Comment on Alfassam et al. Development of a Colorimetric Tool for SARS-CoV-2 and Other Respiratory Viruses Detection Using Sialic Acid Fabricated Gold Nanoparticles.
Pharmaceutics 2021, 13, 502

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Abstract: In a published article in Pharmaceutics, researchers developed a sialic acid (SA) stabilized Au nanoparticle system based on SA’s binding ability that exists on the surface of lungs epithelial cells. The authors reported that many respiratory viruses including influenza, Middle-East respiratory syndrome (MERS-CoV), and the current coronavirus (SARS-CoV-2) bind to SA as one of the main binding targets of the surface protein hemagglutinin (HA).

Keywords: SARS-CoV-2; MERS-CoV; hemagglutinin
as a form 9-O-Ac-SA–specific hemagglutinin-esterase-fusion (HEF) [10]. The HE in some β-CoVs does not have membrane fusion activity unlike HEF, but they are an accessory to the spike protein S [11].

The SARS-CoV-2 and MERS-CoV genomes lack HE gene [10–12] as shown in Figure 1. Thus, these viruses cannot encode HE and use spike glycoprotein to bind sialic acid. The spike glycoprotein contains two subunits including S1 and S2. The receptor-binding domain (RBD), which is located in the S1 subunit, is responsible for binding to the receptor, and the S2 subunit induces the viral fusion and entry process into the host cell. Therefore, SARS-CoV-2, MERS-CoV can bind to SA using the spike glycoprotein.

![Figure 1. Structure of SARS-CoV-2 and MERS-CoV genomes.](image)

**Author Contributions:** Conceptualization, writing—review and editing, and supervision M.Z. writing—original draft preparation, S.S. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Conflicts of Interest:** The authors declare no conflict of interest.

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