

Abstract COVID-19, caused by zoonotic coronavirus SARS-CoV-2, is not a first coronavirus infection, prior to this, two severe coronavirus infections were already faced by the humans at different parts of the world. COVID-19 is found to be more severe than its previous counterparts and cause respiratory syndrome along with some other pathophysiology effects. The main human protein which used by SARS causing coronavirus (SARS-CoV and SARS-CoV-2) is angiotensin-converting enzyme 2 (ACE2), a key member and regulator of RAS. Coronavirus shows a significant affinity with the ACE2, spike protein of the virus participate in this crucial interaction and initiate the infection cycle of the SARS. This ACE2 plays a very significant role in RAS, which directly affect the pathophysiology of humans, mainly of respiratory and cardiovascular diseases. Blockage or down-regulation of ACE2 can easily block the virus entry in the cells, but due to the other important role of the ACE2, the human system cannot afford its suppression or blockage. Due to its importance, it is required to understand the physiology and pathophysiological role of the ACE2, which can help to develop therapy against the SARS. This report provides a detailed account of ACE2, and help to understand about it, which will help to plan a possible way to fight against SARS-CoV-2 and other coronaviruses.

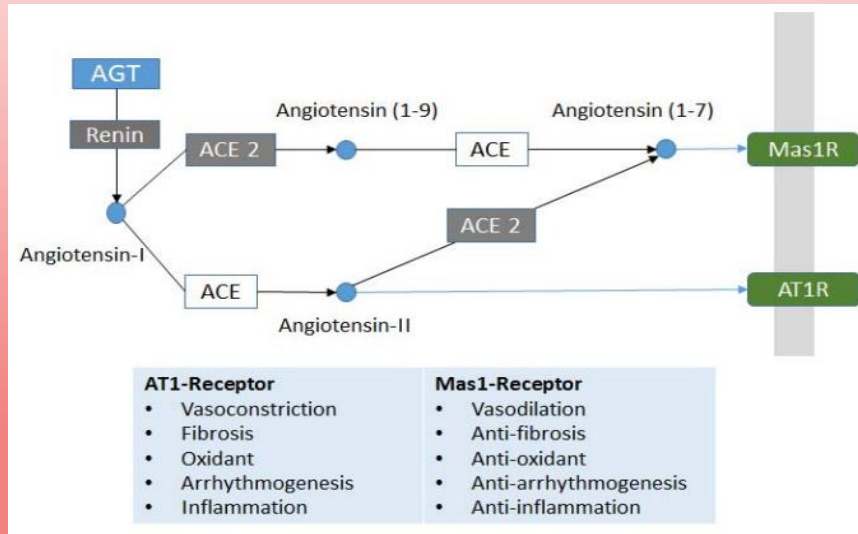


Fig. 1 Role of ACE2 in RAS pathway; angiotensin (1-7) activates MAS1 receptor and Angiotensin-II activate AT1 and AT2-receptor.

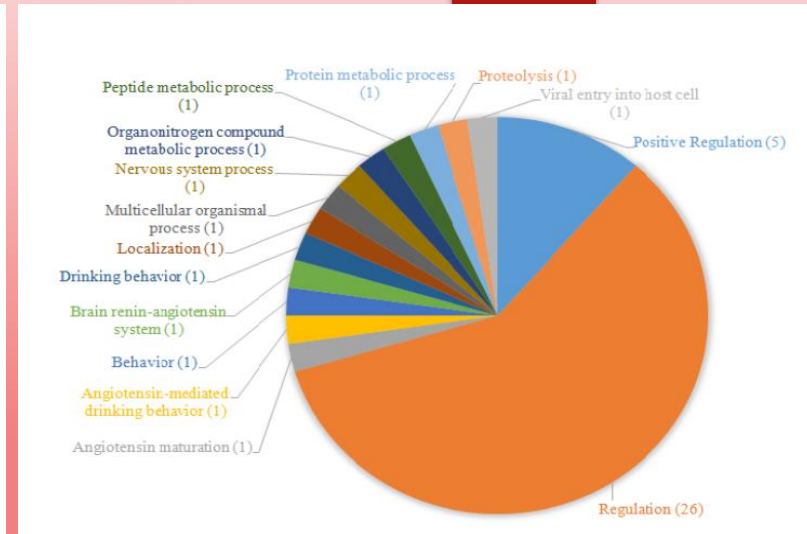


Fig. 3 Pie-chart showing the different biological process that includes the involvement of ACE2, here big share of the regulation process includes all kind of regulatory process in which ACE2 involves, and Positive regulation shows all kind of positive regulation process that involves ACE2

Introduction

All share initial zoonotic transmission followed by human-to-human spread. COVID-19, caused by SARS-CoV-2, proved deadlier than its predecessors, prompting WHO pandemic declaration. Symptoms (fever, cough, shortness of breath) often progress to pneumonia & multi-organ failure in severe cases. ACE2, a protein highly expressed in cardiovascular patients, acts as COVID-19's main entry point to cells. ACE2's diverse roles suggest altering its expression could have severe ramifications, necessitating further research.

Major points

- 1 ACE-2 (Angiotensin Converting Enzyme 2)
- 2 Infection Process and Role of ACE2 As Entry Point
- 3 Effect of Natural Variants and Isoform's on The Binding Affinity between ACE2 and Spike Protein
- 4 Biological Role of ACE2
- 5 Effect of CORONA (SARS-CoV/SARS-CoV-2) Infection on ACE2 and After Circumstances
- 6 ACE2 Enrichment Observation/Analysis

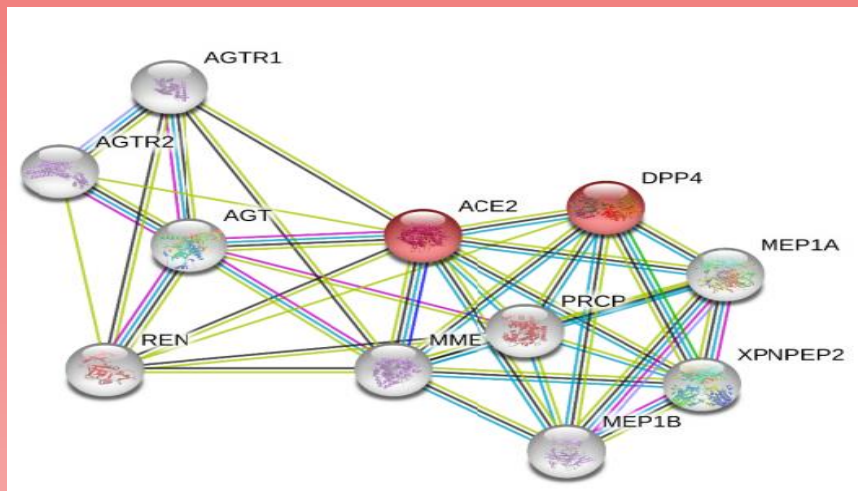


Fig. 2 PPIN network shows protein interaction of ACE2 with other proteins (Network feature- no of nodes:11, no of edges:37, avg node degree:6.73, avg local clustering coefficient :0.844, expected no of edges:11, PPI enrichment p-value:1.29e-09)

Conclusion ACE2, RAS key player (II→9/7 conversion), acts as SARS-CoV-2 receptor (millions dead). Shared by SARS-CoVs, likely for future viruses. Un-targetable, diverse functions, limited understanding despite 20 years of research. More research crucial for viral control and mitigating harmful effects.

Acknowledgement Author acknowledge all doctors and researchers who continuously working on COVID-19 pandemic and provides understanding about role of ACE2 in infection process and cycle

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