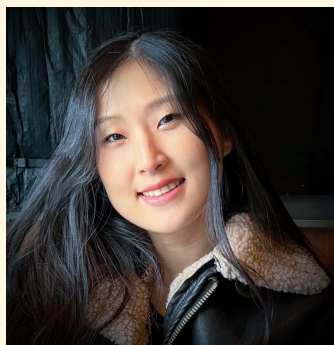


**Ailin Fu**  
DAc, LAc



Dr. Ailin Fu graduated from Bastyr University, receiving both her Masters in Acupuncture and Oriental Medicine and her Doctor of Acupuncture degrees. Ailin treats her patients using Chinese herbs and acupuncture. Raised in a household steeped in Chinese medicine, Ailin wishes to introduce the medicine to others and help them in the same way she experienced while growing up.

**Ying Wang**  
MD (China), LAc



## Chinese Herbal Treatment For Long COVID Brain Fog, A Case Report

By Ailin Fu DAc, LAc, and Ying Wang MD (China), LAc

### Abstract

Coronavirus disease 2019 (COVID-19) is a pandemic of recent emergence that has infected hundreds of millions of individuals worldwide. It is commonly associated with symptoms of shortness of breath, fatigue, cough, sore throat, fever, and chills. Most patients recover within a few weeks of catching COVID-19, but some struggle with long-term symptoms lasting months after the initial infection. One of the more common long-haul symptoms is brain fog. Brain fog does not refer to a specific symptom but rather to how the brain can be affected without structural neurological deficits. Symptoms include confusion, forgetfulness, lack of concentration, and inability to think or learn. The patient in this case report had brain fog that impeded her daily life and ability to work for several months. Her recovery is an example of how Chinese herbal medicine can successfully treat brain fog.

**Keywords:** herbs, COVID, fatigue, brain fog, Chinese medicine, case report

### Introduction

Coronavirus disease 2019 (COVID-19) is an illness caused by SARS-CoV-2. The majority of people who catch COVID-19 are able to make a full recovery within a few weeks. Common symptoms include cough, fever, chills, shortness of breath, sore throat, fatigue, and headache (CDC, 2020). Around 10-20% of all patients will have long COVID, defined as continuous or newly developed symptoms three months or longer after being infected with SARS-CoV-2 (WHO, 2022).

Dr. Wang was trained as a physician in China specializing in integrative medicine, where she practiced for a number of years. Now an associate professor, Dr. Wang has been a core faculty member at Bastyr University since 1996. Dr. Wang does academic and clinical teaching, primarily focusing on internal medicine. For over 40 years, she has also maintained a private clinical practice to help patients with a wide range of illnesses. Dr. Wang is dedicated to teaching the future generation of acupuncturists and herbalists to carry the work of healing forward.

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In a systematic review and meta-analysis of 81 studies, brain fog was the second most common long COVID symptom behind fatigue. Over a fifth of the individuals in the studies experienced brain fog (Ceban, 2021). Brain fog is not a medical term; it is an umbrella term for symptoms that diminish mental capacities, such as lack of clarity, confusion, forgetfulness, disorganization, and inability to focus.

Studies indicate that SARS-CoV-2 causes neuroinflammation; however, the mechanism is not completely clear. Potential mechanisms include SARS-CoV-2 affecting the central nervous system (CNS), cytokine imbalances, and microglial activation (Vanderheiden, 2022). There is still no clinically effective intervention for long COVID brain fog. Lifestyle suggestions like exercise, diet improvement, adequate rest, and activities encouraging the brain to think and memorize are commonly recommended (Duncan, 2021).

Traditional Chinese Medicine (TCM) is frequently used in China to treat acute, chronic, and critical conditions (Luo, 2019). In TCM, SARS-CoV-2 is considered to be a pathogenic factor. Brain fog is caused by dampness or phlegm, causing heaviness and obstruction in the brain. TCM diagnosis uses zang-fu organ systems that differ from biomedical anatomical organs. In TCM, Spleen qi is essential for transporting and transforming fluids in the body. Long-term illness can cause Spleen qi to weaken; a deficient Spleen allows fluids to accumulate and cause dampness, which is a key diagnostic point in brain fog. For treatment, any herbs selected should reflect the TCM diagnosis, strive to eliminate the residual infection from COVID-19, and tonify deficiencies such as Spleen qi to improve recovery.

## Patient Information

A 67-year-old White female presented with the primary complaint of brain fog. She tested positive for COVID-19 in July of 2022. The patient had symptoms of cough, sore throat, chills, and fever for five days. She reported feeling better once the five days had passed but slowly started to feel worse as the month progressed. During this progression, the patient took another test after two weeks with another positive result. By the end of July, she could not function as usual or complete typical tasks. Driving and navigating became difficult. She was unable to find words during conversations and experienced moments of confusion, an inability to concentrate, and fatigue accompanied by a heavy sensation in her head.

exist.

The patient's primary physician thought her symptoms resembled a concussion. There were no reported instances of possible head injury which could have led to concussion. A brain MRI was ordered to check for potential neurological deficits. After no substantial findings from the MRI scan were found, it was determined that the patient likely had long-lasting symptoms of brain fog from COVID-19. Lifestyle suggestions such as light walking, exercise, and diet were advised for the patient to help recover. Chinese herbal treatment was sought in mid-September 2022 after dealing with continuous brain fog, which had forced the patient to take a leave of absence from work.

## Diagnostic Assessment

The patient was not able to properly read and write. She also had trouble focusing and could not find the words she wanted to speak. The patient went to her primary doctor, who did not find substantial health concerns or neurological deficits. Only lifestyle suggestions to help the patient's brain fog were made.

TCM diagnosis and etiology are based on signs, symptoms, and past medical history. COVID-19 is considered to be an external pathogenic factor. Depending on the patient's patterns, TCM practitioners can determine what type of pathogenic factor it is. The patient's onset of symptoms when they caught COVID-19 were sensations of more chills than fever, as well as fatigue, indicating a damp, cold pathogen. The cold sensation and lack of heat signs like sore throat or fever reinforce the diagnosis of a cold pathogen. Damp is often a factor in fatigue when the body feels weighed down and tired. When any pathogen is not appropriately treated, it can linger in the body.

In Chinese medicine, yin is considered cold and yang heat. When there is more cold in the body, the yin and yang are out of balance. Over time, a cold pathogen overpowers yang or qi functions, and weakens them, for example the function of fluid transformation and transportation. Damp can create blockage in the body and obstruct the proper flow of qi and yang. Cold makes it easier for dampness to obstruct yang.

All substances and channels in the body flow in specific directions. Yang is warm, and its direction is to rise. Damp obstructs the healthy flow of yang upwards. The clear flow of yang cannot nourish the brain, and the heaviness of damp overpowers the mind. The brain is similar to the concept of shen or spirit in TCM. Specifically, the diagnosis for this patient was clear yang failing to rise, causing phlegm misting the mind.

The treatment strategy was first to expel the cold pathogen from the body. The patient could not expel the pathogen on her own, as she was too fatigued and deficient. Rather than only tonifying the patient's deficient qi, the cold pathogen had to be expelled, so that tonifying herbs did not end up strengthening the pathogen (Ma, 2019). Another focus is to move dampness in the body so it does not remain stagnated, particularly in the mind.

## Therapeutic Interventions

This patient was treated with herbs in granule form, that is, herbs previously decocted then dehydrated into a powder. Manually decocting raw herbs can be complicated and time-consuming. Granules were selected since they only need to be dissolved in hot water, and this patient's brain fog impaired her ability to do daily tasks.

The granules had base formulas that contained specific herbs in combination with individual herbs to expel the pathogens and strengthen deficiencies. The patient was advised to take the 5 g of the formula, once in the morning and once at night.

The formula brand used was E-Fong granules. The first formula included Bu Zhong Yi Qi Tang 40 g, Wen Dan Tang 25 g, Wu Wei Xiao Du Yin 18 g, ban lan gen 6 g, da qing ye 5 g, and chuan xin lian 6 g.

Bu Zhong Yi Qi Tang restores function through the synergy of individual herbs that tonify different aspects of Spleen qi. One of the Spleen's functions is transportation and transformation. This helps keep the fluid metabolism in check. If the Spleen is deficient, an individual is more prone to edema or thicker fluid phlegm. For a pattern of phlegm misting the mind, treating the Spleen helps improve fluid metabolism and dispel the phlegm from the head. It also helps raise sunken yang. Part of the diagnosis for this patient was clear yang failing to rise. Bu Zhong Yi Qi Tang was selected for its Spleen qi tonifying qualities and its ability to raise clear yang to the head.

Wen Dan Tang is generally used for Stomach and Gallbladder disharmony but excels at transforming and drying phlegm, which addresses the condition of phlegm misting the mind.

Wu Wei Xiao Du Yin is a formula to relieve toxicity, targeting the lingering COVID-19 pathogen affecting this patient long-term.

Da qing ye and ban lan gen are both antiviral and may treat epidemic diseases. Not only did this pair of herbs help to expel the pathogen, but they also addressed COVID-19 respiratory symptoms. Chuan xin lian clears toxicity, especially in the upper respiratory tract, and can resolve phlegm.

This formula was taken for 15 days, after which the patient started feeling better and could start doing regular daily tasks. The formula was switched to Bu Zhong Yi Qi Tang 35 g, Tong Qiao Huo Xue Tang 30 g, Yi Guan Jian 25 g, shi chang pu 8 g, yu jin 6 g.

Bu Zhong Yi Qi Tang was retained to continue supporting the Spleen. Yi Guan Jian was to tonify Liver and Kidney yin deficiency. Tong Qiao Huo Xue Tang is typically used to move blood stasis in the head but also open the orifices. This addition helped to move residual stagnation and excess clouding the mind and calm the shen by opening the orifices. When phlegm has been misting the mind for too long, it also impedes the orifices, disturbing the shen or mind. The patient's shen was compromised at the start of her herb treatment as she could not find words while speaking, was confused, and was unable to do daily tasks.

She took the second formula until the beginning of December.

## Follow-up and Outcomes

As described above, when the patient initially came for treatment, she could not do everyday tasks. The patient held a high position at her job and had to take time off work as doing online meetings was difficult because of trouble finding words and forming thoughts. Throughout herbal treatment, the patient frequently checked in to give updates on how she was feeling. The table below summarizes how her brain fog improved over time. The patient stopped taking the herbs once she felt her brain fog lift. The patient continued to come in for treatment to address a different complaint and had not experienced any brain fog for the four months between the end of treatment and the writing of this case report.

Days between check-ins	Formula	Patient's condition
Fall 2022	#1	The patient could not drive, could not find words while speaking, and could not read or write. Felt spacey most of the time. Took medical leave from work as she could not participate in meetings. Mostly just rested at home with occasional small walks.
6 days later	#1	Did not feel good for a few days after starting formula #1. Energy improved a bit but was still up and down. Tried to go to an event but found it overwhelming and mentally exhausting.
6 days later	#1	Felt more improvement in their energy. Able to walk more. Still experiencing brain fog.
2 days later	#2	Physical energy was good this week. Walked 6000 steps in one day. Brain still felt "gummy." Expressed concerns about granules maybe not working and needing to switch to raw herbs.
5 days later	#2	Started a new formula. Able to do more daily tasks, but actions were slowed. Brain fog was a bit better, and she could work for one day and cook something for her family.
7 days later	#2	Walked 9000 steps a day for two days. Sensitivity to bright lights. Went out to see a movie. Felt like she was living more normally.
7 days later	#2	Had ups and downs throughout the week. Able to focus on doing more. Energy good. "Feeling positive."
7 days later	#2	Not feeling as good this week. Got a COVID booster and felt more tired. Able to go back to work.
7 days later	None	Could work but had a heavy head sensation. Had a cold and did not take the formula. Energy better than the previous week.
14 days later	#2	Still had good and bad days, but even on a bad day, she could still work six hours despite her brain feeling cloudy. Able to talk without completely feeling drained.
21 days later	#2	Back to work with a full schedule. Mentally overloaded with the volume of work but did not have any brain fog.
7 days later	#2	Continuing to work full time. Able to deal with work stress. Still no brain fog.

**Table 1.** Summary of check-in, herbal formula, and how the patient was feeling

## Discussion

This report describes a case where Chinese herbs successfully treated long COVID brain fog. Chinese herbal medicine has a long history and has been used to treat many diseases and conditions. Herbal formulas typically treat more than just one problem; containing multiple herbs allows a multi-targeted approach that can simultaneously address constitutional deficiency/excess conditions as well as pathogens, thus restoring balance to the body. There are hundreds of commonly used Chinese herbs, and the number of ways they can be combined into formulas provides myriad possibilities.



When COVID-19 started in 2019, many hospitals in China only used Chinese herbs to treat post-COVID patients. One study used Qing Fei Pai Du Tang among 214 patients, and reported an effectiveness rate greater than 90%. Sixty percent of those people showed significant improvement (Zhao, 2020). A review gathered many different hospital formulas for COVID-19 (Yang, 2020). Whether it was granules, capsules, or injections, formulas differed between the studies. However, many of the formulas, whether pre-existing or newly made, included many individual overlapping herbs that would explain the similar success in treating COVID-19.

Research shows that COVID-19 can cause brain inflammation (Douaud, 2022). Although brain fog is a blanket term for several symptoms, such as lost focus and heavy sensations in the head, brain fog is also associated with brain inflammation.

Huang qi, one of the main herbs in the formula Bu Zhong Yi Qi Tang, is used in the patient's two prescribed formulas. A study by Xing used huang qi glycoproteins to treat encephalomyelitis in mice and found that huang qi could inhibit proinflammatory cytokines, inhibiting central nervous system inflammation infiltration (Xing, 2019). Another study used huang qi extract in diabetic mice. It was found that the extract not only helped the mice control food and water intake and lower blood glucose levels, but it also improved learning and memory, which suggests neuroprotective effects (Zhang, 2019). While these two studies treat mice with two different diseases, they both use huang qi as a means of treatment. Formononetin is an active compound in huang qi (Tay, 2019). Formononetin and other isoflavones in mice neuron-glia cultures could protect neurons against lipopolysaccharide-induced dopaminergic neurodegeneration while preventing the release of proinflammatory factors (Chen, 2008).

There is no standardized formula in Chinese medicine to treat brain fog. When choosing a formula, its individual herbs should be studied to understand how they work from a biomedical standpoint and what they do therapeutically. As stated, huang qi has neuroprotective and anti-inflammatory effects, and so could have played an important part in alleviating this patient's brain fog. These same effects may be found in other herbs. More study is needed to standardize a formula dedicated to treating brain fog.

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## Conclusion

There have been extensive reports on using Chinese herbal medicine to treat COVID-19, but discussion about the treatment of long COVID symptoms is still urgently needed. The patient on the report had been experiencing persistent, debilitating brain fog after COVID-19. This case report provides evidence of how efficacious the prescribed formula and modifications were in the patient regaining her health and daily life functions while also serving to relate an application of TCM and how it addressed long COVID symptoms. Brain fog may manifest differently from individual to individual, and it would require further study to determine if this treatment would be effective in other instances.

## Disclosure Statement

The author reported no conflicts of interest.

## Informed Consent

Written informed consent was obtained from the patient for publication of this case report, and a copy of the written consent is on file with the author.

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