Angiotensin-converting enzyme 2 receptor

Entry of SARS-CoV-2 into human cells is dependent on the SARS-CoV receptor, angiotensin converting enzyme 2 (ACE2) receptor, and cathepsin. Cathepsin degrades the spike protein (S protein), which results in the entry of viral nucleic acid into the human host cell.

This receptor is also found in the CNS and plays a crucial role in autoregulating cerebral perfusion pressure [1) 2)].

The triad of neuroinvasion of SARS-CoV-2, induction of hypercoagulable state, and the inhibition of ACE2 blocking the formation of Angiotensin serve as the pathophysiology for neurovascular insults.

SARS-CoV-2, which causes the Coronavirus Disease 2019 (COVID-19) pandemic, has a brain neurotropism through binding to the Angiotensin-converting enzyme 2 receptor expressed by neurones and glial cells, including astrocytes and microglia. Systemic infection which accompanies severe cases of COVID-19 also triggers substantial increase in circulating levels of chemokines and interleukins that compromise the blood-brain barrier, enter the brain parenchyma and affect its defensive systems, astrocytes and microglia. Brain areas devoid of a blood-brain barrier such as the circumventricular organs are particularly vulnerable to circulating inflammatory mediators. The performance of astrocytes and microglia, as well as of immune cells required for brain health, is considered critical in defining the neurological damage and neurological outcome of COVID-19. In a review, they discussed the neurotropism of SARS-CoV-2, the implication of neuroinflammation, adaptive and innate immunity, autoimmunity, as well as astrocytic and microglial immune and homeostatic functions in the neurological and psychiatric aspects of COVID-19. The consequences of SARS-CoV-2 infection during ageing, in the presence of systemic comorbidities, and for the exposed pregnant mother and foetus are also covered [3)]

1)
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2)
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3)
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