UNIVERSITÀ POLITECNICA DELLE MARCHE

RESEARCH AREA:

HEALTH

TITLE: Disequilibrium between the classic renin-angiotensin system and its opposing arm in SARS-CoV-2-related lung injury

Principal investigator: Prof. Riccardo Sarzani, r.sarzani@univpm.it, tel: 071 8003225

UNIVPM Research Group: Clinica di Medicina Interna e Geriatria INRCA

Research activity description: A dysregulation of the renin-angiotensin system (RAS) has been involved in the genesis of lung injury and acute respiratory distress syndrome from different causes, including several viral infections. The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection of pneumocytes, the hallmark of the pandemic coronavirus disease 2019 (COVID-19) involving both alveolar interstitium and capillaries, is linked to angiotensin-converting enzyme 2 (ACE2) binding and its functional downregulation. ACE2 is a key enzyme for the balance between the two main arms of the RAS: the ACE/angiotensin (Ang) II/Ang II type 1 receptor axis ("classic RAS") and the ACE2/Ang(1-7)/Mas receptor (MasR) axis ("anti-RAS"). The ACE2 downregulation, as a result of SARS-coronaviruses binding, enhances the classic RAS, leading to lung damage and inflammation with leaky pulmonary blood vessels and fibrosis, when the attenuation mediated by the anti-RAS arm is reduced. ACE inhibitors (ACE-I) and Ang II type 1 receptor blockers (ARB), effective in cardiovascular diseases, were found to prevent and counteract acute lung injury in several experimental models by restoring the balance between these two opposing arms. The evidence of RAS arm disequilibrium in COVID-19 and the hypothesis of a beneficial role of RAS modulation supported by preclinical and clinical studies are the focus of the present review. Preclinical and clinical studies on drugs balancing RAS arms might be the right way to counter COVID-19.

Link:

https://journals.physiology.org/doi/full/10.1152/ajplung.00189.2020?rfr_dat=cr_pub++0pubmed&url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org