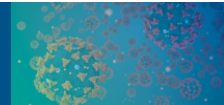


The Functional Medicine Approach to COVID-19: Additional Research on Nutraceuticals and Botanicals

In this paper, we add to the list of nutraceuticals and botanicals introduced earlier in our first article, *The Functional Medicine Approach to COVID-19: Virus-Specific Nutraceutical and Botanical Agents*. Periodically, we will update the original list to highlight other agents that may be considered as complementary treatments against COVID-19. Along with the original list, these agents can be considered as immunoadjuvants, which are substances that act to accelerate, prolong, or enhance antigen-specific immune responses by potentiating or modulating the immune response. Additionally, some agents could potentially inhibit SARS-CoV-2 replication. Our recommendation is to use higher dosing and/or multiple agents when patient contextual factors (e.g., patient desire, pre-existing inflammation, multiple co-morbidities, higher risk, etc.) and/or therapeutic decision-making warrant such use.

Download COVID-19: Nutraceutical and Botanical Recommendations Patient Education tools 



As part of the Functional Medicine approach to COVID-19, IFM has outlined the biological plausibility, mechanism of action, strength of evidence, and risk of harm for various nutraceutical and botanical agents that may have activity against SARS-CoV-2. This article is part two of a series. Click [here](#) to view part one.

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Beta Glucans	N-Acetylcysteine (NAC)
Chinese Skullcap (Scutellaria baicalensis)	Palmitoylethanolamide (PEA)
Curcumin	Quercetin
Elderberry	Resveratrol
Epigallocatechin Gallate (EGCG)	Vitamin A
Licorice (Glycyrrhiza species)	Vitamin C
Melatonin	Vitamin D
Mushrooms	Zinc

BETA GLUCANS

Beta glucans are known to modulate immune activity, mostly by priming or training innate immune responses through interactions with pattern recognition receptors (PRRs)^{1,2} and by increasing anti-inflammatory cytokines such as IL-10.^{3,4,5,6,7} Beta glucans induce activity against

viral attack.^{8,9} Numerous human trials have shown that beta glucans decrease cold and flu symptoms^{10,11,12} and upper respiratory tract infections compared to placebo.^{13,14,15,16,17,18,19}

Intervention	Beta glucans
Suggested dose	250-500 mg daily
Mechanism(s) of action against non-COVID-19 viruses	Priming innate immune function ²⁰ Promoting viral eradication or inactivation ^{8,9}
Outcomes data supporting their mitigating effects on illness from other viral strains	Reduction of symptoms ^{10,11,12,13,14,15,16,17,18,19}
Strength of evidence	Strong
Risk of harm	Mild

MUSHROOMS

Various mushrooms species have been shown to possess broad immunomodulatory effects. They possess multiple mechanisms of action, including increasing the number of circulating B cells,²¹ increasing gut immunity,²² stimulating host immunity,²³ activating innate immune cells,²⁴ and increasing cytotoxic activity of NK cells.²⁵

Intervention	Various medicinal mushrooms, including Shiitake (<i>Lentinula edodes</i>), Lion’s Mane (<i>Hericium erinaceus</i>), Maitake (<i>Grifola frondosa</i>), Reishi (<i>Ganoderma lucidum</i>)
Suggested dose	Varied. Given the variety of active ingredients in mushrooms and the variability of the extraction processes, it is suggested that dosing instructions should be individualized based on research of specific mushroom genus and species.
Mechanism(s) of action against non-COVID-19 viruses	Promoting viral eradication or inactivation ^{26,27} Modulation of innate immune response ^{28,29}
Outcomes data supporting their mitigating effects on illness from other viral strains	Inconclusive, due to variety of species and combinations. Consult knowledgeable healthcare provider.
Strength of evidence	Limited
Risk of harm	Inconclusive, due to variety of species and combinations.

CHINESE SKULLCAP (*SCUTELLARIA BAICALENSIS*)

Chinese skullcap (*Scutellaria baicalensis*) has been used for centuries in Traditional Chinese Medicine (TCM). In various human trials, participants who took TCM formulations containing

Chinese skullcap showed statistically significant decreases in viral infection rates compared to controls.³⁰ Chinese skullcap has anti-inflammatory, antioxidant, antibacterial, and antiviral effects.^{31,32,33} It has been shown to increase immune surveillance and downregulate NLRP3 inflammasomes,³⁴ IL-6, and TNF-alpha.³⁵

Intervention	Chinese skullcap (<i>Scutellaria baicalensis</i>)
Suggested dose	750–1,500 mg daily standardized to flavonoids, baicalin, or baicalein. Given the variability of standardization, it is suggested that dosing instructions should be based on research of specific standardized extracts.
Mechanism(s) of action against non-COVID-19 viruses	Priming innate immune function ^{36,41,42} Promoting viral eradication or inactivation ³⁶⁻⁴¹ Favorably modulating pulmonary inflammation ^{38,41,43,44,45,46,47,48}
Outcomes data supporting their mitigating effects on illness from other viral strains	Reduction of symptoms ⁴⁹
Strength of evidence	Limited
Risk of harm	Mild, though combination product showed significant hepatotoxicity. ^{50,51,52,53,54}

LICORICE (*GLYCYRRHIZA SPECIES*)

Licorice (*Glycyrrhiza* species) has multiple mechanisms of action, including inhibition of viral replication^{55,56,57} blocking the ACE2 receptor,⁵⁸ promoting the activity of Th1 cells,⁵⁹ and inhibition of pro-inflammatory cytokines,⁶⁰ prostaglandins, and nitric oxide production.⁶¹ The inhibition of hydrocortisone metabolism by 11 beta-HSD has also been suggested as a potential mechanism of licorice’s anti-inflammatory action.⁶² Licorice has been use in traditional Chinese medicine (TCM) formulations against SARS-CoV-1 and H1N1 and reviewed for its effects on SARS-CoV-2.^{63,64} Two positive human trials have been performed against SARS-CoV-1 using a TCM formulation containing licorice.^{65,66}

Intervention	Licorice (<i>Glycyrrhiza glabra</i>)
Suggested dose	Licorice root standardized to glycyrrhizin. 200-400 mg daily in divided doses. Short term use: <4 weeks.
Mechanism(s) of action against non-COVID-19 viruses	Promoting viral eradication or inactivation ^{55,56,57,63,64,67,68} Favorably modulating inflammation
Outcomes data supporting their mitigating effects on illness from other viral strains	Reduction of symptoms ^{69,70}
Strength of evidence	Moderate

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