Editorial

Salivary Coronavirus Infection Therapy With Potential Soluble Angiotensin-Converting Enzyme 2

Volume 9 Issue 1 - 2021

Attapon Cheepsattayakorn,[1,2] Ruangrong Cheepsattayakorn,[3] Porntep Siriwanarangsun[1]

[1]Faculty of Medicine, Western University, Pathumtani Province, Thailand
[2]10th Zonal Tuberculosis and Chest Disease Center, Chiang Mai, Thailand
[3]Department of Pathology, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand

Correspondence: Attapon Cheepsattayakorn, 10th Zonal Tuberculosis and Chest Disease Center, 143 Sridornchai Road Changklan Muang Chiang Mai 50100 Thailand, Tel 66 53 140767, 66 53 276364, Fax 66 53 140773, 66 53 273590, Email Attapon1958@gmail.com

Received: December 16, 2021 | **Published:** December 31, 2021

Editorial

Angiotensin-convertingenzyme2(ACE2),amonocarboxypeptidase for cleaving several peptides within the renin-angiotensin system and other substrates that widely expressed in the gastrointestinal tract and the kidneys, with relatively low expression in the lungs (Figure 1).[1] Interestingly, higher RNA expression of ACE 2 in lung AT2 cells was found in Asian donors, compared to African and white American donors.[2] Soluble ACE 2 that lacks the membrane anchor circulates in small volumes in the blood.[3] ACE 2 and TMPRSS 2 protein expression are identified mainly in the cytoplasm and cytomembrane of the epithelial cells in the serous acinus cells in submandibular and parotid salivary glands and *in vitro*, exogenous ACE 2 and TMPRSS 2 can anchor and fuse to human oral mucosa and the spike protein of SARS-CoV-2 can bind to ACE 2 receptors in the salivary glands.[4] A recent study demonstrated that during the hospitalization period, 25 % of COVID-19 patients reported of taste impairment, 20 % of patients reported of difficulty in swallowing, and 15 % of patients reported of burning sensation.[5] A recent study proposed that chewing gum with SARS-CoV-2-trapping proteins can debulking virus in saliva and minimizing viral transmission (Figure 2).[6]

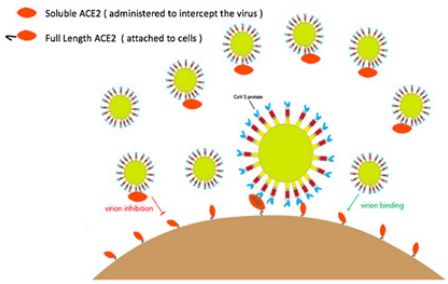

Figure 1 Demonstrating schematic of coronavirus (CoV) spike protein (S) binding to the surface receptor that is full-length ACE 2 (Soluble ACE 2 administration may prevent binding of the SARS-CoV-2 viral particle to the surface-bound, full-length ACE 2 by acting as a competitive interceptor of SDARS-CoV-2 and other coronaviruses).[7]

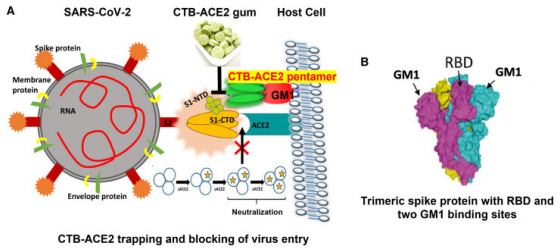

Figure 2 Demonstrating debulking and blocking of viral entry Using ACE 2 chewing gum.[6]

(A) CTB (Cholera Toxin B)-ACE 2 binds to both ACE 2 and GM 1 (monosialotetrahexosylganglioside, prototype of ganglioside) co-receptors

(B) Each SARS-CoV-2 trimeric spike protein has a single RBD (Receptor-Binding Domain) domain and two GM 1 binding sites. CTB-ACE 2 pentamers form microparticles, insoluble and sediment SARS-CoV-2 upon binding to soluble ACE 2, in monomer, dimer, or trimer forms. CTB-ACE 2 also directly binds to ACE 2 and GM 1 receptors, then blocking entry into human or Vero cells.

In conclusion, soluble recombinant human ACE 2 protein could be a novel potential biotherapeutic to fight against SARS-CoV-2 and other coronaviruses infection and progression.

Acknowledgments

None.

Conflicts of interest

The authors declare no conflicts of interest.

References

1. Serfozo P, Wysocki J, Gulua G, et al. Ang ii (angiotensin ii) conversion to angiotensin-(1-7) in the circulation is POP (prolyloligopeptidase)-dependent and ACE 2 (angiotensin-converting enzyme 2)-independent. Hypertension. 2020;75:173–182.
2. Zhao Y, Zhao Z, Wang Y, et al. Single-cell RNA expression profiling of ACE 2, the putative receptor of Wuhan 2019-nCoV. bioRxiv 2020.
3. Wysocki J, Ye M, Rodriguez E, Gonzalez-Pacheco FR, et al. Targeting the degradation of angiotensin ii with recombinant angiotensin-converting enzyme 2:prevention of angiotensin ii-dependent hypertension. *Hypertension*. 2010;55:90–98.
4. Zhu F, Zhong Y, Ji H, Ge R, et al. ACE 2 and TMPRSS 2 in human saliva can adsorb to the oral mucosal epithelium. *Journal of Anatomy.* 2022;240:398–409.
5. Sinjari B, D´ Ardes D, Santilli M, et al. SARS-CoV-2 and oral manifestation:an observational, human study. *Journal of Clinical Medicine*. 2020;3218:14.
6. Daniell H, Nair SK, Esmaeili N, et al. Debulking SARS-CoV-2 in saliva using angiotensin converting enzyme 2 in chewing gum to decrease oral virus transmission and infection. Molecular Therapy 2022;30(4):13.
7. Battle D, Wysocki J, Satchell K. Soluble angiotensin-converting enzyme 2:a potential approach for coronavirus infection therapy ? *Clinical Science.* 2020;134:543–545.