

SARS-CoV-2 Spike Protein Impairs Endothelial Function via Downregulation of ACE 2

[Ming He](#)

.....

is related to

Footnotes

*Y. Lei and J. Zhang contributed equally.

†U. Manor, S. Wang, Z.-Y. Yuan, and J.Y.-J. Shyy contributed equally as senior authors.

For Sources of Funding and Disclosures, see page 1324.

Correspondence to: John Y-J. Shyy, PhD, Division of Cardiology, Department of Medicine, University of California, San Diego, 9500 Gilman Dr, La Jolla, CA 92093, Email jshyy@health.ucsd.edu

Zu-Yi Yuan, MD, PhD, Department of Cardiology, First Affiliated Hospital of Xi'an Jiaotong University, 277 Yanta W Rd, Xi'an 710061, China, Email zuyiyuan@mail.xjtu.edu.cn

References

1. Teuwen LA, Geldhof V, Pasut A, Carmeliet P. COVID-19: the vasculature unleashed. **Nat Rev Immunol**. 2020; 20:389–391. doi: 10.1038/s41577-020-0343-0 [Crossref](#) [Medline](#) [Google Scholar](#)
2. Codo AC, Davanzo GG, Monteiro LB, de Souza GF, Muraro SP, Virgilio-da-Silva JV, Prodonoff JS, Carregari VC, de Biagi Junior CAO, Crunfli F, et al.. Elevated glucose levels favor SARS-CoV-2 infection and monocyte response through a HIF-1 α /glycolysis-dependent axis. **Cell Metab**. 2020; 32:437–446.e5. doi: 10.1016/j.cmet.2020.07.007 [Crossref](#) [Medline](#) [Google Scholar](#)
3. Kuba K, Imai Y, Rao S, Gao H, Guo F, Guan B, Huan Y, Yang P, Zhang Y, Deng W, et al.. A crucial role of angiotensin converting enzyme 2 (ACE2) in SARS coronavirus-induced lung injury. **Nat Med**. 2005; 11:875–879. doi: 10.1038/nm1267 [Crossref](#) [Medline](#) [Google Scholar](#)
4. Shen H, Zhang J, Wang C, Jain PP, Xiong M, Shi X, Lei Y, Chen S, Yin Q, Thistlethwaite PA, et al.. MDM2-Mediated Ubiquitination of angiotensin-converting enzyme 2 contributes to the development of pulmonary arterial hypertension. **Circulation**. 2020; 142:1190–1204. doi: 10.1161/CIRCULATIONAHA.120.048191 [Link](#) [Google Scholar](#)
5. Varga Z, Flammer AJ, Steiger P, Haberecker M, Andermatt R, Zinkernagel AS, Mehra MR, Schuepbach RA, Ruschitzka F, Moch H. Endothelial cell infection and endotheliitis in COVID-19. **Lancet**. 2020; 395:1417–1418. doi: 10.1016/S0140-6736(20)30937-

April 30, 2021

Vol 128, Issue 9

Article Information

Download: 186