Severe Acute Respiratory Syndrome Coronavirus 2 Host Cell Entry Might Involve Beta Adrenergic Receptors

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Sir,

Coronavirus disease 2019 (COVID-19) is caused by Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection. SARS-CoV-2 enters the host cell by binding its spike protein with the angiotensin converting enzyme 2 (ACE2) receptor. Cluster of differentiation 147 (CD147) also known as Basigin or extracellular matrix metalloproteinase inducer (EMMPRIN), has been proposed as another host cell receptor that might be involved in SARS-CoV-2 cellular entry.[1] Any other host cell receptors that exist for SARS-CoV-2 is not known at present.

SARS-CoV-2 shares high similarity with SARS-CoV is well known. For SARS-CoV, it has been already shown that along with the ACE2 receptor in the host cell, surface vimentin by its association with ACE2 acts as a co-receptor for SARS-CoV cellular entry.[2] For SARS-CoV-2 also surface vimentin might act as co-receptor. Drugs targeting vimentin has been proposed as a treatment for COVID-19.[3] It is interesting to note that vimentin is involved in beta adrenergic receptor activation and regulates the extracellular signal-regulated kinase (ERK) pathway.[4] Beta adrenergic receptor via vimentin may be associated with the ACE2 receptor and involved in SARS-CoV-2 host cell entry.

As mentioned earlier CD147 might be another host cell receptor involved in SARS-CoV-2 cellular entry. It is known that CD147 forms complex with beta2 adrenergic receptors and this complex plays a crucial role in meningococcal infection.[5] A similar process of CD147 forming complex with beta adrenergic receptor might happen in SARS-CoV-2 infection also. I suggest that the Beta adrenergic receptor might be involved in the SARS-CoV-2 cell entry, by its interaction via surface vimentin to the ACE2 receptor and by forming a complex with CD147. It is interesting to note that beta blockers have been already proposed as a treatment option for COVID-19.[6] Whether beta-adrenergic receptors act as a co-receptor for SARS-CoV-2 cell entry needs to be found experimentally in the future.

CONFLICT OF INTEREST

Author declare that they have no conflict of interest.

Funding

The author did not receive any funding.

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History

- Submission Date: 11-07-2020;
- Review completed: 20-08-2020;
- Accepted Date: 03-09-2020.

DOI : 10.5530/ijcep.2020.7.3.30

Cite this article: Vasanthakumar N. Severe Acute Respiratory Syndrome Coronavirus 2 Host Cell Entry Might Involve Beta Adrenergic Receptors. Int J Clin Exp Physiol. 2020;7(3):125.