ***not*** a good idea.

3. You will also need: Saline solution for nebulizers. I use modudose saline solution for inhalation sold by Amazon, 5 ml each, 100 to a box, $16.50. One 5 ml container per session.

4. Also needed: Effervescent glutathione capsules. Glutathione is a potent antioxident, normally present in the surfactant liquid in the lungs. People with severe lung infections and disease tend to have low levels of all antioxidants including glutathione. This will help reduce the inflammation in the lungs. I dissolve a single capsule in the 5 ml saline solution I have already put in the nebulizer cup. (It will fizz and foam when you first put it in the liquid . . . after you have finally gotten the capsule apart that is.) I think Thernaturals, Reduced L-glutathione plus, enhanced absorption, ultra purity grade is the best one to use. It costs $37.00 for 100 capsules. This will last a bit over three months.

4. Essential oils. These are pretty important. I put these in the nebulizer cup in single drop doses the very last thing. I suggest the use of 1-2 drops of peppermint and 1-2 drops of eucalyptus. The peppermint is strongly anti-spasmodic (helping coughing); both of the essential oils will help thin and liquify mucus and help it move up and out of the lungs, thus enhancing breathing and oxygen exchange.

C. **Mucinex tablet** (which is a 600 mg guaifenesin, extended release tablet). This will, along with the rest of the nebulizer protocol, thin and help move mucus up and out of the lungs. Dosage: one tablet am, one tablet pm. (There are also non-extended release forms by other

companies, they all work fine.)

To Protect the Kidneys

Again, nettle infusion daily along with nettle seed tincture.

GI Tract Exacerbations

To help with the symptoms of GI tract infection, e.g., the cramping and diarrhea. I have found the following to be helpful.

For cramping: *Viburnum prunifolium* and other related species, aka cramp bark. Dosage: 30 to 90 drops to 6x daily. This can take a few days to kick in but it does help eventually. *And/or:* peppermint – either capsules that include essential oil *or* those really tiny coffee mints that are incredibly strong . . .just swallow 3-4 of them as needed.

For diarrhea: *Rubus villosus* (aka: blackberry) root. Strong decoction: put one to two ounces of the root in two quarts of water. Bring to boil, simmer until liquid is reduced to half. Cool and then consume during the day. Repeat every day until diarrhea is under control. *Note:* This should also help control any bleeding that is occurring. ***Please*** do not buy blackberry root tea bags, they are useless. Do not try to substitute raspberry. You can always find blackberry root on etsy via the internet.

Also: *Ailanthus altissima* (tree of heaven) is also good for a number of problems that occur during Covid-19 infections, including diarrhea. It is the inner bark (that is, the white bark that peels off easily which is located just under the very thin green outer bark). This is an invasive botanical throughout the US and much of the EU and thus pretty easy to find. *Other*

actions of the herb: bronchial dilator, antiinflammatory (esp for the lungs), antifibrotic (esp in the lungs), anti-asthmatic, strong antioxident, antiviral, antimicrobial, antimycotic, antimalarial.

Note: Tincture of goldenseal or any of the other berberine-containing plants may be of use; they can sometimes initiate strong healing of the GI tract.

Extended Protocol for Various Symptoms Including Post Coronavirus Syndrome

1.0 Fatigue

A. For chronic, add:

1) *Eleutherococcus* tincture, 1:5 formulation as a tonic, ½ tsp 3-6x day. (*Note:* if it is severe or acute onset use the 1:1 or 2:1 formulation made by HerbPharm and some others, pulse every ten days. When it becomes less severe, convert to the 1:5 formulation.)

2) Chronic fatigue formula, see section **1.1**: 1/4 cup of the powder, blended in juice or water in morning and again just before bed.

3) D-ribose, capsules to 3400 mg morning and noonish or 1 scoop of powder am and noonish.

B. For adrenal fatigue, add:

1) *Pinus* (Pine pollen) tincture, 1/4-1/2 tsp 3x daily (must be held in mouth for one minute then swallowed, do not put in water), and/or . . .

2) *Glycyrrhiza* (licorice) tincture, 1/4 to ½ tsp 3x daily (not to exceed 30 days), and/or . . .

3) Maca (*Lepidium meyenii*) powder, 1 tsp 2-3x day, and/or . . .

4) *Rhodiola* tincture, 10-40 drops 2-4x day, and/or . . .

5) *Codonopsis pilosula* tincture, 1/4 tsp 4x day.

C. For thyroid fatigue, add:

1) *Juglans nigra* (black walnut hull) tincture, 5-10 drops 2x day, and/or . . .

2) Selenium, 200 mcg daily, and/or . . .

3) Kelp, 500 mg every other day, and/or . . .

4) *Rhodiola* tincture, 10-40 drops 2-4x day.

D. For mitochondrial fatigue

1) *Leonurus cardiaca* (motherwort) fresh plant tincture, 1/2-1 tsp 3x day, and/or

2) NADH, 10-20 mg 2x day

3) D-ribose, capsules to 3400 mg morning and noonish or 1 scoop of powder am and noonish.

4) L-arginine, 1000 mg 3x day.

5) Also of use: L-carnitine (500 mg 3x day), Alpha lipoic acid(200-600 mg daily), Coenzyme Q10 (60-150mg daily).

1.1 Chronic fatigue formula

This is *very* specific for reversing chronic fatigue, especially if it is chronic. *Note:* all the herbs *must* be *powdered*. (To find herbs: Amazon, google shopping, ebay, etsy. To find preblended: google search)

To make:

1) Take two parts (for example, 4 ounces) *each* of: spirulina, milk thistle seed, licorice, astragalus, turmeric, dandelion root, and nettle leaf, and . . .

2) One part each (for example, 2 ounces) *each* of : chlorella, burdock root, ashwagandha, eleutherococcus, bladderwrack, and dried wheat grass juice.

3) Blend them well in a *very* large bowl.

Dosage:

1) I normally take 1/4 cup of the powder, blended in a blender in water or juice in the morning and evening before bed during severe episodes, only one in evening before bed to maintain. The dose can be adjusted up or down as necessary.

2.0 Lungs

A: General:

1) Continue with nebulizer protocol, this will help clear mucus and help breathing and oxygen intake.

2) To enhance oxygen exchange/blood oxygen: *Lysichiton americanum* (western skunk cabbage), f**reshly** dried root tincture. Dosage: as desired or needed – normally I use for myself around 30 drops as needed or desired. *Note:* I have not used the eastern variety and I am not sure it will do the same thing.

B. With shortness of breath:

1) Liquid chlorophyll, 1 tbl in 20 oz water, once day, and/or . . .

2) *Ailanthus altissima* tincture, 10 drops to ½ tsp 4x day, and/or. . .

3) *Cordyceps* tinture, 1 tsp 3x day, and/or . . .

4) *Polygonum cuspidatum* (knotweed root) tincture, ½ tsp 3-6x daily, and/or . . .

5) *Astragalus*, 1,000 to 4,000 mg, 3-4x daily.

C. Chronic cough:

1) *Sambucus spp* (any), fresh or decocted leaf tincture, to 30 drops as needed. *Note:* non-decocted tincture may cause nausea in *some* sensitive individuals, most people experience no nausea. Extended use may cause watery diarrhea.

2) *Lobelia inflata*, fresh leaf tinture (dried is very inferior), 5-20 drops as needed. Or: dried seed tincture, 3-10 drops as needed. *Note:* the dried leaf is far more nausea inducing than the fresh leaf or seed, I would not use it. For some people the plant is a strong emetic, I, however, have not found it so. *Note:* this can also help move mucus up and out of the lungs.

D. Chronic Bronchitis

1) TCM formulation: Si Ni Tang (prepared aconite, ginger, licorice), 4 capsules 3x daily. *Note:* Best if used with ephedra (and yes, I still sometimes order it from China irrespective of what the FDA thinks I should do; it's a good herb but those meth heads ruined it for the rest of us.)

E. Fibrosis (scarring):

A. To inhibit, reduce, or repair

1) tinture formulation, equal parts: *Angelica sinensis, Salvia miltiorrhiza, Lonicera japonica, Polygonum cuspidatum, Cordyceps spp.* Dosage: 1tsp 3-6x daily depending on severity of fibrosis.

3.0 Neurological/Brain problems, general

A. Specific:

1) *Uncaria rhynchophylla* tincture: ½ to 1 teaspoon 3-6x daily, depending on

severity of brain infection.

2) Tryptophan, 1500 mg 3x daily. (*Note:* will lower brain inflammation, decrease a number of psychological/physiological symptoms.)

B. With severe brain/CNS involvement, add:

1) *Scutellaria baicalensis*, tincture, can increase current dose, plus . . .

2) *Chelidonium majus* (greater celandine), tincture, 1/4 tsp 3x daily, plus . . .

3) *Pueria lobata* (kudzu) root, tincture, 1/4 teaspoon 3-4x daily.

4) N-Acetyl Cysteine may also help, 2000, 2x daily, as will . . .

5. *Leonurus cardiaca* (motherwort) fresh plant tincture, 1/4 to ½ teaspoon to 6x daily.

C. To reduce neurotoxins in the brain (e.g. quinolinic acid), add:

1. *Sida cordifolia* tincture: 5-40 drops to 3x day, and/or . . .

2. *Angelica sinensis* tincture: 1/4-1/2 tsp 3x day, and/or . . .

3. Melatonin, 3-9 milligrams daily.

D. Brain "feels toxic," add:

1) *Centella asiatica*, 500 mg 2x daily or 1/4 tsp tincture 2x day. *Note:* may cause headaches.

E. Low brain energy, add:

1) Acetyl-L-carnatine, 500 mg 2x daily (*Note:* contraindicated if seizures are present.)

F. Brain "pressure," add:

1) *Pueria lobata* (kudzu), 1/4-1/2 tsp of tincture 3x day.

G. Tremors, add:

1. *Sida acuta* (or equivalent species), 5 to 40 drops 3x daily, and/or . . .

2. *Scutellaria baicalensis*, can increase current dosage, and/or . . .

3. *Mucuna pruriens* (L-dopa precursor), 500 mg 1x day in morning, and/or. . .

H. Memory/Cognitive dysfunction, trouble finding words, brain fog, add:

1. Phosphatidyl-serine, 100 mg 3x day, and/or . . .

2. *Ginkgo biloba*, standardized, 150mg 2x daily, and/or . . .

3. *Centella asiatica* (gotu kola), 500 mg 2x daily, or tincture 1/4 tsp 2x day (may cause headaches), and/or . . .

4. Taurine, 125 mg, 3x day.

5. Some of the following may also be of use: Phosphatidyl-choline, 500 mg 3x daily; *Cordyceps* powder (or tincture at the lower dose), 1 tsp - 1tbl 3x day; *Pueria lobata* (kudzu root), 500-1000 mg 3x daily or 1/4-1/2 tsp tincture 3x day; *Polygala senega* (Chinese senega root) tincture, 30 drops 3x day; *Hericium erinaceus* (lion's mane) 1 tsp powder 3x day or 1/4-1/2 tsp tincture 3x day; quercetin, 1200 mg day; pycnogenol (from french martime pine bark only) 100 mg 1x day; Vitamin D3, 5000-10000 IU day; *Bacopa monniera* (especially for short term memory help) 500 mg 2x day; homeopathic Kali Phos, 30C, 4 pellets 3x day.

I. With hypoperfusion of the brain, add:

1) *Ginkgo biloba* tincture (standardized), 1/4 tsp 3x daily, or standardized capsules: 125 mg 3x day.

J. With neural pain, add:

1) *Chelidonium majus* (greater celandine), tincture,1/4 tsp 3x daily, and/or . . .

2) *Pueria lobata* (kudzu) root tincture, ½ teaspoon 3-4x daily, and/or . . .

3) *Melissa officinalis* (lemon balm) tincture, ½ tsp 3-4x day, and/or . . .

4) Homeopathic Kali Phos 30C 4 pellets 4x day.

K. With "buzzing" or "electric feeling" in nerves, add:

1) *Sida acuta* (or equivalent species), tincture, 5-40 drops 3x day.

L. With epilepsy/seizures, add:

1) *Uncaria rhynchophylla*, increase dose up to 1 tbl 6x day depending on severity of seizures, and also take . . .

2) *Gastroida elata* tincture, 1/4-1/2 tsp 3-6x day.

3) *Salvia miltiorrhiza* may also be of help: increase dose to 1 tbl, depending on severity of seizures, 3-6x daily, and/or . . .

4) Cannabis oil or equivalent, variable dosages, and/or . . .

5) *Cryptolepis sanguinolenta* tincture may also be of help, ½ tsp 3-6x daily, and/or . . .

7) Taurine sometimes helps, 125mg 3x day.

8) Frankincense essential oil, applied topically, daily, to the temples and base of skull may help alleviate severity of seizures.

M. With left temporal strokes, add:

1. *Salvia miltiorrhiza*, increase dose, up to 1 tsp 6x daily, and/or . . .

2. *Uncaria rhynchophylla*, increase dose, up to 1 tsp 6x daily, and/or

3. *Ginkgo biloba* tincture (standardized), 1 tsp 3-6x daily, or standardized capsules: 600 mg 3x day.

N. With subarachnoid hemorrhage, add:

1) Melatonin, 3-9 mg daily.

O. With bouts of unrestrained rage, add:

1) *Uncaria rhyncyophylla*, increase dose, up to 1 tsp 6x daily, and/or

2) *Cryptolepis sanguinolenta* tincture, ½ tsp 3-6x daily, and/or . . .

3) Tryptophan, 1,000-1,500 mg 3x day.

P. With feeling that brain is on fire, add:

1) Homeopathic gelsenium, 30C 4 pellets 4x day

Q. To restore neuronal structures, add neural regrowth stimulants:

1) *Polygala senega* (Chinese senega root) tincture, 30 drops 3x day, and/or . . .

2) *Hericium erinaceus* (lion's mane) powder, 3-8 grams per day or 1 tsp tincture 3-4x day.

R. Limbs feel heavy, add:

1) *Centella asiatica* (gotu kola) , 500 mg or 1/4 tsp tincture 2x daily.

3.1 Muscle twitches, tingling/crawling sensations/ numbness in extremities

A. General:

1) Vitamin B-12, 1000 micrograms daily (lower to 500 as symptoms resolve), and/or . . .

2) Vitamin B-6, 100 mg 2x daily (lower to 50 as symptoms resolve), and/or . . .

3) Folic acid, 400 micrograms daily, and/or. . .

4) Magnesium, 200-400 mg to 3x daily, and/or. . .

5) *Sida acuta* tincture, 5-40 drops 3x day, and/or . . .

B. With numbness, add:

1) *Polygonum cuspidatum* (knotweed root) tincture, ½ tsp 6-10x day, (note: especially useful for carpal tunnel- and lateral epicondylitis-type problems).

2) *Ginkgo biloba* tincture (standardized), 1 tsp 3-6x daily, or standardized capsules: 600 mg 3x day.

3) *Zingiber officinalis* (ginger) root, 2 ounces fresh juice, squeeze of lime, pinch of cayenne, honey to taste, in 8-10 ounces hot water, 3-4 cups daily.

3.2 With anxiety/ hysteria/extreme fear/panic attacks

A. General, add:

1) *Pulsatilla* (pasque flower) tincture, 10 drops each hour as long as necessary, and/or. . .

2) *Leonurus cardiaca* (motherwort) fresh plant tincture, 1/4 to ½ tsp to 6x daily, and/or . . .

3) *Corallorhiza maculata* (coral root), or equivalent species, 30 drops (full dropper) to 6x daily, and/or . . .

4) Homeopathic gelsenium, 30C 4 pellets 4x day

5) *Scutellaria baicalensis* tincture, 1/4 - ½ tsp 3x daily, and/or . . .

6) *Verbena officinalis* (vervain) tincture, 30 drops to 6x daily, and/or . . .

7) *Uncaria rhynchophylla* tincture, 30 drops to 6x daily, and/or. . .

8) Tryptophan, 1,000-1,500 mg 3x day.

3.3 With unconsolable anxiety

A. General, add:

1) Homeopathic aconite 30C 4 pellets dissoved in half cup water, sipped throughout day.

3.4 With sleep disturbance/insomnia

A. General, add:

1) Melatonin liquid, manufacturers directions, one hour before bed, and/or. . .

2) *Withania somnifera* (ashwagandha) tincture, 1/2 tsp one hour before bed; or powder or capsules, 1 gram an hour before bed, and/or . . .

3) *Scutellaria baicalensis* tincture, ½ to one tsp 3x daily, and/or . . .

4) *Leonurus cardiaca* (motherwort) fresh plant tincture, 1/4 *ounce* (yes, that is right) in liquid just before bed (if the melatonin does not help), and/or . . .

5) Suan zao rhen tang tablets/pellets, plum flower brand (5 tablets just before bed), and/or . . .

6) Te xiao zao ren an mian pian (sleepeace) tablets/pellets, 5 tablets just before bed, and/or . . .

7) Glycine, 125-375 mg daily, and/or . . .

8) Tryptophan, 1000 mg just before bed, and/or . . .

B. For bolting awake in middle of night, add

1) Phosphatidyl serine (100 mg 3x day), and/or . . .

2) *Withania somnifera* (ashwagandha), ½ tsp tincture one hour before bed; or powder or capsules, 1 gram an hour before bed, and/or . . .

3) *Schisandra chinensis* tincture, 1/2 tsp just before bed.

4) Cannabis, various formulations.

3.5 Depression

A. General:

1) *Eleutherococcus,* 1:1 formulation, 1/4-1/2 tsp 3x daily, and/or . . .

2) Melatonin, 3-9 mg day, and/or . . .

3) *Mucuna pruriens*, 500 mg 1x day in morning, and/or . . .

4) *Leonurus cardiaca* (motherwort) fresh plant tincture, 1/4-1tsp as often as needed, and/or. . .

5) *Corallorhiza maculata* (or equivalent), ½ to 1 tsp to 6x daily, and/or . . .

6) SAMe, 200 mg 1-2x day, and/or . . .

7) Tryptophan, 1,000-1,500 mg 3x daily.

8) Kratom (*Mitragyna speciosa*) powder, ½ tsp mixed in warm water, 1-3x day (may cause jitteriness).

3.6 Headaches

A. Migraine-like, add

1) *Verbena officinalis* (vervain) tincture, 1/4 to 1 tsp as needed, and/or . . .

2) Cannabis or CBD, variable dosages, and/or . . .

3) *Pueria lobata* (kudzu), ½ teaspoon 3-4x daily, (will also help prevent), and/or

4) *Scutellaria baicalensis*, tincture, 1/2 tsp 6x day in addition to core protocol dose, and/or. . .

5) Lithium orotate, 5-20 mg day.

B. With headache at back of head:

1) *Verbena officinalis* (vervain) tincture, 1/4 to 1 tsp as needed

C. At front of head:

1) *Silybum marianum* (milk thistle seed), standardized, 1200 mg every 3 hours, and/or . . .

2) *Rumex crispus* (yellow dock) root, tincture, 1 tsp in water at bedtime.

4.0 Liver, elevated enzymes/inflammation

A. General:

1) *Silybum marianum* (milk thistle seed), standardized, 1200 mg 3x daily.

B. Liver pain, just under rib cage

1) *Salvia miltiorrhiza* tincture, 1 tsp 3x daily, and/or . . .

2) *Ceanothus* (red root) tincture, 1/4-1 tsp 3x daily, and/or . . .

3) *Schisandra chinensis*, tincture, 1/4-1/2 tsp 3x day.

5.0 Fever

A. General, add:

1) *Eupatorium perfoliatum* (boneset), hot tea as often as needed.

2) *Sambucus* (elder) flower, hot tea, as often as needed.

3) *Mentha piperata* (peppermint), hot tea, as often as needed.

4) *Corallorhiza maculata* (coral root), or equivalent species, 30 drops (full dropper) to each hour depending on severity, and/or . . .

5) *Achillea millefolium* (yarrow), hot tea, as often as needed, or tincture, 10-30 drops as often as needed.

6) *Cryptolepis sanguinolenta* tincture, ½ to 1 tsp 3-4x day.

B. If severe, add:

1) Wash with cool cloth or in tub until fever lowers, and/or. . .

2) Dosages of above may be increased if very severe.

B) For relapsing/recurrent fever

1) *Eupatorium perfoliatum* (boneset) tea, 3-6 cups daily.

6.0 Eye involvement

A. Specific for infected conjunctiva: *Isatis* infusion eyewash (prepared as with nettles), 1-2 drops in eyes, 3x daily. Keep refrigerated, will last a week.

7.0 Pain

A. General, add:

1) Bryonia homeopathic 30C 4 pellets 4x day, and/or. . .

2) Arnica homeopathic, same dosage, and/or . . .

3) Hypericum homeopathic, same dosage, and/or . . .

4) *Corydalis* tincture, 1/8-1/4 tsp 3-4 x day (contraindicated in liver disease), and/or . . .

5) *Monotropa uniflora* (Indian pipe) tincture, 1/4-1/2 tsp hourly or as needed, and/or . . .

6)*Corallorhiza maculata* (coral root), or equivalent species, ½ to 1 tsp to 6x daily, and/or . . .

7) *Verbena officinalis* (vervain) tincture, 1/4 to 1 tsp as needed, and/or . . .

8) *Leonurus cardiaca* (motherwort) fresh plant tincture, 1 teaspoon to ½ ounce (yes, ounce) in water, as needed, and/or . . .

9) *Pedicularis* (lousewort) tincture, 1 teaspoon to ½ ounce (yes, ounce) in water, as needed, and/or . . .

8.0 Heart problems

A. With angina, add:

1) *Polygonum cuspidatum* (knotweed root) tincture, ½ tsp 3-6x daily, and/or . . .

2) *Salvia miltiorrhiza* tincture, ½ tsp 3-6x daily, and/or . . .

2) *Astragalus*, 1,000 to 4,000 mg, 3-4x daily, and/or . . .

3) *Stephania* tincture (either species), ½ tsp tincture 3x daily, and/or

4) *Crataegus oxyacantha* (hawthorn), 120-900 mg 3x daily, and/or . . .

5) *Amni visnaga* (khella), 250 - 300 mg daily, and/or . . .

6) L-Carnitine, 500 mg 3x day.

B. With arrhythmia, add:

1) *Stephania* tincture (either species), ½ tsp tincture 3x daily, and/or

2) *Crataegus oxyacantha* (hawthorn), 120-900 mg 3x daily, and/or . . .

3) Taurine, 125-375 mg 3x day, and/or . . .

4) *Leonurus cardiaca* (motherwort), fresh plant tincture, 1/4 tsp 4x day.

C. With palpitations, add:

1) *Polygonum cuspidatum* (knotweed root) tincture, ½ tsp 3-6x daily, and/or . . .

2) *Astragalus*, 1,000 to 4,000 mg, 3-4x daily, and/or . . .

3) Liquid chlorophyll, 1 tbl in 20 oz water, once day, and/or . . .

4) Cataplex E, standard process, dose as on bottle,

5) *Urtica dioca* (nettle) leaf tea strong infusion, 1/4 cup herb in quart of hot water, let stand overnight, drink throughout day.

6) (Check potassium levels and electrolytes)

D. With shortness of breath, add:

1) *Polygonum cuspidatum* (knotweed root) tincture, ½ tsp 3-6x daily, and/or . . .

2) *Astragalus*, 1,000 to 4,000 mg, 3-4x daily, and/or . . .

3) Liquid chlorophyll, 1 tbl in 20 oz water, once day, and/or . . .

4) *Cordyceps* powder, 1 tsp - 1tbl 3x day, and/or . . .

5) *Ailanthus altissima* tincture, 10 drops to ½ tsp 4x day.

E. With hypotension:

1) *Glycyrrhiza* (licorice) tincture, 1 tsp to 6x daily depending on severity of condition (note: do not take for more than 60 days in this form), and/or . . .

2) Caffeine, variable dosing, and/or . . .

3) If nothing else works: yohimbine as supplement, begin with dosing on bottle and increase as needed. (Please note warnings on label and use caution.)

F. With hypertension:

1) Specific: *Uncaria rhynchophylla* tincture, ½ tsp to 6x day.

2) *Crataegus oxyacantha* (hawthorn), 120-900 mg 3x daily, and/or . . .

3) *Leonurus cardiaca* (motherwort), 30 drops to one teaspoon to 6x daily, and/or

4) *Mimosa pudica* tincture, 20-60 drops daily. (Note: may also be of benefit in depression, anxiety, headaches, and damaged nervous structures.)

G. With poor circulation (cold extremeties), add:

1) *Zingiber officinalis* (ginger) root, 2 ounces fresh juice, squeeze of lime, pinch of cayenne, honey to taste, in 8-10 ounces hot water, 3-4 cups daily.

9.0 Muscle weakness

A. General:

1) *Pinus* (pine pollen) tincture, *Aralia naudicaulis, Panax quinquefolius* (American ginseng), combination tincture, equal parts of each, full dropper of the tincture 3x daily for 6 months (take by mouth, do not put in water), and/or . . .

2) L-carnitine, 1000 mg 3x day, and/or . . .

3) Taurine, 500-1000 mg 3x day, and/or . . .

4) Homeopathic lycopodium 30C, 4 pellets 4x day.

10.0 Swollen lymph nodes/sluggish lymph

A. General, add:

1) *Salvia miltiorrhiza* tincture, 1 tsp 3x daily, and/or . . .

2) *Phytolacca* (poke) root tincture, 5-10 drops 2x day, and/or . . .

3) *Galium aparine* (cleavers) tincture, (esp for nodules and cysts), ½ tsp 3x day.

11.0 GI tract/bowels

A. Diarrhea:

1) Blackberry root strong infusion (1/4 ounce to one ounce herb in one quart of hot water, cover and steep overnight – or decoction in acute episodes) strain and then drink throughout the day.

B. Nausea:

1) Homeopathic nux vomica, 30C 4 pellets every hour, and/or . . .

2) *Mentha piperata* (peppermint) essential oil, ONE drop only, on tongue, followed by 6 ounces water.

3) *Moringa oleifera*, 1tsp powder in water 3x daily.

C. Leaky gut:

1) *Salvia miltiorrhiza* tincture, 1 tsp 3x daily.

2) *Althaea officinalis* (marshmallow) root, 1 tsp - 1 tbl powder in liquid, 3x daily.

3) Tumeric milk, 3x daily, see recipe section below.

4) Glutamine, 500 mg 2x day.

D. Ulceration/damage to bowel wall and epithelia:

1) Fresh juice of piece of green cabbage the size of a medium carrot (the core of

the protocol – lowers inflammation, heals ulceration/mucosa), 4 fresh plantain leaves (if you can find them – look in the yard, the plant really does help heal the mucosa and lower inflammation), one medium beet, 4 stalks celery, 3 carrots. Daily in am and just before bed.

2) The chronic fatigue formula (see 1.1) will help heal the bowel wall as well as lower bowel inflammation and help normalize cytokines.

3) Although most herbalists no longer recommend it, I still use and am a big fan of comfrey root powder for healing bowel ulceration, mucosa, inflammation. (The reason most people are skittish about the herb is due to concerns about the pyrrolizidine alkaloids, PA, in the plant; I don't consider these a problem for short term use and have never seen negative impacts from them in 35 years of practice when used short term). I add one tablespoon to the chronic fatigue blend or else simply use 1 tbl comfrey root powder, 1 tbl licorice powder, 1 tbl marshmallow root powder. Limited intake to 30 days. (If you have concerns about PA impacts on the liver, take with standardized milk thistle seed as dosed under liver, 4.0.) I have never found anything better for healing damage to the intestinal tract, even in cases where surgeons were prepared to remove large sections of the stomach due to ulceration.

12.0 Kidneys

A. To repair or inhibit further damage:

1) *Urtica dioica* (nettles): add 1-2 ounces of dried nettle leaf to a quart mason jar. Add hot water, let steep overnight, strain and drink throughout the next day. (Some people think they herb can be used again at least once more.) Do this every day. As well, take 1/4 tsp nettle seed tincture 3x daily, every day.

13.0 Fibrosis in organs

A. To inhibit, reduce, or repair

1) tinture formulation, equal parts: *Angelica sinensis, Salvia miltiorrhiza, Lonicera japonica, Polygonum cuspidatum, Cordyceps spp.* Dosage: 1tsp 3-6x daily depending on severity of fibrosis.

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