MedCrave
Step into the World of Research
International Journal of Complementary & Alternative Medicine

Editorial

A cup of antiviral tea for prevention of SARS-CoV-2 infection

Volume 14 Issue 4 - 2021

Chung-Jen Chen[1,2,3]
[1]Departmet of Internal Medicine, Kaohsiung Municipal Ta-Tung Hospital, Taiwan
[2]Kaohsiung Medical University Hospital, Taiwan
[3]Kaohsiung Medical University, Taiwan

Correspondence: Chung-Jen Chen, Department of Internal Medicine, Kaohsiung Municipal Ta-Tung Hospital, Kaohsiung, Taiwan, Tel +886 7 3121101, Email cjchen@kmu.edu.tw

Received: July 01, 2021 | **Published:** July 05, 2021

Editorial

COVID-19 has caused a big threaten for global health. Till June 29, the cumulative number of cases reported globally was 180million and the number of global deaths is almost 4million.[1] As known, it is caused by SARS-CoV-2, a positive-sense single stranded RNA virus, which infecting the epithelial cells of respiratory system, resulting alveolar damage, pneumonia, ARDS or death in severe cases.[2] It is believed that a safe and effective vaccine strategy and a global vaccination programme is necessary to help global people returning a normal life.[3] However, the availability, strength, and safety of COVID-19 vaccine are concerned. Different countries could have different difficulty or concern. Hence, can we have different option than vaccine to prevent COVID-19? Safety is the first priority. Therefore, can we find something beneficial from our daily life materials?

RNA-dependent RNA polymerase (RdRp) is an important enzyme for coronavirus to catalyze the replication of RNA from RNA templates. Lung et al.[4] at Taiwan firstly found that theaflavin being able to dock in the catalytic pocket near the active site of RdRp in SARS-CoV-2, SARS-CoV, and MERS-CoV. Furthermore, by the two different molecular docking methods, they revealed that theaflavin having the lowest idock score and lower binding energy in the catalytic pocket of SARS-CoV-2 RdRp.[4] The above suggests that theaflavin could be a potential inhibitor of SARS-CoV-2 RdRp. In addition, previous studies have shown that theaflavin and theaflavin gallate derivatives having antiviral activity against influenza A and B viruses[5] and hepatitis C virus.[6] As known, theaflavin is a polyphenolic compound in black tea. Hence, a proper intake of black tea could be considered for the prevention of COVID-19.

The 3C-like protease (3CL-protease) is the main protease found in coronaviruses. The 3CL-protease is a potential drug target for SARS-CoV-2 infections owing to its essential role to process the polyproteins that are translated from the viral RNA. Jang et al.[7] at Korea did in vitro studies and found that EGCG and theaflavin exhibiting inhibitory activity against the SARS-CoV-2 3CL-protease in a dose-dependent manner. More importantly, they revealed that the half inhibitory concentration (IC50) was 7.58μg/ml for EGCG and 8.44μg/ml for theaflavin.[7]

In Germany, Henss et al.[8] conducted a further study of EGCG.[8] At first, EGCG exhibited a dose-dependent inhibition of SARS-CoV-2-pseudotyped vectors after 24 and 48h incubation. To validate the potential effect of EGCG, they furthermore tested the influence of EGCG on the infection of Vero cells with coronaviruses. They revealed that "the IC50 of the inhibitory effect observed with SARS-CoV-2 was 1.72μg/ml (corresponds to 3.14μmol)", which was close to the common range previously described for the antiviral effects of EGCG.[9] More importantly, they found that "only when EGCG was added 1 h before the infection an inhibitory effect could be observed". The above indicates that EGCG mainly interferes with early steps in SARS-CoV-2 infection.[8] Hence, we propose that green tea, which containing abundant EGCG, could also be applied as a preventive rather than a therapeutic material.

Recently, Jan et al.[10] conducted a large-scale survey. At first they used a cell-based infection assay to screen more than 3,000 agents used in humans and animals. Then, two enzymatic assays, along with molecular modeling, were developed by this team to confirm those materials targeting the virus 3CL-protease and the RNA-dependent RNA polymerase. Finally, they evaluate the in vivo anti-infective efficacy of potential drugs and herbs in female golden Syrian hamsters. They uncovered that extract of Mentha haplocalyx (*M. haplocalyx*) exhibiting a very intense effect to reduce viral load than that of control and extracts of Perilla frutescens (*P. frutescens*) also showed good antiviral effects.[10]

Collectively, the above four natural products, black tea, green tea, *P. frutescens* and *M. haplocalyx* have been used in our daily life for a long history. Some people used to drink a cup of green tea, some prefer black tea. In the timing of COVID-19 crisis, a mixture of half green and half black could be reasonable. In theory, EGCG in green tea plus theaflavin in black tea seems to be a good couple owing to their differential action.[11] According to my personal experience, the mixture of green and black tea taste wonderfully!

P. frutescens is an aromatic herbs and functional food. In East Asian countries, it has been regarded as a valuable source of culinary and traditional medicinal uses. The leaves of *P. frutescens* are popularly used for various therapeutic applications in traditional medicine. In recent research, *P. frutescens* was concluded to have various biological activities, including antioxidant, antimicrobial, anti-allergic, antidepressant, anti-inflammatory, anticancer, and neuroprotection effects.[12] impressively, its effect against SARS-CoV-2 was firstly found in 2021 by the team from Academia Sinica at Taiwan.[10]

M. haplocalyx is widely distributed in east-southern Asia and popularly used in food, cosmetics and herbal medicines. Recently, the extracts of its aerial parts are found to significantly inhibit the activity of α-glucosidase.[13] Surprisingly, its intense effect against SARS-CoV-2 was recently found together with *P. frutescens* in 2021.[10]

Both *P. frutescens* and *M. haplocalyx* are aromatic and culinary. Hence, to put both into the mixture of green tea and black tea to

enhance the antiviral activity against SARS-CoV-2 as a preventive tea is logic and tasty with nice smelling. To give a nomenclature for this novel tea composed of the above four natural products, I would like call it as "Antiviral Four-Gentlemen Tea" owing to their gentle and safety with potential against SARS-CoV-2.

Besides Vaccine, we need something creative and highly safe during the pandemics of COVID-19. Tea, esp. the new developed "Antiviral Four-Gentlemen Tea" could bring us an alternative option for those people unavailable or intolerant of vaccination. In the future, this new proposed novel tea could be worth of a clinical trial to prove its effectiveness.

Acknowledgments

None.

Conflicts of interest

Author declares there are no conflicts of interest.

Funding

None.

References

1. World health Organization (WHO) Weekly epidemiological update on COVID–19. Geneva, Switzerland: World health Organization; 2021.
2. Hu B, Guo H, Zhou P, et al. Characteristics of SARS–CoV–2 and COVID–19. *Nat Rev Microbiol.* 2021;19(3):141–154.
3. Jeyanathan M, Afkhami S, Smaill F, et al. Immunological considerations for COVID–19 vaccine strategies. *Nat Rev Immunol*. 2020;20(10):615–632.
4. Lung J, Lin YS, Yang YH, et al.The potential chemical structure of anti–SARS–CoV–2 RNA–dependent RNA polymerase. *J Med Virol*. 2020;92(6):693–697.
5. Yang ZF, Bai LP, Huang WB, et al. Comparison of in vitro antiviral activity of tea polyphenols against influenza A and B viruses and structure–activity relationship analysis. *Fitoterapia*. 2014;93:47–53.
6. Chowdhury P, Sahuc ME, Rouillé Y, et al. Theaflavins, polyphenols of black tea, inhibit entry of hepatitis C virus in cell culture. *PLoS One*. 2018;13(11):e0198226.
7. Jang M, Park YI, Cha YE, et al. Tea Polyphenols EGCG and Theaflavin Inhibit the Activity of SARS–CoV–2 3CL–Protease *In Vitro*. *Evid Based Complement Alternat Med*. 2020;2020:5630838.
8. Henss L, Auste A, Schürmann C, et al. The green tea catechin epigallocatechin gallate inhibits SARS–CoV–2 infection. *J Gen Virol*. 2021;102(4).
9. Steinmann J, Buer J, Pietschmann T, Steinmann E. Anti–infective properties of epigallocatechin–3–gallate (EGCG), a component of green tea. *Br J Pharmacol*. 2013;168(5):1059–1073.
10. Jan JT, Cheng TR, Juang YP, et al. Identification of existing pharmaceuticals and herbal medicines as inhibitors of SARS–CoV–2 infection. *Proc Natl Acad Sci U S A*. 2021 Feb 2;118(5):e2021579118.
11. Mhatre S, Srivastava T, Naik S, et al. Antiviral activity of green tea and black tea polyphenols in prophylaxis and treatment of COVID–19: A review. *Phytomedicine*. 2021;85:153286.
12. Ahmed HM. Ethnomedicinal, Phytochemical and Pharmacological Investigations of *Perilla frutescens* (L.) Britt. *Molecules*. 2018;24(1):102.
13. He XF, Geng CA, Huang XY, et al. Chemical Constituents from Mentha haplocalyx Briq. (Mentha canadensis L.) and Their α–Glucosidase Inhibitory Activities. *Nat Prod Bioprospect*. 2019;9(3):223–229.