

## Renin Angiotensin Converting Enzyme 2 and COVID-19: Prevention and Treatment

Dear Editor,

The 2019 novel corona virus (SARS-CoV-2) has already taken on pandemic proportions, having infected more than seven million people in 213 countries. The increased prevalence of the disease as well as involvement of the angiotensin-converting enzyme 2 (ACE2) have suggested to consider its role in corona virus infection diseases-2019 (COVID-19).

ACE2 is a type-I membrane-bound glycoprotein that cleavages angiotensin I (Ang I) into Ang 1-9 and Ang II into the Ang1-7. Organs such as the heart, liver, kidney, and especially the lungs play a greater role in COVID-19 mortality while a higher expression of ACE2 was detected in these organs. SARS-CoV-2 utilizes ACE2 as an entry receptor in ACE2-expressing cells, and actually inhibit the physiological activity of ACE2.<sup>[1]</sup> The ACE inhibitors and AngII type-I receptor blockers (ARBs) are the simple choice to increase ACE2 expression, and the binding of soluble ACE2 with SARS-CoV-2 spike may reduce the viral load,<sup>[2]</sup> and cellular blocking of ACE2 act as pro-inflammatory.<sup>[3]</sup> Diseases such as asthma, pneumonia, and influenza are dependent on ACE2 activity,<sup>[4]</sup> and ACE2 activators may prevent the lung against fibrosis.<sup>[5]</sup> The expression of ACE2 may promote by some vitamins such as vitamins C, D, and B3.<sup>[3]</sup> In addition, ARBs, metformin and the drugs containing diminazene aceturate also are suggested to be used as ACE2 activators.<sup>[3,4]</sup> Collectively, the relationship between ACE2 and SARS-CoV-2 in the treatment of COVID-19 patients cannot be ignored.

However, the SARS-CoV-2 has spread in our lives and it has no time to go away. Special attention of course, should be paid to the treatment of COVID-19 patients, but prevention by diets and protection should not be forgotten. ACE2 is a good and a logical target, and proper nutrition to maintain the physiological level of ACE2 expression is needed. Proper use of compounds such vitamin C and prevention of vitamin E deficiency that increase ACE2 expression may be important for prevention of COVID-19. In addition, we must keep in mind that the activity of the enzyme depends on sex and age.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

**Marzieh Kafami, Mehdi Nematbakhsh<sup>1</sup>**

*Department of Physiology, Sazevar University of Medical Sciences, Sabzevar, Iran, <sup>1</sup>Water and Electrolytes Research Center, Isfahan University of Medical Sciences, Isfahan*

**Address for correspondence:**

*Dr. Mehdi Nematbakhsh,  
Water and Electrolytes Research Center, Isfahan University of Medical Sciences, Isfahan, Iran.  
E-mail: nematbakhsh@med.mui.ac.ir*

**Received:** 27 Sep 20 **Accepted:** 04 Feb 21

**Published:** 25 Jun 21

### References

1. Lu R, Zhao X, Li J, Niu P, Yang B, Wu H, *et al.* Genomic characterisation and epidemiology of 2019 novel coronavirus: Implications for virus origins and receptor binding. *Lancet* 2020;395:565-74.
2. Monteil V, Kwon H, Prado P, Hagelkrüys A, Wimmer RA, Stahl M, *et al.* Inhibition of SARS-CoV-2 infections in engineered human tissues using clinical-grade soluble human ACE2. *Cell* 2020;181:905-13.e7.
3. McLachlan CS. The angiotensin-converting enzyme 2 (ACE2) receptor in the prevention and treatment of COVID-19 are distinctly different paradigms. *Clin Hypertens* 2020;26:14.
4. Rodríguez-Puertas R. ACE2 activators for the treatment of COVID 19 patients. *J Med Virol* 2020;92:1701-2.
5. Prata LO, Rodrigues CR, Martins JM, Vasconcelos PC, Oliveira FM, Ferreira AJ, *et al.* Original Research: ACE2 activator associated with physical exercise potentiates the reduction of pulmonary fibrosis. *Exp Biol Med* (Maywood) 2017;242:8-21.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Access this article online	
<b>Quick Response Code:</b> 	<b>Website:</b> <a href="http://www.ijpvmjournal.net/www.ijpm.ir">www.ijpvmjournal.net/www.ijpm.ir</a>
	<b>DOI:</b> 10.4103/ijpvm.IJPVM_585_20

**How to cite this article:** Kafami M, Nematbakhsh M. Renin angiotensin converting enzyme 2 and COVID-19: Prevention and treatment. *Int J Prev Med* 2021;12:70.

© 2021 International Journal of Preventive Medicine | Published by Wolters Kluwer - Medknow