

## **HERBAL TREATMENT FOR CORONAVIRUS INFECTIONS**

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The regrettable truth is that we live in a time of increasingly severe disruption of the ecosystems of our planet. As those disruptions worsen, more pathogenic microbial organisms will flow upward out of those disrupted ecological matrices into the human species. (Almost always this jump originates from a region-specific animal species.) The current emerging pathogen that is raising concern is known as SARS-Cov-2 – the infection which it causes is called Covid-19. And yes, it is confusing that it is Cov-2 when the virus is discussed but Covid-19 when it becomes an infection. (Just because a bunch of people get advanced degrees does not mean they are sensible or know how to talk to people who actually live in the real world.)

Not that the following description will be of any real use to those of us on the (non-Ph.D.) front lines, corona viruses are enveloped, positive-stranded RNA viruses which have the largest genome of all all viruses. (See, that doesn't help at all.) Like most RNA viruses they regularly engage in recombination of their genetic code – that is they continually make new variants of themselves. Viruses are one of the most highly adaptable organisms on this planet.

Despite the existence of a few antiviral pharmaceuticals the only real treatment that western medicine has developed for viral infections is the creation of vaccines. Unfortunately vaccines for new organisms generally take a year or so to develop (which is why a Covid-19 vaccine is going to take awhile and will probably be, like the original SARS vaccine, only partially effective). And because viral organisms (such as influenza) tend to continually rearrange their genome, new vaccines for things like the flu have to be made every year. Viral pathogens are almost always far harder to deal with using western medical paradigms than bacteria (which are themselves proving harder to rationally control than originally believed).

There are perhaps a dozen or two known corona viruses, only seven or so (at this time) are known to infect people. The first one that raised serious international concern was SARS (Sudden Acute Respiratory Syndrome). The new, pandemic coronavirus is a very close relative which is why it's called SARS-Cov-2. As with the original SARS organism, it is a serious pathogen when it begins to spread among large numbers of people. Unfortunately, SARS-Cov-2 is a far more aggressive pathogen than the original SARS virus. An analysis of the first 75,000 people who were infected found that it has a mortality rate of around 2.3%, making it some 23 times more fatal than seasonal flu infections (which is why a worldwide pandemic could be very serious indeed). Like influenza organisms this virus primarily affects the lungs and is

spread most often through respiratory droplets – though direct contact with body secretions can also transmit it.

As with the majority of respiratory viruses, infection stimulates coughing and sneezing which enables the virus to find more hosts. (Many people who are infected have minor or no symptoms, so that they act as stealth carriers, spreading the virus throughout the population.) Unfortunately, the virus can also survive for a relatively long time on most surfaces, thus being transmitted in some cases by touch. (You touch the door knob, then your mouth or nose, and Bob's your uncle.)

SARS and MERS (Middle East Respiratory Syndrome – caused by a related viral pathogen) also tend to infect the GI tract in people who become ill. Around a quarter of those infected develop a rather intense diarrhea. Early studies of the new virus have found viral particles in stool samples which indicates it might also spread via feces (as SARS and MERS do) and most likely in urine (again like SARS and MERS).

As with SARS, Cov-2 has a sort-of distinct three-stage impact on lung tissue once someone is infected: initial infection that allows viral replication, immune response which can include in more serious cases immune hyper-reactivity, and relatively minor to very severe pulmonary damage. That being said, most infections tend to be very much like the flu. Most people will in fact believe themselves to have the flu – not a coronavirus infection. In reality, Cov-19 infections for around three quarters of those infected will remain relatively mild. Only about 18% of those infected experience a severe infection. Most of those will be older, that is people whose immune systems have aged over time; people with compromised immune systems; and people with existing disease conditions such as COPD.

Somewhat oversimplified, here is what serious Cov-19 infections do in the lungs. Once in the lungs the virus infects specific cells, among them the cilia. The cilia can be likened to tiny hairs. They protrude from cells in the lungs and continually move like waves on the ocean. This moves mucus and particulate matter up and out of the lungs.

During infection, SARS viruses often kill the cilia they infect which allows debris and fluids to build up in the lungs (this is pneumonia). When the infection becomes this serious the immune system can become highly activated. This sends large numbers of immune cells to the lungs to stop the infection, clear out the debris, and heal the tissues.

Oversimplified (again), during infection the affected cells send out chemical messenger molecules which (despite their being a variety of them with different names) I group together under the single name of *cytokines*. (Really, at root, this is just a tomato tomahto kind of thing; they are all messenger molecules that do stuff in the body during infections.)

When the Cov-2 virus, finds its preferred cells it uses very specific and evolutionarily ancient strategies to get inside those cells, take them over, and use their structures to reproduce. Then it breaks the cells open, releasing new viruses into the body which can then go on to infect other cells, and so on, ad nauseum. Along the way it stimulates coughing to infect more mammals to spread the virus into new hosts.

It is important to realize that viruses are some of the oldest living things on the planet (despite this many biologists continue to insist viruses are not “alive,” which as anyone with a brain can plainly see is inaccurate). Viruses are in fact billions of years old. As such they are exceptionally good at what they do and like all living things they learn as they go, adapting new behaviors along the way. Plants, in comparison, are only about a billion years old, complex land plants around 300 million years or so. In contrast our most ancient hominid ancestors are at most 1-2 million years old, our species in the form it has now is only around 35,000 years old. Western medicine (at a generous estimate) is 200 hundred years old. Its knowledge of viral pathogens and infections is only around 50 years old. Much of that is rudimentary or even incorrect (based as it is on outdated ecological models and medical understandings).

All pathogens are sophisticated at modulating human cytokines to achieve their own ends. They have learned how to circumvent many of our normal immune responses in order to facilitate their entry into the body, their reproduction, and their release into new hosts. Elderly and compromised immune systems are quite often unable to respond sufficiently to these viral sophistications; they get overwhelmed.

Cytokine responses in the human body often involve inflammation (a normal and important part of the healing process and response to disease). With some infections, if the immune system can't shut down the infection successfully an ever-worsening inflammatory cascade occurs (sometimes called a cytokine storm). This can sometimes be extremely serious. With the SARS-group of viruses, the damage usually occurs in the lungs. Even if people recover, this can take years to repair itself. If severe enough, it will cause death.

Cytokine storms like this can spread throughout the body via the blood and will sometimes cause what is called septic shock. Because the blood circulates

through the liver and kidneys, these organs some of the earliest organs that are damaged by a cytokine storm. Eventually the organs shut down, death often follows. (With MERS acute kidney damage is very common.)

## **Mechanisms of Cellular Infection and Natural Interventions**

One they get into the body, the SARS-group of viruses attach to what are called angiotensin-converting enzyme-2 (ACE-2) linkages on the surface of cells. This is an integral membrane protein found on many cells throughout the body, including the lungs (but not so much in the nasal or sinus tissues), GI tract, heart, vascular cells, and the kidneys.

ACE-2 is intimately involved in regulating the renin-angiotensin system (RAS). RAS is active throughout the body and in most organs including the lungs, spleen, lymph nodes, kidneys (where it regulates renal electrolyte homeodynamics), the vascular system (where it regulates constriction and relaxation of the vessels), and so on. RAS is crucial to the functioning of most organs in the body.

ACE-2 has a number of regulatory functions, among them converting angiotensin 2 (Ang-2) to less potent molecular forms. (Angiotensin 2 is a highly bioactive molecule, ACE-2 regulates/modulates its actions.)

The SARS-group of viruses attach to ACE-2 wherever it occurs on the surface of cells (including the cilia in the lungs). [Herbs that protect ACE-2 are *Glycyrrhiza spp* (licorice), *Scutellaria baicalensis* (Chinese skullcap root), *Sambucus spp* (elder), luteolin, *Aesculus hippocastanum* (horse chestnut), *Polygonum cuspidatum* (Japanese knotweed root), *Rheum officinale*, and plants high in procyanidins and lectins (e.g. cinnamon)].

These ACE-2 linkages are the entry point for the viruses infection of cellular tissues. Once ACE-2 is damaged by viral attachment and penetration ACE-2 levels in the lungs (or the affected organ) fall, ACE-2 function declines or is destroyed, the RAS system is no longer modulated properly. The lungs show enhanced vascular permeability, edema, neutrophil accumulation and worsening lung function.

ACE-2 function also tends to be less dynamic the older people grow. This is part of the reason that the SARS-group of viruses has more damaging impacts on the elderly [Herbs that upregulate ACE-2, increasing its levels in the body, are *Pueria spp* (kudzu), *Salvia miltiorrhiza* (Dan shen), and *Ginkgo biloba*]. ACE inhibitors (in contrast to ACE-2 upregulators) will actually increase the

presence of ACE-2 and help protect the lungs from injury [ Some herbs that do that are *Crataegus spp* (hawthorn) and *Pueraria spp* (kudzu)].

Upon infection by the SARS-group, a cascade of inflammatory cytokines is initiated: IFN-gamma, CXCL10, IL-1b, TNF-a, and IL-6 are some of the major ones, IL-6 particularly so. RANTES, MCP-1, IL-8 are elevated in about half of those who are infected. The p38 MAPk pathway is highly stimulated and as infection progresses levels of PGE2 and TGF-b (with a later elevation of IL-2) all rise. (*Salvia miltiorrhiza* is a strong cytokine adaptogen, specific for this kind of thing; it acts to normalize cytokine dysfunction.)

Lowering TGF levels can be very helpful (herbs that can do this are *Angelica sinensis* and *Astragalus spp*). HMGB1 levels during SARS-group cytokine cascades can be high, especially in those who are seriously ill (*Salvia miltiorrhiza* is specific for reducing HMGB1 levels). During infection this cytokine cascade initiates a massive movement of immune cells, their infiltration and accumulation into lung tissues. Generally, the older the infected animal (human or otherwise) the greater the cytokine upregulation and the worse the outcome.

Sharply reducing IL-1b has been found to significantly decrease the impact of the disease on the infected and to inhibit mortality [Some herbs for reducing this cytokine are *Polygonum cuspidatum* (Japanese knotweed), *Scutellaria baicalensis* (Chinese skullcap), *Cordyceps spp*, *Pueraria* (kudzu), and *Eupatorium perfoliatum* (boneset)].

Severe hypoxia (not enough oxygen) often occurs in the cells that are affected (and in the person so afflicted). The RAS-stimulated cellular hypoxia generates high levels of free radicals through the rapid increase of Ang-2, i.e. a hypoxia-re-oxygenation injury cycle. The cells generate large levels of hydrogen peroxide and superoxide radicals. Endothelial cells become porous and organ and cellular integrity is lost. In short the excessive Ang-2 levels (due to the destruction of the ACE-2 cells by the virus) causes massive damage to the lungs. Lymph and spleen tissues are often quite compromised as well.

Protecting the cells from the induced hypoxia significantly reduces 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.)

Again, the virus specifically targets (and replicates within) ciliated cells, destroying the cells and their capacity to move mucous up and out of the lungs.

(Cilia-protective herbs are *Cordyceps spp*, olive oil and leaf, any berberine-containing plants, and *Bidens pilosa*.)

Autoantibodies are produced that begin to attack host epithelial and endothelial cells, increasing the destruction. Reducing autoimmunity (*Rhodiola*, *Astragalus*, *Cordyceps spp*) and protecting endothelial cells (*Polygonum cuspidatum* – Japanese knotweed root) is crucial.

Autopsies of those who have died from infection by the SARS-group of viruses has revealed that alveolar damage in the lungs is severe. There is massive damage to the lymph nodes of the lungs, including severe necrosis in the white pulp and marginal sinus of the spleen, destruction of the germinal centers in the lymph, apoptosis of lymphocytes, and an infiltration of monocytic cells. Protection of spleen and lymph are essential [*Ceanothus spp* (red root), *Phytolacca* (poke root), *Scutellaria baicalensis* (Chinese skullcap root), *Salvia miltiorrhiza*, *Bidens pilosa*].

While the SARS-group of viruses often replicates in ciliated epithelial cells, they do as well in infected dendritic cells, both mature and immature. It does not kill the DCs 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. These viruses very powerfully upregulate IL-6 and IL-8 in the epithelial cells. These particular cytokines concentrate around the immature DCs and strongly inhibit their maturation *and* the priming ability of mature DCs for the generation of active T cells. This inhibits the production of active T cells and allows the virus to enter and severely damage the lymph organs in the lungs. Stimulating DC maturation (*Cordyceps spp*) and increasing T cell counts [*Glycyrrhiza spp* (licorice), *Ceanothus* (red root), *Sambucus spp* (elder), and zinc] can help reduce symptom picture and disease severity.

### **Natural Protocols for SARS-group Viral Infections, Including COV-19**

The rationale here is to find plants that will counteract the actions of the SARSgroup of viruses, then to cross correlate those in order to choose the plants that are present in most categories of action and that have a tradition of use for these kinds of infections. What is needed are plants that have the following actions:

- 1) Plants specifically antiviral for the SARS-group of viruses; the strongest known so far are *Scutellaria baicalensis* (Chinese skullcap root),

*Houttuynia spp*, *Isatis spp*, *Glycyrrhiza spp* (licorice), *Forsythia suspensa* (the fruit), *Sophora flavescens*, and *Lycoris radiata* (extremely potent). *Lonicera japonica* and *Polygonum cuspidatum* are also effective as antivirals for coronaviruses as a group.

- 2) Block viral attachment to ACE-2 linkages. Specific for this are *Glycyrrhiza spp* (licorice), *Scutellaria baicalensis* (Chinese skullcap root), *Sambucus spp* (elder), luteolin, *Aesculus hippocastanum* (horse chestnut), *Polygonum cuspidatum* (Japanese knotweed root), *Rheum officinale*, and plants high in procyanidins and lectins (e.g. *Cinnamomum*, i.e. cinnamon).
- 3) Upregulate and protect ACE-2 expression, increase its activity (esp in the aged), and lower Ang-2. Herbs specific for this are *Pueria spp* (kudzu), *Salvia miltiorrhiza* (Dan shen), and *Ginkgo biloba*. Use ACE inhibitors (in contrast to ACE-2 upregulators) to increase the presence of ACE-2 and help protect the lungs from injury: *Crataegus spp* (hawthorn) and *Pueraria spp* (kudzu) are specific.
- 4) Modulate cytokine responses (*Salvia miltiorrhiza*), including the lowering of TGF levels [*Angelica sinensis* (dong quai), *Astragalus mongholicus*], regulating HMGB1 (*Salvia miltiorrhiza*), and reducing IL-1b [*Polygonum cuspidatum* (Japanese knotweed), *Scutellaria baicalensis* (Chinese skullcap), *Cordyceps spp*, *Pueraria* (kudzu), and *Eupatorium perfoliatum* (boneset)],
- 5) 5) Protect lung cells from hypoxia (*Rhodiola spp*).
- 6) 6) Protect the cilia (*Cordyceps spp*, olive oil and leaf, any berberinecontaining plants, and *Bidens pilosa*).
- 7) Reduce autoimmunity and increase healthy immune function (*Rhodiola*, *Astragalus spp*, *Cordyceps spp*).
- 8) Protect endothelial cells (*Polygonum cuspidatum* – Japanese knotweed root).
- 9) Protect spleen and lymph system [*Ceanothus spp* (red root), *Phytolacca* (poke root), *Scutellaria baicalensis* (Chinese skullcap root), *Salvia miltiorrhiza*, *Bidens pilosa*].
- 10) Stimulate DC maturation (*Cordyceps spp*) and increase T cell counts [*Glycyrrhiza spp* (licorice), *Ceanothus* (red root), *Sambucus spp* (elder), and zinc].

## Suggested Protocols

**General protective:** Shuanghuanglian formulation. (Note: this was found in the earlier SARS outbreak in China to help considerably – a review of the already mentioned mechanisms indicates why. It is now being tested in clinical trials in China for treatment of Cov-19 infections). The formulation is composed of

*Forsythia suspensa* fruit (2 parts), *Lonicera japonica* (1 part), *Scutellaria baicalensis* (1 part).

**Suggested dosage:** 1 tsp 3x daily. **However:** *I would also take with this the immune formulation from the following protocol in order to activate the most effective healthy immune function for this particular viral pathogen.*

**SARS-group Treatment Protocol:** This is composed of three tincture formulations, as follows.

1) **Core formulation:** *Scutellaria baicalensis* (3 parts), *Polygonum cuspidatum* (2 parts), *Pueraria* (2 parts), *Glycyrrhiza* (1 part), decocted *Sambucus* leaf tincture (1 part). **Dosage:** 1 tsp 3x day, if acute 1 tsp 6x day.

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), *Ceanothus* (2 parts), *Bidens pilosa* (1 part). **Dosage:** Same as number one.

### **Some Comments on Preparation of the Formulas**

“Part” refers to how much of the plant matter is used. So, if you already have the tinctures, then – if you are working with fluid ounces (i.e., 30 ml for metric people) for the core formulation you would blend together three ounces of *Scutellaria baicalensis*, two ounces each of the tinctures of *Polygonum cuspidatum* and *Pueraria*, and one ounce each of the tinctures of *Glycyrrhiza* and decocted *Sambucus* leaf. The dosage would be as above for the tincture combination. (Please note if you want to make your own tinctures, please see the medicine making chapter of my book *Herbal Antibiotics*, second edition, or any equivalent source.)

### **About Decocted (*Sambucus*) Elder Leaf Tincture**

This is not generally commercially available. (Please see the lengthy section on Elder in my book *Herbal Antivirals*). Elder leaf and bark are exceptionally potent medicines for a variety of things, including viral pathogens.

Unfortunately bad press by adversarial medical activists in the early twentieth century spread the rumor that elder (*Sambucus*) is a poisonous plant. It is not. In descending order of impact the bark, leaves, and berries can cause vomiting *in some people, not all*. (I am not generally affected and use undecocted tinctures.) It depends on the dose and personal susceptibilities. **However**, if the herb is

boiled (i.e., decocted) the compounds that cause vomiting are deactivated. **Note:** The leaves and bark are far more potent anti-virals than the berries or flowers. I would not suggest the berries for use in treating this pathogen; they are not, in my opinion, strong enough. **To make a decocted elder leaf tincture:** Boil four ounces of dried elder leaf (two ounces if fresh) in two quarts water until it is reduced by half. Cool, strain, then measure the amount of liquid left. To this add 25% pure grain alcohol. **If** your state will not allow you to buy pure grain alcohol (which is 95% alcohol) then after you cool and strain the liquid, put it in the pot again and reduce it once more by half. Let it cool again and then measure and add to it the same amount of 40% to 50% vodka, 50% is preferable. Hopefully, someone will begin making this commercially soon.

### **Some Other Plants Found Active Against SARS-group Coronaviruses**

*Artemisia annua, Cassia tora, Cibotium barometz, Dioscorea batatas, Eucalyptus spp, Gentiana scabra, Linera aggregate, Lonicera japonica, Panax ginseng, Polygonum multiflorum, Taxillus chinensis, Pyrrosia lingua, and Rheum officinale.*

### **References:**

- \* Bandara, M. et al. Indigenous herbal recipes for treatment of liver cirrhosis, *Procedia Chemistry* 14 (2015): 270-276.
- \* Basak, Ajoy. et al. Inhibition of proprotein convertases-1, -7 and furin by diterpenes of *Andrographis paniculata* and their succinoyl esters, *The Biochemical Journal* 338 (1999): 107-13.
- \* Buhner, Stephen Harrod. *Herbal Antibiotics, second edition*, Storey Publishing, 2012.
- \* Buhner, Stephen Harrod. *Herbal Antivirals*, Storey Publishing, 2013.
- \* Dharmananda, Subhuti. Shuanghuanglian: Potent anti-infection combination of lonicera, forsythia, and scute, [itmonline.org/arts/shuang.htm](http://itmonline.org/arts/shuang.htm), nd.
- \* Hoffmann, H, et al. Human coronavirus NL63 employs the severe acute respiratory syndrome coronavirus receptor for cellular entry, *Proceedings of the National Academy of Sciences USA* 102(22) (2005): 7988-93.
- \* Kuhn, JH, et al. Angiotensin-converting enzyme 2: a functional receptor for SARS coronavirus, *Cellular and Molecular Life Sciences* 61 (2004): 2738-43.
- \* Lewis, Ricki. Covid-19 vaccine will close in on spikes, [blogs.plos.org/dnascience/2020/02/20](https://blogs.plos.org/dnascience/2020/02/20).
- \* Li, Guangdi and Erik De Clerq. Coronavirus (2019-nCoV), [nature.com/articles/d41573-020-00016-0](https://nature.com/articles/d41573-020-00016-0).
- \* Li, W, et al. Angiotensin-converting enzyme 2 is a functional receptor for the SARS coronavirus, *Nature* 426 (2003): 450-4.

- \* Li, W, et al. Efficient replication fo severe acute respiratory syndrome coronavirus in mouse cells is limited by murine Angiotensin-converting enzyme2, *Journal of Virology* 78 (2004): 11429-33.
- \* Li, W, et al. Receptor and viral determinants of SARS-coronavirus adaptation to human ACE2, *The EMBO Journal* 24(8) (2005): 1634-43.
- \* Marshall, R.P. The pulmonary renin-angiotensin system, *Current Pharmaceutical Design* 9(9) (2003): 715-22.
- \* McKeever, Amy. Here's what coronavirus does to the body, *National Geographic*, February 18, 2020.
- \* Peng, M. et al. Luteolin restricts dengue virus replication through inhibition of proprotein convertase furin, *Antiviral Research* 143 (2017): 176-85.
- \* Wevers, Brigitte and Lia Van der Hoek. Renin-angiotensin system in human coronavirus pathogenesis, *Future Virology* 5(2) (2010): 145-161.
- \* Xia, Shuai. et al. A pan-coronavirus fusion inhibitor targeting the HR1 domain of human coronavirus spike, *Science Advances* 5 (2019): eaav4580.
- \* Zimmer, Katarina. Why Some Covid-19 cases are worse than others, *The Scientist*, February 24, 2020.

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