

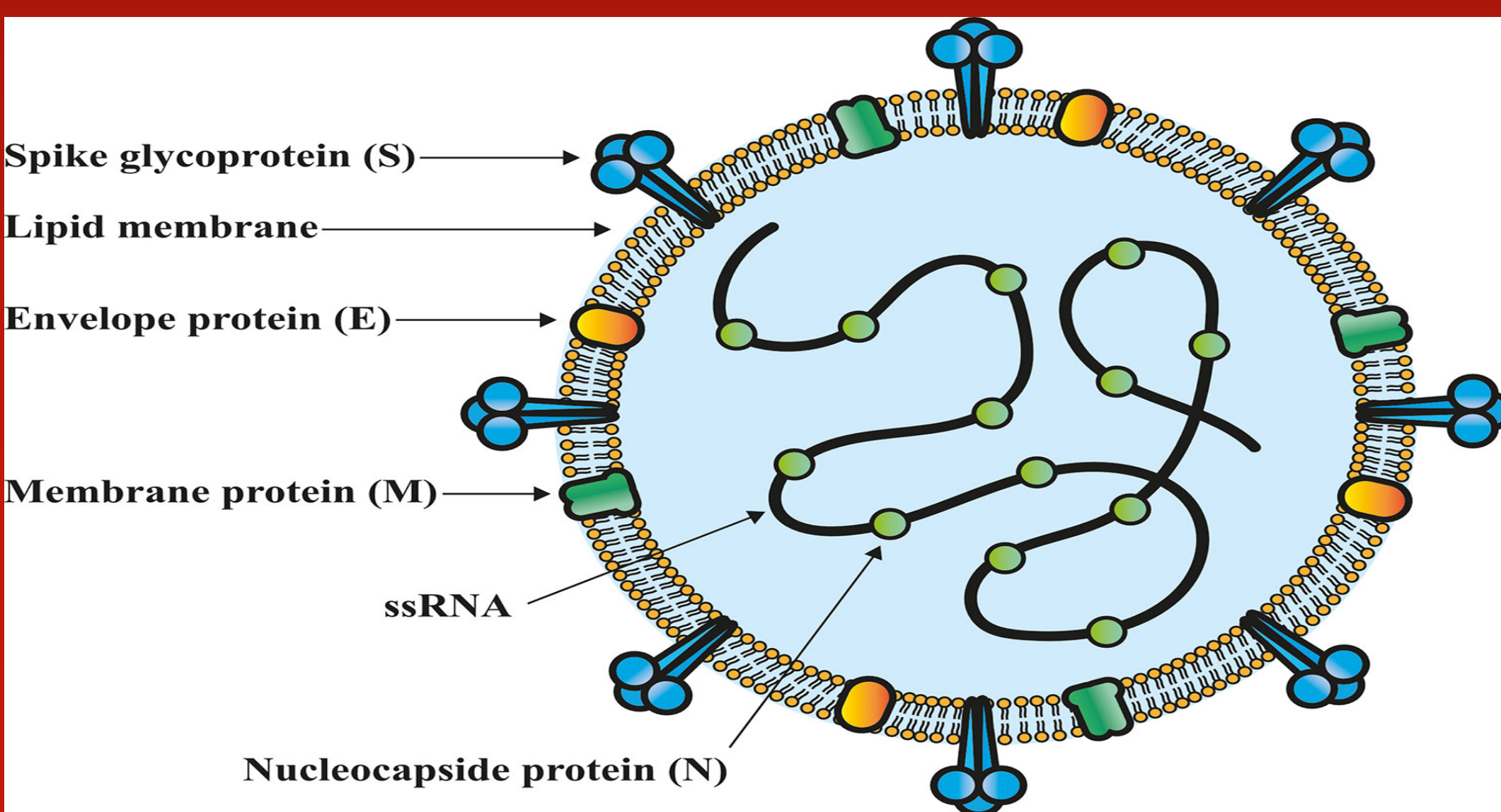
# Phase 1a Clinical Study for Q-Griffithsin Intranasal Spray for Prevention of Coronavirus

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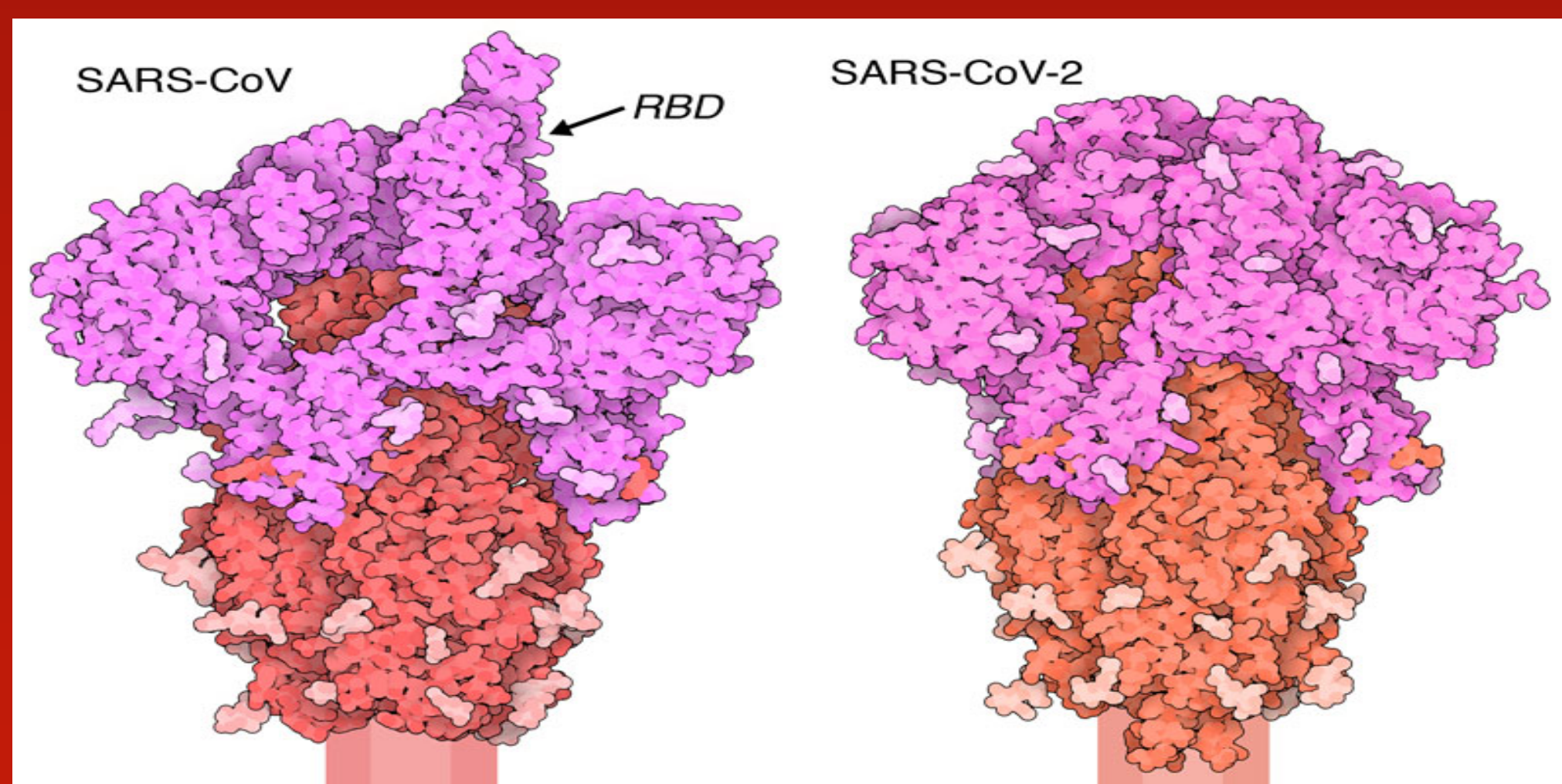
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## Introduction

- The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a highly infectious virus. Infection with SARS-CoV-2 can lead to acute respiratory disease, known as coronavirus disease 2019 (COVID-19).
- Q-Griffithsin (Q-GRFT) is a recombinant protein produced in *Nicotiana benthamiana* plants that works as a broad-spectrum viral entry inhibitor [3].
- Q-GRFT binds oligomannose residues in glycoproteins on the envelopes of viruses such as HIV-1, coronaviruses, paramyxoviruses and herpesviruses [4, 5].
- *In vitro* and *in vivo* studies suggest that Q-GRFT has activity against MERS-CoV and SARS-CoV-2.
- Q-GRFT has been developed as an intranasal spray to prevent COVID-19 infection.



**Figure 1:** The structure of SARS-CoV-2 coronavirus contains four structural proteins (envelope, membrane, spike, and nucleocapsid) [1].

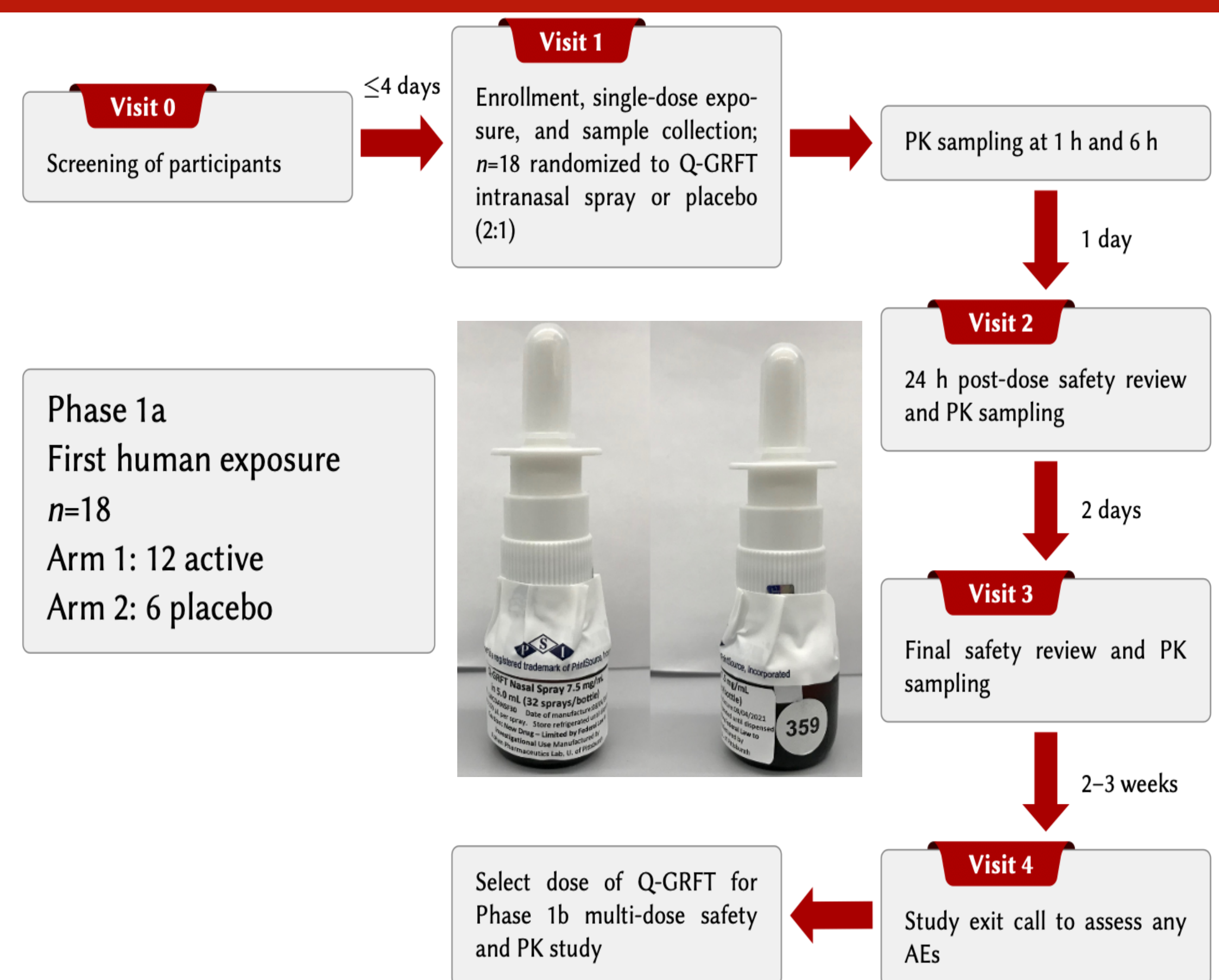


**Figure 2:** The glycosylated spike protein contains a receptor binding domain (RBD). Both the spike protein and RBD are targets of neutralizing antibodies. The lighter shades shown are sugar chains [2].

## Significance

Commercialization of this type of product provides a new means for protection against SARS-CoV-2 infection, which would be beneficial for front-line healthcare workers, first responders, and other vulnerable populations with weakened immune systems.

## Methods

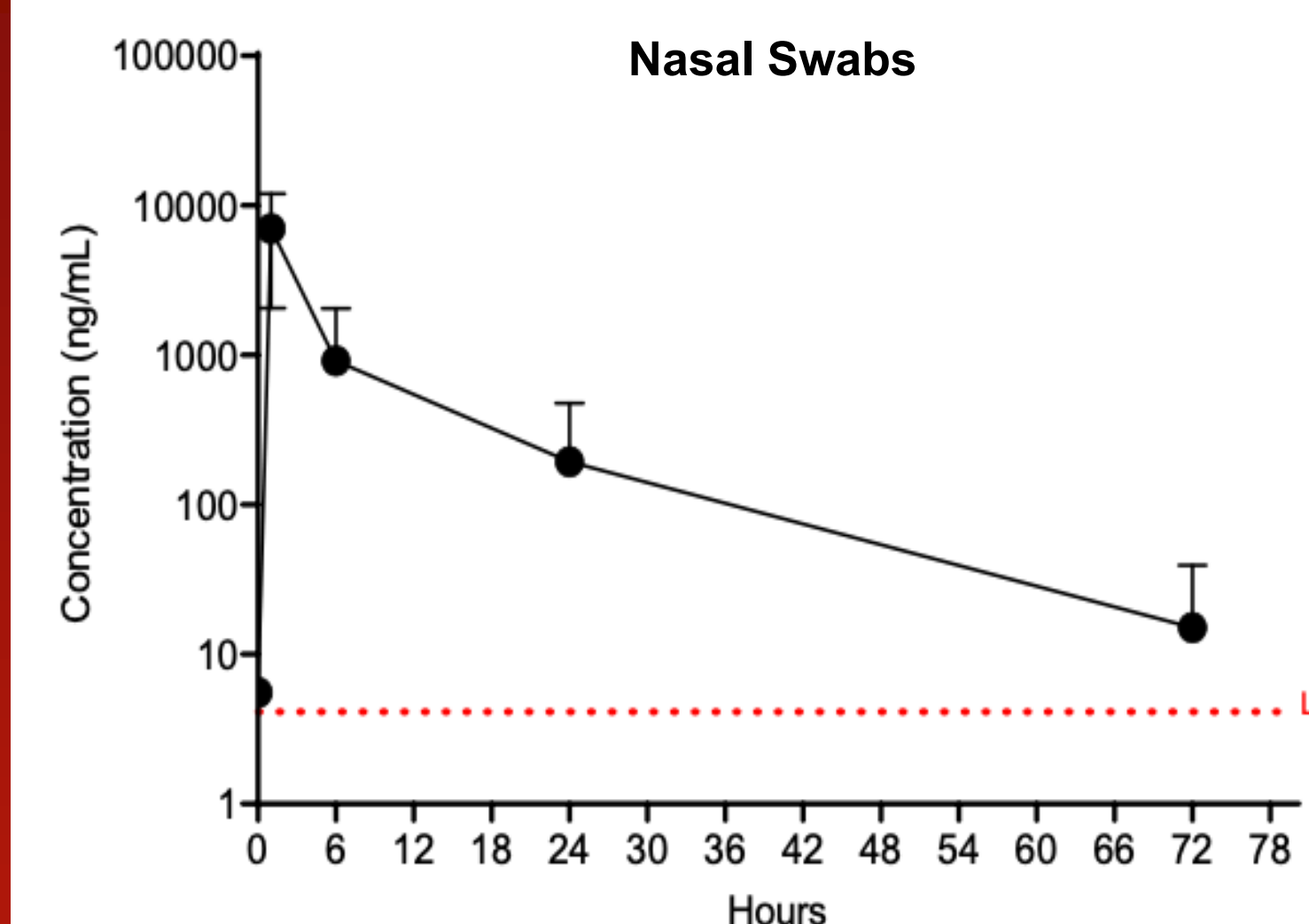


**Figure 3:** Schematic of phase 1a study design. Participants were healthy non-smokers with no pre-existing conditions. Primary goal was to access safety of a single 3 mg dose of Q-GRFT and to measure pharmacokinetics of administered Q-GRFT. Abbreviations: AE, adverse events; PK, pharmacokinetics. [6]

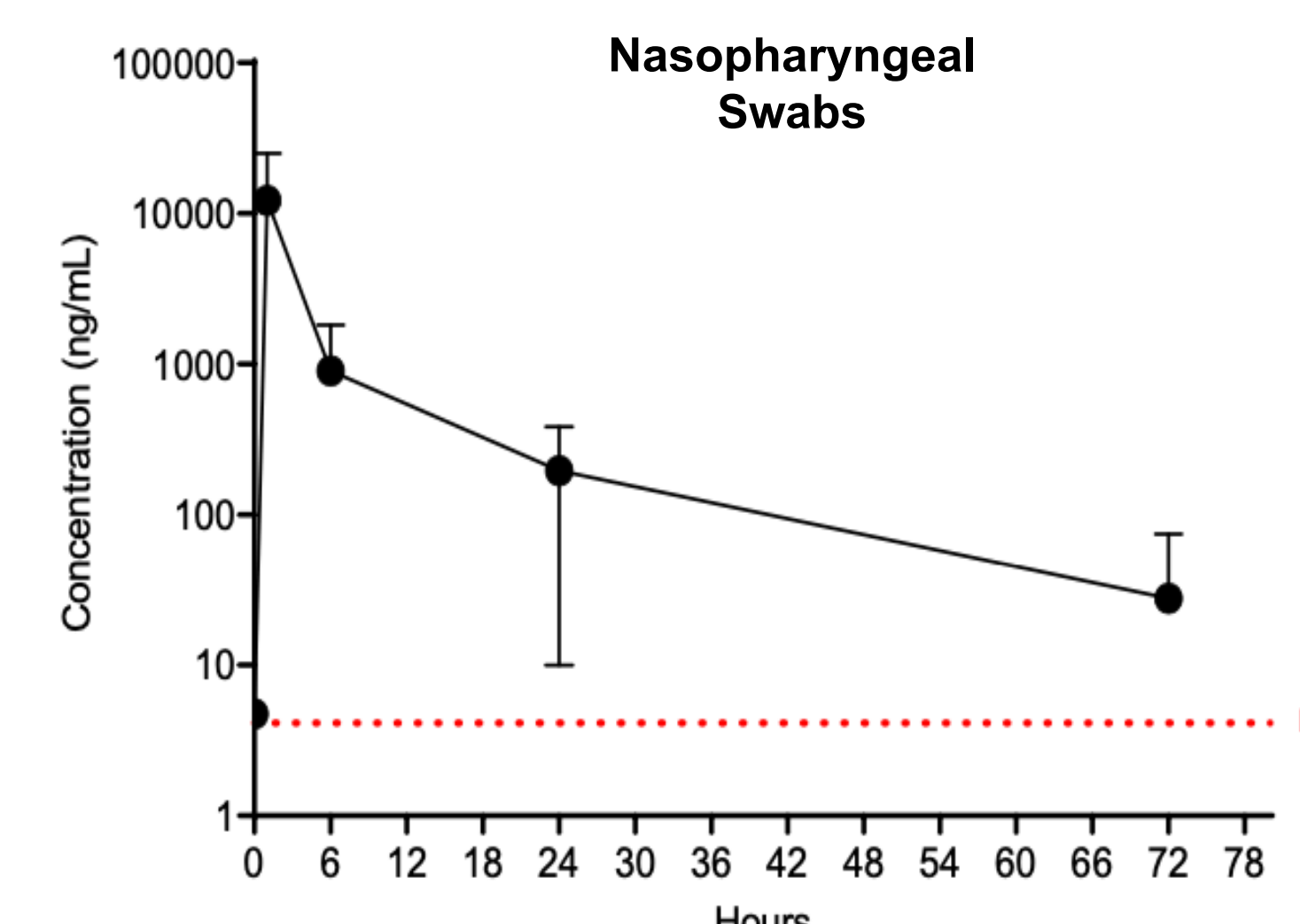
## Acknowledgements

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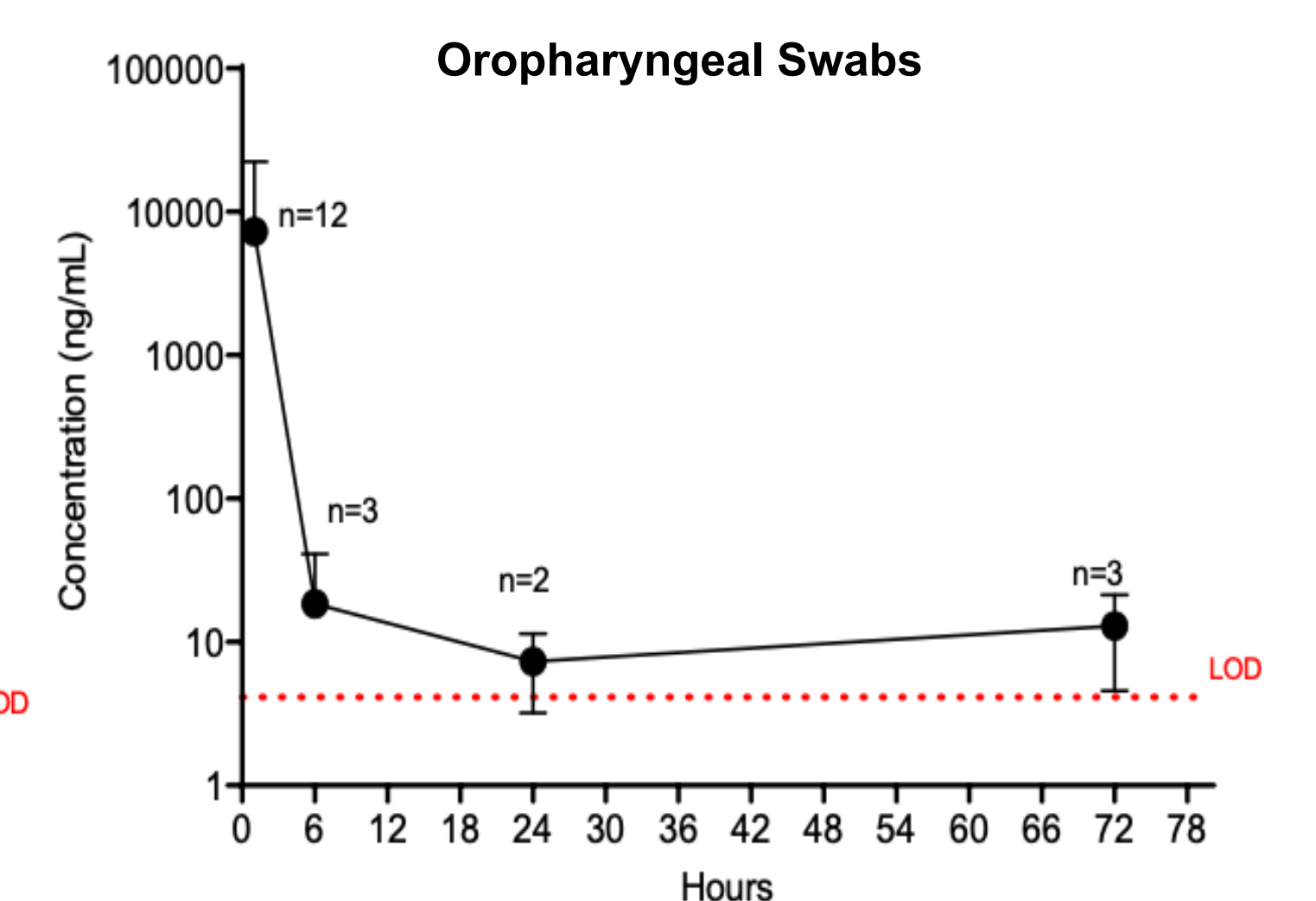
## Results



**Figure 6:** The average maximum concentration (Cmax) was 7068 ± 4904 ng/mL (N=12) with an estimated half-life of 9.5 ± 5.2 hours (N=10). Error bars represent standard deviation, and the red dotted line represents the assay limit of detection (LOD).

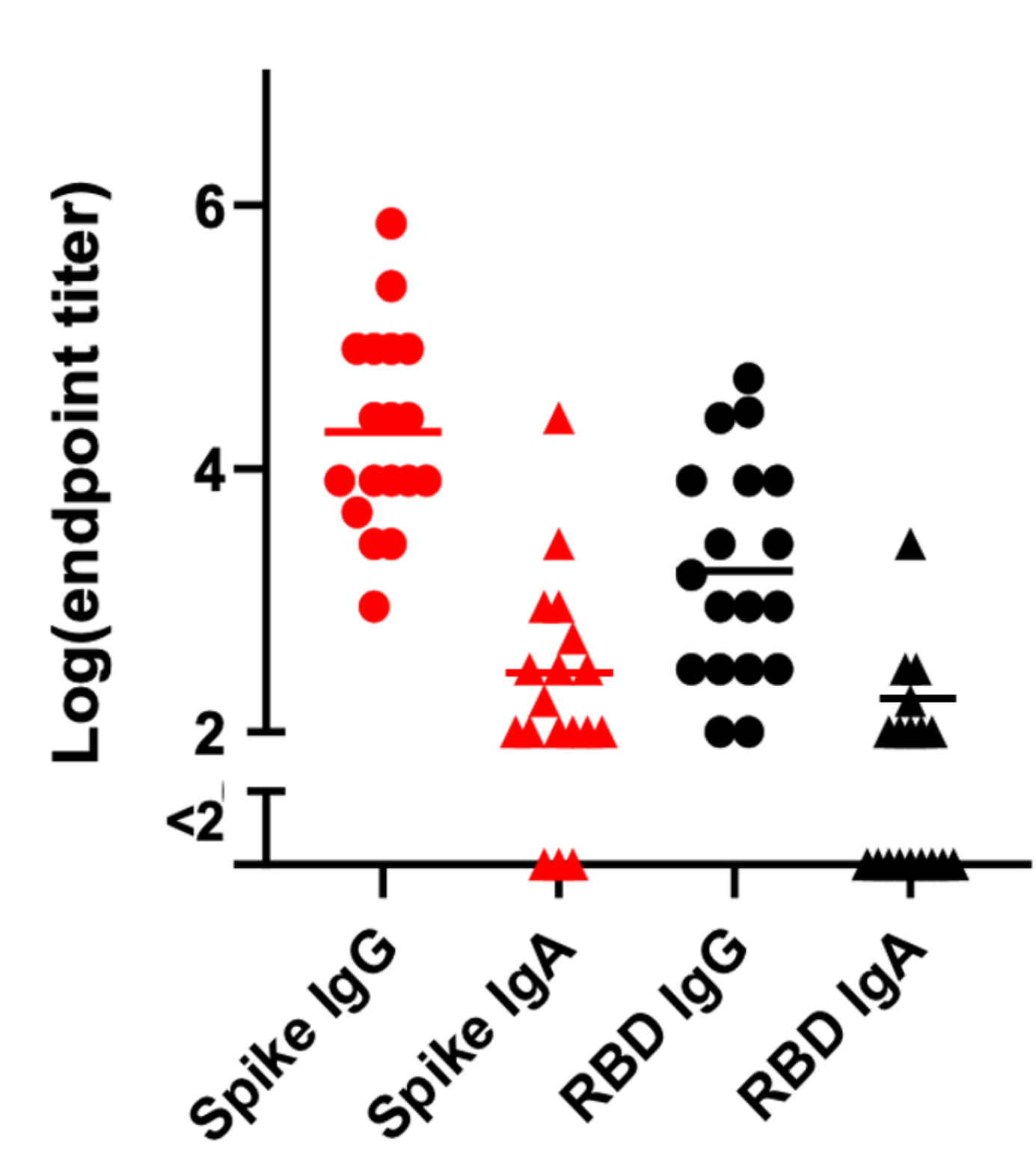


**Figure 7:** The average Cmax was 12215 ± 12823 ng/mL (N=12) and the estimated half-life was 9.4 ± 4.9 hours (N=11).



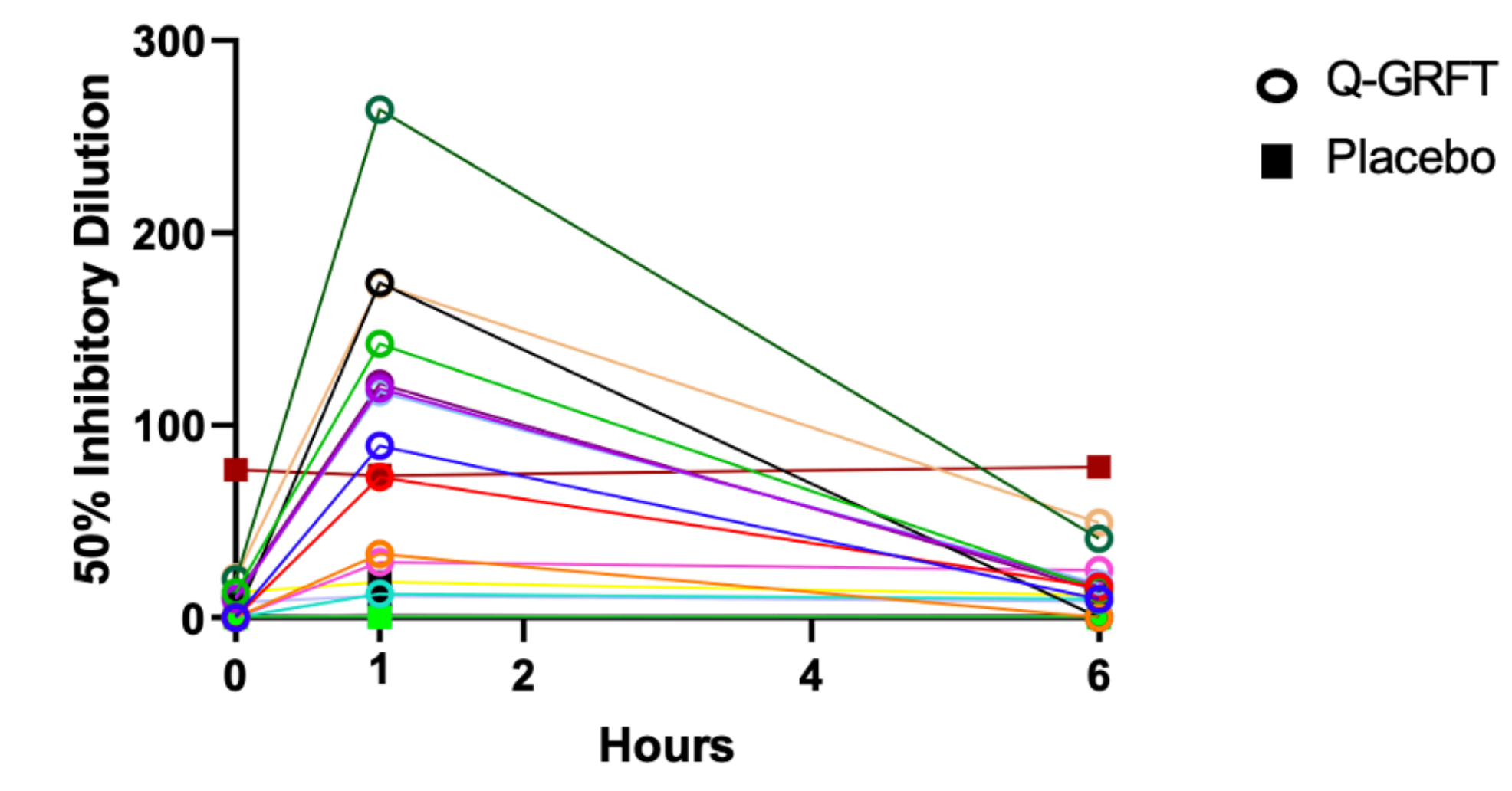
**Figure 8:** The average Cmax was 7275 ± 15045 ng/mL and the estimated half-life was 2.4 hours. However, only one participant had sufficient data above the LOD for analysis of this parameter.

## Antibody Endpoint Titers

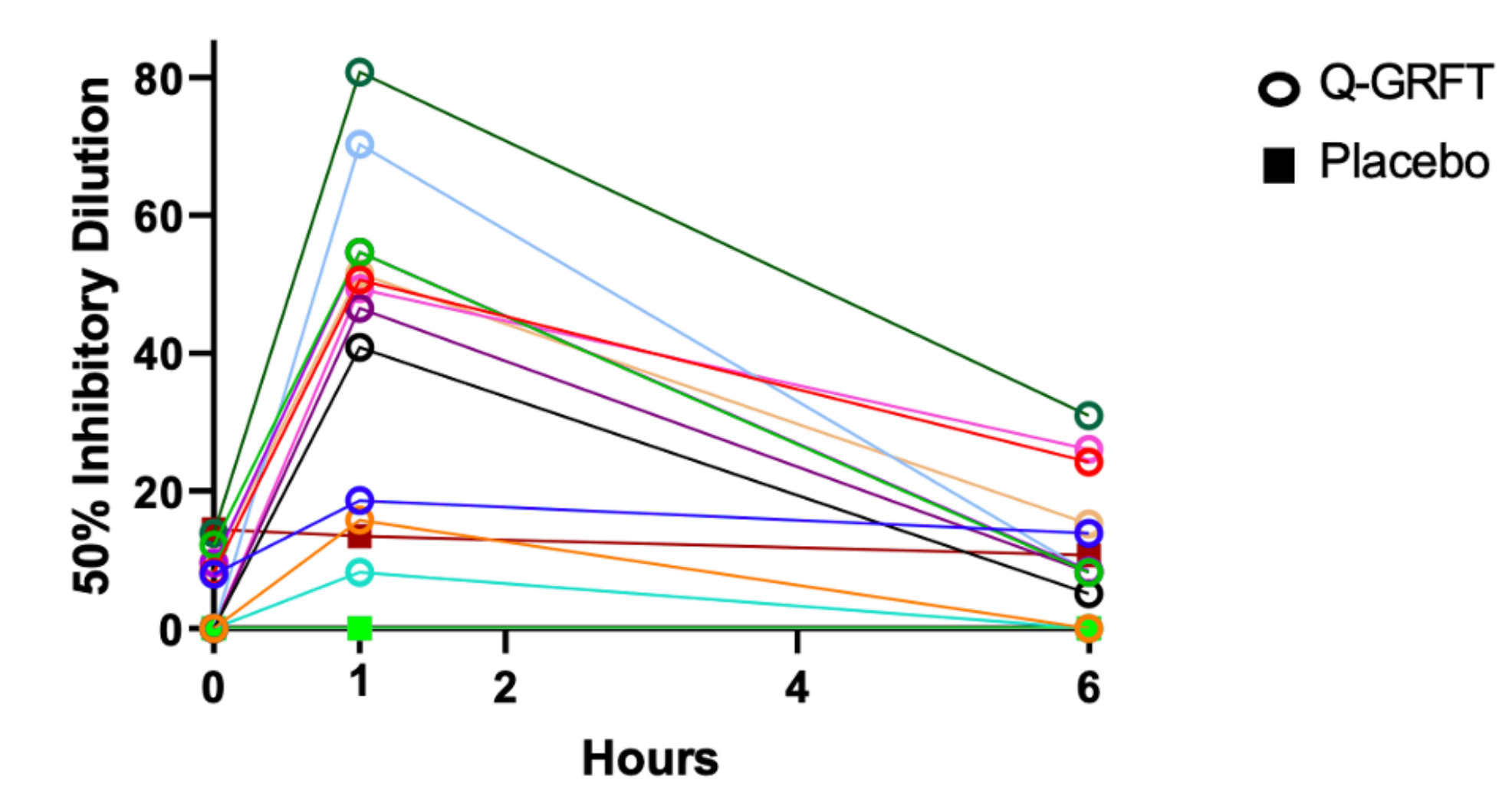


**Figure 9:** Antibody endpoint titers were performed on plasma samples for all 18 participants from the screening visit. Undetectable levels of antibody (<100) are shown as <2 on the X-axis. The bars represent geometric means with the undetectable levels excluded.

## NP Delta



## NP Omicron



**Figure 10:** Nasopharyngeal swabs were collected at pre-dose, 1-hour and 6-hours after administration of the nasal spray. All samples were serially diluted two-fold from 1:10 to 1:640 and mixed with 100 pfu/well of SARS-CoV-2 Delta or Omicron for 1 hour. Then, sample-virus mixtures were added to 85-90% confluent monolayers of VeroE6 cells. CPE was scored on Day 4.

## Conclusions

- Intranasally administered Q-GRFT remained active and detectable in nasal passages and the nasopharynx for up to 24 hours, with no product related adverse events observed.
- The results support proceeding to a repeat dose trial to assess safety and pharmacokinetics of this product in healthy volunteers.

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