Coevolving with the Influenza Virus: A bit of history, some pathophysiology and one suggested herbal treatment among many possibilities.

by Margaretha Haughwout

Introduction/ a bit of history

The early 20th-century witnessed it's first global flu pandemic; the H1N1 strain known as the "Spanish Flu," or "La Grippe" killed somewhere between 20-40 million people in 2 years. The Spanish Flu killed more people in one year than in four years of the bubonic plague. One fifth of the global population was infected, and this particular flu virus, unlike the vast majority of strains, was more deadly to people between the ages of 20 and 40. Although unnoticed at the time, the first wave of this flu hit military camps in the US and especially in Kansas in March of 1918. In August of that year, a second wave that was much more severe spread via wounded war veterans to France, Spain, the US, and around the world. Spain was ravaged, losing around 8 million people due to the virus. In the last quarter of the year, the US was hit again, this time killing hundreds of thousands. The illness came on very fast, and the symptoms could be awful. Stories abounded of individuals falling to the ground on their way to work, and never recovering. Lungs clogged with blood and frothy liquid, cyanosis, and difficulty breathing were commonplace. A rapid onset of pneumonia often followed. Aspirin was just released to the public at the time, and many doctors were recommending high doses to combat the epidemic. Some researchers now believe that such a high dose of aspirin could have led to numerous deaths; especially the "cytokine storms," the frothy blood clogging the lungs, nose and mouth, could have stemmed from complications with the drug that Bayer was advertising so heavily, not from the virus itself. As Karen M. Starko acknowledges in her research, the *Journal of the American Medical Association* recommended 1000 milligrams every 3 hours; this is about 25 tablets per day, or twice the amount considered safe today. How many died as a result of aspirin is unknown. Other mysteries adhere to the 1918 pandemic, such as how the flu virus mutated 3 times in a matter of months; usually it takes years for such a significant mutation, or "antigenic shift" to occur.

Subsequent epidemics and pandemics have appeared and subsided over the past 100 years, and many of these were deeply felt, though usually not as far reaching as the public's fears. Today, the threat of pandemic looms, but to date has not emerged anywhere close to the devastation of 1918. The flu remains a seasonal illness in our lives that will not be deadly for most of us unless we are very old, or have or health problems. Always, the possibility of pandemic looms; knowing what virulence is possible, how to care for ourselves and others, and what treatments are available will help us feel confident should a pandemic ever come about. This paper examines the patho-physiology of the Influenza virus; how we contract it, how it affects our bodies, and how we can counteract its effects, perhaps even cure it with herbal medicines.

Identification

The influenza virus is an RNA virus, named for the ribonucleic acid that comprises its genetic material. RNA viruses enter cells and utilize the DNA of the host cell in order to replicate. Influenza is a member of a family of viruses known as Orthomyxoviridae, which includes six genera, three of which are Influenzavirus A, Influenzavirus B, Influenzavirus C. Influenzavirus A by far is the most virulent in humans, is the most evolutionarily active, and has the most strains. It has caused all of the well known flu pandemics. Influenzavirus A affects humans, other mammals, and birds. Influenzavirus B affects humans and seals, and can cause epidemics in local populations. Influenzavirus C affects humans and pigs. Strains, or "serotypes," are based on the Hemaggluten and Neuraminidase markers on the surface of the virus, hence the H and the N in the names. The full naming schema for influenza viruses has six parts: the genera A, B, or C; the host the virus was first found in, such as swine or birds -- though if the virus was first found in humans no name is given; the location where the virus was first found; the strain number; the year the virus was isolated; and for Influenzavirus A, the Hemagluten and Neuraminidase antigen information. This information is included in parentheses at the end of the line, so that the full name might look something like this: A/quail/ Mattapoiset/35/91 (H3N3).

As mentioned above, the H and the N in the name of Influenza A serotypes are Hemaggluten and Neuraminidase markers; these are also known as antigens, and are kinds of glycoproteins. Antigens are what antibodies respond to in the body, what trigger a flurry of activity from the body's immune system to find a genetic match to the foreign material, and thus allows the antibody to attach to the foreign material and disarm it. The term antigen in fact, is a combination of the two words antibody and generator. Specifically the Influenza antigen Hemagluten binds with cell membranes, while Neuraminidase prevents coagulation of the newly minted viruses in the cell, thereby promoting fast dispersion. "Antigenic drift" refers to mutations in the Hemaggluten and Neuraminidase antigens that have little effect on the reach of the virus, though it may certainly impact the effectivity of the current flu vaccine. "Antigenic shift" refers to significant changes in these surface proteins that can enable a serotype to achieve pandemic status.

It can be very difficult to tell the difference between a cold and a flu virus, but the symptoms of the flu will be more severe. Both may begin with a sore throat, but the cold is more likely to cause a stuffy and runny nose, whereas the influenza virus will travel to the lungs more quickly. Sinusitis (this usually develops after a cold, has copious amounts of pus in the nasal passage, and has no sensitivity to anti-histamines and decongestants), allergic rhinitis (typically those with allergic rhinitis will have runny, clear mucous in the nose, frequent sneezing, itching), and strep throat

(strep throat causes severe and enduring pain in the throat, while the sore throat of the flu virus is much more mild) may also resemble influenza at the onset. Fevers and body aches are associated with the flu, and the illness typically lasts longer, a couple weeks to the few days of acute cold symptoms.[1] Indeed, fevers ranging from 102-106F (especially, in the beginning, chills from increasing temperature), body aches, dizziness, headaches, lack of energy, nausea, and a spasmodic cough are the general symptoms of the flu. Diagnosis usually happens via symptoms, but rapid diagnostic tests are available in clinics,[2] and may even be bought online; however according to the Merck Manual Online, these tests vary in their details and ability to identify specific strains and their mutations. I'd like to envision a DIY culture,[3] where these tests are developed and perfected and made easily accessible to populations who could test themselves outside of the medical/ hospital system; the ability to rapidly identify what kind of serotype might be moving through our community and if it was a significantly new strain could help herbalists, homeopaths, and medical doctors alike develop viable treatment plans: to decide whether to use elderberry or lomatium for example, whether to take the current vaccine or homeopathic remedy. Surely, one lesson that can be learned from the 1918 flu is that the pandemic was made much worse by lack of coordination and honest observation.

Exposure

A weakened immune system, travel, and exposure are the general ways one can catch the flu. Germs travel in mucous, airborne droplets of water up to 6 feet away, through skin to skin contact, or by touching something an infected person just touched, such as a drinking glass, the knob of a faucet, or a bus standing pole, and then touching their own nose or mouth. Caring for another with the flu may cause the caretaker to contract the illness. Indeed, the flu usually hits a community in two waves. The first wave affects school age children and reaches deeper into the population through parents and guardians; the second wave affects the elderly and other housebound populations. Those affected by the second wave are also more at risk for developing complications from the flu. The flu is believed to be contagious approximately one day before symptoms show and 5-7 days after it has taken hold.

The seasonal flu is very common. During "cold season," or the winter months, the flu will affect millions world wide. For most, the affliction will be an inconvenience, uncomfortable to be sure, perhaps at best, an opportunity to rest from our busy lives. But thousands will be hospitalized for critical care of flu related complications, stemming from age -- from either being very old (over 65 years-old) or being very young (under 4 years-old -- infants "may present with a sepsis-like syndrome") -- compromised immune systems. For individuals with renal or hepatic insufficiency, neurological disorders, chronic lung disease, asthma, diabetes, cardiopulmonary deficiency, or late pregnancy; undoubtably, influenza can be fatal.[4] At times, approximately every 2-3 years, certain influenza strains reach epidemic status, where a mutation of a virus strain affects a whole community in a certain area. A flu virus can also reach pandemic status where a new serotype travels across significant terrains such as continents, affecting numerous human populations. Influenza A viruses shift into a new strain every 10-12 years. While usually causing mild symptoms, Influenza B viruses, when they reach epidemic or pandemic status, can cause severe disease. This shift in B viruses gain the aforementioned potential every 3-5 years. Even the healthy are at risk for severe complications and death during a pandemic. The H1N1 virus is one example of a flu virus that caused two pandemics to date, the first being the Spanish Flu of 1918, the second being the Swine Flu of 2009. Other notable pandemics include the H2N2 virus of 1957, dubbed the Asian Flu, the Hong Kong flu, or the H3N2 of 1968. The H5N1, the "bird flu," is a current pandemic threat.

If a cough from the flu does not clear up within 2 or 3 weeks, bronchitis may have developed. Bacterial and viral pneumonia can arise even if a person seems to be otherwise healthy. Warning signs include increased difficulty breathing 7+ days after the flu was contracted, a worsening cough, blood in the mucous, recurrence of fever after the flu seemed to be clearing up. If a child appears to be getting better and then suddenly relapses with a high fever, there is definitive reason for concern about a secondary infection. If there is consistent vomiting, or consistent vomiting and diarrhea, the afflicted is at extreme risk for severe dehydration, which could be fatal. Other rarer complications include encephalitis (inflammation of the brain often due to infection), inflammation of the heart muscle, and renal failure; but again, these are considered rare. Reye syndrome, a fatal disease that causes failure of multiple organs, including swelling of the brain and cirrhosis of the liver, and deep coma can be a complication for children, and is

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[1] This time frame is general, not accounting for how these viruses might affect the elderly, children, smokers, people with other illnesses. All these factors will affect length and severity, as will be discussed.

[2] A brief search renders sites like this: http://www.cliawaived.com/web/Flu_Test.htm that have an array of tests foran average of a couple hundred dollars. If these could be made more accessible and more sensitive, a distributed, yet coordinated effort to combat flu pandemics could extend beyond hospital and laboratory walls.

[3] See http://www.swsbm.com/HOMEPAGE/Anarcho-herbalism.html

[4] http://www.merckmanuals.com/professional/infectious_diseases/respiratory_viruses/influenza.html

associated with the use of aspirin during the Spanish Flu. Children especially should not take aspirin when they are sick. For most of the above developments, hospitalization is called for if it is available.

In the case of H1N1, or the "swine flu" vomiting and diarrhea may accompany an acute respiratory infection. A very intense, dry, upper respiratory cough that comes on very quickly, within a day, is associated with this strain. It can cause cramping throughout the whole body when the afflicted coughs. This new version of H1N1, the 2009 version, has now mostly replaced the old version in human populations. Before it did this it caused the first major pandemic in 40 years. Currently, the H1N1 virus and the H3N2 are the two strains found in people, though antigenic drift is happening all the time. The H5N1 is also especially focused on the lungs for infection, meaning as a site for replication of the virus. H5N1 is considered to be very deadly, though to date does not seem to be spreading much through human to human contact. There have been approximately 600 documented cases of the Avian or Bird Flu, and half of this number have died from this strain. A positive feedback loop of T cells, macrophages and chemicals (especially mitogen-activated protein kinases, or MAPK seems to be the chemical that is "over expressed in certain strains that initiates this storm) traveling to the site of a infection and locally creating more T cells, known as the "cytokine storms," discussed above, is also associated with H5N1. Chemicals involved in this inflammatory reaction are called "cytokines." Cytokine storms can be fatal if the sudden and rapid replication of immune cells block air passages or clog blood vessels. The jury is still out however in regards to how these develop: Karen M. Starko notes in her landmark article, "Salicylates and Pandemic Influenza Mortality, 1918–1919 Pharmacology, Pathology, and Historic Evidence," that the pulmonary edema and other symptoms associated with Avian Flu fatalities are consistent with the over use of acetyl salicylic acid.[5]

Treatment

New Influenzavirus A strains are evolving all the time, which makes a consistently effective vaccine very difficult. The current vaccine is based on a combination of H1N1, H3N2, and Inflenzavirus B. There are two main kinds of vaccine: there is an intravenous shot containing dead flu viruses that is recommended for healthy people, the elderly, and for those with chronic health conditions, and there is a nasal spray containing weakened live viruses that is inhaled through the nose. This latter vaccine is known as LAIV, or Live Attenuated Influenza Vaccine, and is recommended for healthy people between the ages of 2 and 49 years who are not pregnant. Both are meant to prompt the body's immune system to make antibodies that will fight the current strains of the flu virus if and when exposed.

Critics of the vaccine say that it is never assured to work because it is always based on the last year's strain, and it is unclear how fast a new vaccine could be created and disseminated in the event of a pandemic, particularly in low income or rural areas. In addition, it takes around 2 weeks for the vaccine to teach the body to make the appropriate antibodies, so if the pandemic is moving quickly, an individual could contract the illness before it has learned how to fight it. The vaccine can also have side effects often similar to the flu itself. But herbalists must take caution as well, for a pandemic strain such as the H5N1, some of our trusted herbs may cause the virus to worsen and may even prove fatal. *Echinacea spp.* and *Sambucus nigra*, two herbs usually indicated for the common flu, may foster deadly cytokine storms, by stimulating the surface immune response in the body. While not specifically studied, because *Spilanthes acmella* and *Xanthoxylum* are similar to *Echinacea spp.* in their composition and actions, they may also have this effect.

Antivirals used by the medical industry include Tamiflu TM and Relenza TM, both neuraminidase inhibitors, and Amantadine TM and Rimantadine TM, which disable a protein in the virus called M2. This second class of antivirals are fading from use, as many strains of the Influenzavirus are resistant. Studies available to the public about Tamiflu TM are limited, which is cause for the concern. As is often the case with pharmaceutical medicines, most of the drug data is secret.[6] Studies show that strains, notably the H3N2 and H1N1 developed resistance to Tamiflu TM in the laboratory. As Kathy Abascal observes in her book *Herbs and Influenza, How herbs used in the 1918 Flu Pandemic can be effective today,* the possible resistance to Tamiflu TM during a pandemic could be extremely damaging if this is the only protocol we rely on.

Undoubtably, the practicing herbalist encountering a flu that is or is potentially a pandemic strain, needs a strong anti-viral that won't trigger the surface immune system into a dangerous positive feedback loop of T cells and macrophages. *Hypericum perforatum* is an excellent anti-viral, especially indicated for RNA viruses. It has been observed in the lab to reduce cytokine storms. *Hypericum* is seen to reduce MAPK and IL-6, chemicals involved in this inflammatory response. In the petri dish of the lab, and in live poultry, *Hypericum* has had marked effect on

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[5] Acetyl salicylic acid, while initally derived from salicylates found in willow, meadowseet, and birch, unlike these plants, has a permanent affect on platelet aggregation.

[6] For more information, see the NYT article on their attempts to access this data: http://www.nytimes.com/2012/04/11/opinion/drug-data-shouldnt-be-secret.html?ref=tamifludrug&_r=0&gwh=E0823EE079CE6D01B16AD7B3B62D80E1

H5N1, and could arguably be a specific for this serotype. *Lomatium dissectum* is another North American herb with strong anti-viral properties with a long history of use among Native American societies for the flu. *Lomatium* could be a specific for pandemic strains of the virus. The only irony here is that the plant is endangered, so widespread use needs to be thought through. Ethical wildcrafting or cultivation are essential. Eclectic physicians learned this herb from the Native North Americans and used it during the 1918 pandemic with great success. *Eupatorium perfolatum* is another lauded herb from the Eclectic physicians use in 1918/1919. Many Eclectics praised its use for antiviral activity, as well as reducing the pain, fever and cough associated with the illness. All noted that it was extremely safe. *Alium sativum* is another safe anti-viral with a long history of use for the flu in Europe. If we are certain that we are dealing with the common flu, *Echinacea spp., Sambucus nigra* (Guido Mase suggests a succus of the berries.), *Spilanthes acmella, and Xanthoxylum spp.* are all indicated as potent anti-virals. *Sambucus nigra* has shown excellent anti-viral activity in the laboratory disarming the antigens that enter cell membranes. *Echinacea spp.,*[7] *Spilanthes acmella,* and *Xanthoxylum* are all rich in isobutylamides, immune system stimulants. Other anti-virals of note include *Andrographis paniculata, Hyssopus officinalis*, and *Forsythia suspens*.

Herbs that are anti-inflammatory generally and can reduce cytokine storms specifically are also called for. Again, *Hypericum* is indicated here. *Andrographis paniculata, Skutellaria baicalensis, Salvia milthiorhiza, Zingiber spp., Curcuma longa, Baptisia australis,* have all shown to quell inflammatory citokines. *Salvia*, *Curcuma* and *Zingiber* all have warming energetics, which could be especially useful at the beginning of infection as the fever is building.

Diaphoretics are called for to help a fever resolve quickly. *Eupatorium perfoliatum* and *Monarda fistulosa* are both excellent in their ability to work out the aches and pains of the flu and to facilitate a deep sweat that pushes out heat and toxins through the pores of the skin. Todd Caldecott classifies two categories of diaphoretics, warming, for the onset of fever, and cooling for the fever's crest. *Zingiber* and *Matricaria recutita* are classic warming agents (*Matricaria* being especially gentle for children), while *Nepeta cattaria, Melissa officinalis* (also an anti-viral) and *Achillea millefolium* are helpful in bringing the fever down in its later stages. If a fever is particularly high and stubborn, it is time to consider anti-pyretics such as *Populus tremuloides or Hydrastis canadensis*.

Respiratory herbs are also central to the herbalist's approach to the flu. *Prunus serotina*, *Asclepius tuberosa*, *Lobelia inflata*, *Verbascum thapsus* and again, the terpene-rich *Lomatium dissectum* should be considered. *Prunus serotina,* as cold infusion has trace amounts of hydrogen cyanide which reduces spasm and opens the lungs. *Asclepius* is demulcent and expectorant, therefore it soothes and moistens the lung tissue while also facilitating the clearing of the lungs. It is also considered a specific for bloody sputum, and therefore may be considered for cytokine storms. This herb was one of the top herbs of choice for treating the 1918 pandemic by the Eclectic physicians. *Lobelia*, a low dose botanical, and another herb used widely by the Eclectics during the Spanish Flu, is indicated in dry coughs and is a powerful anti-spasmodic. *Verbascum* will help to maintain appropriate moisture in the lungs, maintain clear passageways, and move out excess mucous. Neither *Rosa spp.* or *Pinus* should be overlooked for their ability to gently clear congestion.

Analgesics are critical for treating the aches and pains associated with the flu. In addition to the anti-inflammatory herbs such as *Curcuma* above, *Eupatorium perfoliatum,* and *Actaea racemosa* should be considered.

Nervines such as *Melissa officinalis*, *Matricaria recutita*, *Rosa spp.*, *Hypericum perfolatum*, and *Avena sativa* may all be helpful combat the anxiety that comes with illness. Lymphatics to help the body clear out toxins, wasted viral material, etc. are also indicated especially as the recovery period begins. *Ocotillo*, *Echinacea spp. spp., Calendula officinalis, Arctium lappa, Ceanothus spp., Trifolium pratense, Xanthoxylum, Alnus and Verbascum thapsus* may all be considered here. Hepatics such as *Arctium lappa*, *Hypericum perfolatum*, *Achillea millefoium*, *Glycyrrhiza glabra, Matricaria recutita*, and *Sylibum marianum* will help the liver to process toxins and move them out of the body. When the illness is no longer infectious, adaptogens may be used to help the body restore itself to good health, good stress response, and appropriate energy levels. *Ganoderma lucidum* could be especially helpful here with its affinity for the lungs, but also *Panax quinquefolius* has an affinity for the flu, and is reputed to work especially well with *Andrographis* for this affliction.

The following is a sample protocol for a scenario where it is possible the Influenzavirus seems uncommon and of pandemic potential, or is definitely a pandemic strain. Doseage is for an otherwise healthy adult that is not pregnant, between 20 and 60 years of age.

If flu is detected or suspected early, a simple of large doses of *Eupatorium perfoliatum* -- 1/2 tsp every 3 hours -- may prevent it from developing entirely.

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[7] Eclectic physicians did use *Echinacea* effectively in 1918, but since there is concern with cytokine activity, until there is more research, it may be best to leave it off the list.

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Tincture:
For a 4oz bottle, or 120mls:
40ml *Lomatium dissectum*
40ml *Hypericum perfolatum*
25ml *Asclepius tuberosa*
15ml *Lobelia inflata*
10mls/ day during acute phase. 2-3 1/2 droppers approximately every 2 hours. Viruses can replicate quickly, so it is important to dose frequently in the early stages of illness.

Tincture 2:
An alternate remedy.
For a 4oz bottle, or 120mls:
60 ml *Eupatorium perfoliatum*
40ml *Asclepius tuberosa*
20ml *Actaea racemosa*
10mls/ day during acute phase. 2-3 1/2 droppers full approximately every 2 hours.

If tincture 1 is working, keep simple of *Actaea racemosa* available to assist with pain and nerve support. Dose as needed, starting small up to effectiveness. No more than 75 drops/day.

Tea, Infusion:
To aid in diaphoresis and pain:
2 parts *Eupatorium perfoliatum*
3 cups/ day or as needed.

Tea, Infusion:
A nervine tea (could be added to the boneset).
3 parts Melissa officinalis
1 part Rosa spp.
1 part Glycyrrhiza glabra.
Drink as needed

Syrup:
3 parts *Prunus serotina (*cold infusion of *Prunus,* add infusion to *Pinus* infusion and honey*)*
3 parts *Zingiber (*decocted fresh)
2 parts *Pinus spp.*

As the fever resolves, the *Eupatorium tea* may be switched out in favor of a decoction.
Tea, Decoction*:*
To aid in lymphatic and hepatic cleasing & general restorative activity:
2 parts Ganoderma lucidum
2 parts Zingiber
2 parts *Alnus*
2 parts *Arctium Lappa*
1 part *Glycyrrhiza glabra.*

Once infection has passed and fever has resolved, the tincture may be eased off of, but the syrup can be continued for the lungs as needed. A separate simple of *Aesclepius* may be recommended if the respiratory tract is especially clogged, 20-60 drops, TID. *Ulmus rubra* may be added or *Glycyrrhiza* may be increased if the lungs need more demulcency.

While the infection is in acute stages, we watch for any changes in or difficulty breathing, heaviness in the chest, dizziness, confusion, persistent vomiting, or a recurrence of symptoms with severe cough or fever after a period of recovery. In children, the above holds true, with extra attention paid to fast breathing, a blue pallor, dehydration, lack of interaction / not wanting to be held.

It cannot be emphasized enough that hydration is critical, as is a light plant rich diet with copious amounts of garlic and ginger when the fever is acute, soups, and bone broths when the fever has broken. Extra rest, hot baths, good hygeine, and realistic expectation for the length of the recovery period are also extremely beneficial for the flu patient.

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Beginning with the end: prevention

Nutrition, good hygeine, vitamins and minerals, and deep immune herbs can all help an individual keep the flu at bay. Washing hands or using sanitary wipes and sprays (one infused with *Usnea spp.* is excellent) of some kind, keeping rooms aired and windows open are advised. Vitamin D and Zinc are two supplements that have proven to improve health during cold and flu season.[8] Finally, deep immune herbs, especially *Astragalus membranaceus* and *Ganoderma lucidum,* in a strong decoction daily can help fortify the body's defense in times of exposure. These herbs must be discontinued if the infection takes hold.

Fears of a pandemic flu strain are more viral than any strain seen in almost 100 years, but the devastation of 1918 cannot be ignored. With greater air travel, environmental degradation and maltreatment of other animals it seems to many that a pandemic is overdue. But with our industrialized networks come new distributed and decentralized communication networks that can help us to inform each other of what is emerging in our communities, and what solutions are truly working. Stockpiles of anti-viral drugs and vaccine are undoubtably necessary, especially for at risk populations such as the elderly and the immuno compromised, but equally important is the informed herbalist, at least one for each community, who can treat common people with an array of traditionally used plant medicines. This herbalist is especially prized if they can share their observations and research rapidly with others, distinguish between honest research coming from medical doctors and research funded by drug companies, fight for affordable DIY testing, and know the limits of their practice.

[8] For more information, watch http://www.youtube.com/watch?v=BpQ4HMfi3gs&feature=player_embedded#!

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