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ACE2 is not only a receptor, but also can be a therapeutic target for COVID-19

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The outbreak of the novel coronavirus continues to challenge public health all over the world. This virus has a 3-dimensional organization of spike protein which is closely attached to the human cell receptor, angiotensin-converting enzyme 2 (ACE2). The ACE2 is a principal counter-regulatory enzyme for the key axis of the renin-angiotensin system (RAS) potently degrading angiotensin II to angiotensin 1–7, and playing a key role in vasoconstriction, sodium retention, and fibrosis (1). ACE2 is positioned on the type II pneumocytes cells, renal tubular cells, and gastrointestinal cells (2). When the SARS-CoV-2 virus binds to ACE2, it inhibits ACE2 to control ANG II signaling, and then, ACE2 action is "inhibited," making more ANG II accessible to the damaged tissues. Therefore, although ACE2 could facilitate the viral entrance, the decreased available ACE2 leads to more ANG II-mediated damage (3). The ACE2 gene expression is influenced by different factors, including sex (*ACE2* gene is X-linked), polymorphisms in the *ACE2* gene, drug therapy, and comorbidities (increased in the presence of diabetes, cardiovascular disease, and hypertension) (4). To date, no definite therapy is available for COVID-19. At low concentration, soluble ACE2 is normally present in plasma. In cell culture and animal models, adding enzyme copy of hrsACE2 (human recombinant soluble ACE2), which is called APN01, could deceive the virus to bind itself to the copy, instead of the actual cells so that the virus cannot be able to enter the cells. On the other hand, hrsACE2 reduces the harmful inflammatory reactions in the lungs and other organs and protects them from any damage. Not only could the recombinant ACE2 protein be a treatment to block the spreading of SARS-CoV-2, but also by the modulation of the RAS it could have a protective effect. Nevertheless, this drug needs to be tested in vivo (5).

In summary, renal or any organ involvement in COVID-19 is multifactorial and very dependent on the interaction between surface virus glycoprotein and host cell proteases. Therefore, hrsACE2 is a new hope against COVID-19 infection.

Implication for health policy/practice/research/medical education

Renal or any organ involvement in COVID-19 is multifactorial and depends on the interaction between surface virus glycoprotein, host cell ACE2, and proteases. Human recombinant soluble ACE2 (hrsACE2) is a new hope against COVID-19 infection.

Author's contribution

FF is the single author of the manuscript.

Conflicts of interest

The author declared no competing interests.

Ethical consideration

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