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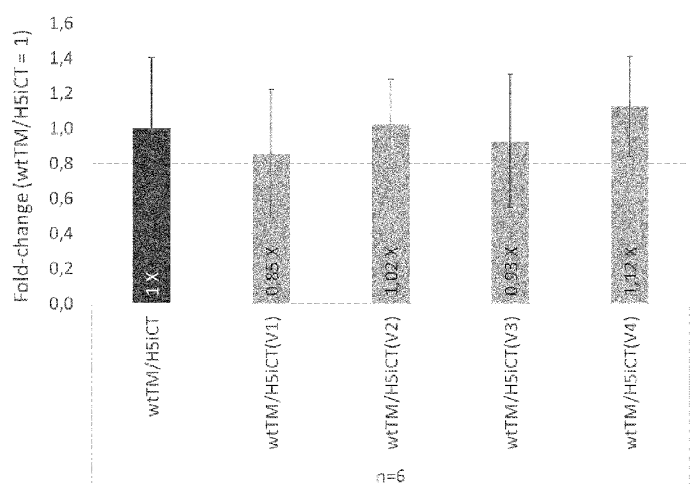
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Figure 5B



(57) **Abstract:** Modified coronavirus spike (S)-protein, virus-like particle (VLPs) comprising the modified S protein and nucleic acids encoding modified S protein are provided. Methods for modified S-protein and VLP production in a host or host cell are also described. The modified S-protein may comprise a transmembrane domain (TM) or portion of a TM, and a cytosolic tail (CT) or of a CT, wherein the CT or portion of the CT is derived from an influenza hemagglutinin (HA) protein and wherein the TM or portion of the TM is heterologous to the CT or portion of the CT. In addition a method for inducing immunity to a coronavirus infection in a subject, comprising administering a composition comprising the modified coronavirus (S)-protein or VLP to the subject is described.

[Continued on next page]

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