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LETTER TO THE EDITOR

Response to the letter, entitled 'Haemagglutinin, neuraminidase and haemagglutinin esterase on the surface of SARS-CoV-2?'

The review by Humaid et al., 2021 was prepared and submitted for publication in 2020, while several publications that were available at the time revealed the existence of Haemagglutinin Esterase (HE) in the SARS-CoV-2 structure.[1,2] For instance, numerous publications stated that SARS-CoV-2 has HE and haemagglutinin glycoprotein on the viral envelope,[3–6] and other publications mention that HE is used by coronaviruses to connect to sialic acid on the glycoprotein surface.[7] Recent publications also showed that SARS-CoV-2 recognises 9-O-acetyl sialic acid for primary binding and penetration and shares the ligand binding specificity with influenza haemagglutinin Esterase Fusion protein (HEF).[8] A publication also showed that HE acts as a neurological manifestation of COVID-19 and can be used as a therapeutic target.[9] Furthermore, it has been suggested that HE could enhance the S protein-mediated cell entry of SARS-CoV-2 and as a virus extension through the mucosa.[10] Few other studies highlighted the role of HE inhibitors as promising SARS-CoV-2 therapy.[11,12]

Regarding the controversy raised in the letter to the editor, the reported structural similarity between SARS-CoV-2 and other coronaviruses with the importance of HE as a viral envelope glycoprotein that targets sialic acid species to mediate the viral entry; besides, the evidence that links the importance of HE to the S1 domain of some coronaviruses and the sugar-binding activities that appear vital to coronaviruses including SARS-CoV-2[13] raised the question that how the virus copes without HE. Furthermore, a publication indicates the existence of hidden genes in the SARS-CoV-2 genome,[14] in addition to a publication that highlights the high mutation rate of SARS-CoV-2 with an estimated 33 genomic mutations/year known as a quasispecies as a result of the replication process for RNA viruses, often has high error rates.[15] Based on these findings, a mystery arises that SARS-CoV-2 has a haemagglutinin-like activity.

Based on all the above data, further investigation may be needed to better understand the pathogenesis of SARS-CoV-2 and its complete genomic structure. The study of SARS-CoV-2 is currently ongoing, and studies that dispute the existence of HE on SARS-CoV-2 have appeared, while the aid of full genome sequencing of the viral variants may help to update the SARS-CoV-2 genome data.

AUTHOR CONTRIBUTIONS

Rania Hamdy and Sameh S. M. Soliman wrote the draft and final version. Sameh S. M. Soliman supervised and designed the response.

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CONFLICT OF INTEREST

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DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analysed in this study.

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