

PERSPECTIVE AND INSIGHT

Traditional Chinese medicine provides new ideas for the treatment of coronavirus disease 2019

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INTRODUCTION

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) caused hundreds of millions of infections worldwide due to its high pathogenicity and strong infectivity. The typical symptoms of people infected with the coronavirus disease 2019 (COVID-19) are fever and cough. Patients with the SARS-CoV-2 may have dyspnea, and in some cases pneumonia may be detected. In addition to respiratory symptoms, the infected person may also have abnormal functions of the digestive system, nervous system and immune system, resulting in a series of complications that make the patient ill and even death.

Traditional Chinese medicine (TCM) has rich historical experience in the treatment of infectious viruses, and has been used to treat influenza A (H1N1) and SARS viruses. For COVID-19, Chinese experts have explored some TCM formulas that have potential therapeutic effects in clinical trials. Especially, the treatment scheme of “three drugs and three parties” is widely recognized, that is, three Chinese patent medicines, Jinhua Qinggan Granules, Lianhua Qingwen capsule, and Xuebijing Injection. There are three prescriptions: Qingfei Paidu Decoction, Huashi Baidu Recipe and Xuanfei Baidu Recipe. Among them, Lianhua Qingwen capsule is the most common drug.

ANTIVIRAL EFFECT OF LIANHUA QINGWEN CAPSULE

Lianhua Qingwen capsule as a traditional Chinese

medicine was widely used for COVID-19 treatment. The main components of Lianhua Qingwen capsule are forsythia, *Lonicera japonica*, *Glycyrrhiza uralensis*, plaster and so on. According to ancient Chinese medicine books, *Forsythia* and *Lonicera japonica* have the effects of clearing, detoxification, and antiviral. Components such as *Lonicera japonica* and liquorice have a relieving effect on cough and sore throat. Some studies have shown that these active ingredients reduces the expression of pro-inflammatory cytokine (TNF- α , IL-6) and chemokines (IFN- β , MCP-1, Cxcl1) and then inhibits virus spread and accelerates the recovery of immune function to achieve antiviral effect.^[1]

In addition, the clinical trial results showed that the clinical symptoms of the patients were relieved and the recovery time was shortened after a period of treatment with Lianhua Qingwen capsule.^[2]

THE ROLE OF KEY INGREDIENTS IN TRADITIONAL CHINESE MEDICINE ON COVID-19

Many pharmaceutical components in traditional Chinese medicine play an important role in the process of virus infection. Studies have shown that some TCM ingredients, such as lentil D of *Hadrosaur macrocephalus*, can interfere with the entry of viruses into host cells by blocking membrane fusion.^[3] After entering the host cell, the virus begins to replicate in large quantities, and this process requires the action of key enzymes such as 3C-like protease (3CL^{pro}) and papain (PL^{pro}), which are essential for the transcription and replication of the virus. The active substance tanshinone extracted from *Salvia miltiorrhiza* has proved to be a selective inhibitor of these two vital enzymes.^[3] The active ingredients of Chinese medicinal materials can also regulate immune cells T cells to enhance the immunity of the body and improve the resistance and recovery ability of host cells in the face of the novel coronavirus infection.^[4] At the same time, the cytokine storm (CSS) that can occur when the body's immunity is weakened by viral infection is proportional to the

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severity of the disease in the late stages of COVID-19, and can even lead to death.

TCM IS BEING CONSIDERED TO TREAT COVID-19

Up to now, several drugs (such as Molnupiravir, Paxlovid and monoclonal antibody et al.) are approved by the FDA for the treatment of COVID-19 infection. Prevention and supportive treatment are still the main means of treating the COVID-19.

Among the traditional Chinese medicine formulations for COVID-19, Jinhua Qinggan Granule and Lianhua Qingwen capsule are recommended during medical observation, and Xuanfededu Granule is recommended for patients with moderate symptoms.^[5] Lung Cleansing and Detoxifying treatment were effective in severe and non-severe patients.^[5] Huashibaidu and Xuebijing injection are also used for severe cases.^[5]

Furthermore, some pharmaceutical companies are committed to using artificial intelligence analysis methods to help TCM combination analysis, hoping to screen out better drug targets and effective Chinese herbal medicinal ingredients for the treatment of COVID-19. The application of nanotechnology to embed mRNA or DNA vaccine into nanoparticles for delivery, while supplemented with Chinese medicine adjuvant to help the body initiate the immune response, which also provides a new idea for the development and design of COVID-19 vaccine.^[6]

To date, there are multiple variants of COVID-19 around the world, which still pose a threat to human life and health. The World Health Organization (WHO) recently declared that while the coronavirus pandemic may be nearing a turning point, it still constitutes a public health emergency of international concern. Therefore, it is still of great significance to explore effective treatments for the novel coronavirus.

TCM has been used in China for a long time, with complete theoretical foundation and practical experience. However, the effectiveness and safety of TCM in modern medicine still need to be reviewed with more modern clinical data. Studies have shown that no adverse reactions occurred when Lianhua Qingwen capsule was used in mice with the adoptive concentrations which were higher normal concentration in humans.^[1] Moreover, it was reported that the incidence of adverse reactions of Xuebijing injection was 0.3%, and the main adverse reactions were allergy and skin pruritus, but no

serious adverse reactions were reported.^[7]

In the early days of the outbreak in China, TCM medical personnel made important contributions to epidemic control. The further development of traditional Chinese medicine and its therapeutic effect on the novel coronavirus is of great significance to the development of TCM in the new era and the treatment of novel coronavirus.

Author Contributions

Jie Guan: Conceptualization, Writing—Original draft preparation, Writing—Reviewing and Editing. Yuxuan Hu: Conceptualization, Supervision. Wenying Yu: Supervision, Project administration.

Ethics Approval

Not applicable.

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Conflict of Interest

The authors declare no competing interest.

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