

Letter: role of probiotics in the COVID-19 pandemic

Editors,

We have read with great interest the review article by Dr. Tian et al¹. Being one of the earliest publications reviewing the impact of COVID-19 on the GI system, it has paved the way for further studies. We are particularly interested in the possible use of probiotics among patients with COVID-associated diarrhoea. While there is still no recommendation regarding probiotics in the treatment of COVID-19 until now, we wish to highlight the available evidence regarding its potential benefits during the pandemic.

Probiotics are living microorganisms that when administered in sufficient amounts confer a health benefit on the host.² They can reinforce the colonic microbiota by increasing the concentration of beneficial microbes, thereby improving gastrointestinal barrier function, modification of gut microbiota, competition for epithelial adherence and immunomodulation.³ Several of their known benefits are reported in digestive diseases such as inflammatory bowel diseases, irritable bowel syndrome, traveler's diarrhoea and *Clostridium difficile* infection.⁴ However, studies have also proposed a gut-lung crosstalk in the pathogenesis of certain respiratory conditions and immune responses of the lungs.^{5,6} There is evidence that probiotics can shorten duration of respiratory infections and decrease susceptibility to pathogens. A meta-analysis of 12 RCTs with 3720 subjects has shown that subjects taking probiotics have twofold lower odds of developing upper respiratory tract infections (OR 0.53, 95% CI 0.37-0.76, $P < 0.001$).⁷ Another meta-analysis of 13 RCTs with 1975 patients has shown that administration of probiotics significantly reduced the incidence of ventilator-associated pneumonia (OR 0.62, 95% CI 0.45-0.85; $P = 0.003$).⁸ Both meta-analyses studied *Lactobacillus* and *Bifidobacterium* species.

In the context of COVID-19, the use of probiotics might therefore plausibly help in the prevention of pulmonary infections. It is also important to consider that antibiotics and antivirals are often administered in patients with COVID-19, which could result in alteration of the gut microbiota.⁹ Thus, a recent study in Hong Kong noted significant changes in the faecal microbiomes among 15 COVID-19 patients.¹⁰ Whether the intestinal microbial dysbiosis is specific to SARS-CoV-2 infection or is exacerbated

by antibiotic use is not known. Nevertheless, this study showed that baseline abundance of *Bacteroidetes* species had an inverse correlation with COVID-19 severity and faecal viral load of SARS-CoV-2. They also discovered that *Actinomyces viscosus*, an opportunistic pathogen of the upper respiratory tract, is present in the gut of COVID-19 patients. This further supports the potential benefit of probiotics following the gut-lung connection hypothesis.

The future of probiotics in COVID-19 is still unclear and there is still much to be learned. In particular, there is a need to identify specific strains which are beneficial as each strain may have a specific effect. Nevertheless, the investigation of probiotic therapies during the pandemic could be reasonable. Interestingly, they are already being used in patients with severe COVID-19 disease in China.⁹ If others should follow—that, we still have to discover.

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LINKED CONTENT

This article is linked to Tian et al and Tian and Rong papers. To view these articles, visit <https://doi.org/10.1111/apt.15731> and <https://doi.org/10.1111/apt.15931>

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