

Description of Additional Supplementary Files

File Name: Supplementary Data 1

Description: **Computed energetic information of the RSV F protein.** The in silico energetic analysis was carried out with the Rosetta software suite and guided the selection of mutations for experimental validation.

File Name: Supplementary Data 2

Description: **Computed energetic information of the hMPV F protein.** The in silico energetic analysis was carried out with the Rosetta software suite and guided the selection of mutations for experimental validation.

File Name: Supplementary Data 3

Description: **Computed energetic information of the SARS-CoV-2 S protein.** The in silico energetic analysis was carried out with the Rosetta software suite and guided the selection of mutations for experimental validation.