

JCC Research Seminar



TOPIC

Endothelial dysfunction in COVID-19: from molecular mechanism to potential therapies

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HONG KONG TIME

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Online via ZOOM

2:00pm - 3:00pm

Abstract:

Coronavirus disease 2019 (COVID-19) caused by SARS-CoV-2 infection is an ongoing pandemic causing severe symptoms and long-term sequela. However, the pathomechanisms of acute and long COVID-19 is understudied. Endothelial cells are sentinels lining the innermost layer of blood vessel that gatekeep micro- and macro-vascular health by sensing pathogen/danger signals and secreting vasoactive molecules. SARS-CoV-2 infection primarily affects the pulmonary system, but accumulating evidence suggests that it also affects the pan-vasculature in the extrapulmonary systems directly (via virus infection) or indirectly (via cytokine storm), causing endothelial dysfunction (endotheliitis, endothelialitis and endotheliopathy) and multi-organ injury. Endothelial nitric oxide synthase (eNOS)-dependent nitric oxide (NO) production is essential for vascular homeostasis. eNOS is transcriptionally regulated by kruppel-like factor 2 (KLF2). We recently discovered that KLF2/eNOS downregulation occurs in COVID-19 patient serum-treated human endothelial cells, and genetic or pharmacological activation of KLF2 attenuates endothelial dysfunction. Of clinical relevance, we found that inhalation of NO (160 ppm 30 min/time, three times a day) by our patented instrument, can improve patients' oxygenation index (PaO₂/FiO₂ ratio) and reduce the mortality of COVID-19 patients. Our study indicates the importance to accelerate the discovery of therapeutic modalities by targeting endothelial dysfunction in pan-vasculature of COVID-19 patients.

Speaker's Biography:

Suowen Xu is currently a principal investigator in First Affiliated Hospital of University of Science and Technology of China (USTC). He was selected into the National High-level Special Talent Program Young Top Talent Program and the list of the world's top 2% scientists. He received his Ph.D. in pharmacology from Sun Yat-sen University in 2011, and his postdoctoral research at the National Institutes of Health (NIH) and the University of Rochester, USA, from 2011 to 2016, and was promoted to Research Assistant Professor at the University of Rochester and adjunct Associate Professor at University of Queensland, Australia. He has long been engaged in the research of endothelial dysfunction and panvascular diseases. He was funded by the American Heart Association and National Natural Science Foundation of China. He has published papers in Eur Heart J, PNAS and Pharmacol Rev etc (H-index of 50). He serves as the editor or editorial board member of Pharmacological Research, Cardiovascular Diabetology as well as external review for Research Grant Council (RGC) and Health & Medical Research Fund (HMRF) of Hong Kong.



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