

Novel Concepts Testing Summary

Novel Concepts has created formulations to test for activity against SARS CoV-2, the virus responsible for the COVID-19 pandemic. Three tests have been conducted thus far with multiple formulations and production batches.

Production Batch 1

Spike-ACE2 binding disruption

To enter host cells, the SARS CoV-2 spike protein receptor binding domain (RBD) interacts with the angiotensin I converting enzyme 2 (ACE2) receptor on the cell surface. Disruption of this interaction will prevent viral entry into cells and could be a potential treatment or prevention of COVID-19. Two formulations from production batch 1 demonstrated an ability to disrupt the spike RBD – ACE2 interaction.

TMPRSS2 Inhibition

Prior to binding with ACE2, the spike protein undergoes priming via a serine protease TMPRSS2. Inhibition of this protease, blocks fusion of the virus with ACE2 and thus represents an additional therapeutic target for COVID-19. The same production batch 1 formulations that were able to disrupt spike RBD – ACE2 binding were also able to inhibit TMPRSS2.

Production Batch 2

Spike-ACE2 binding disruption

None of the production batch 2 formulations demonstrated inhibition of the ACE2 – spike RBD interaction.

TMPRSS2 Inhibition

All of the production batch 2 formulations demonstrated inhibition of the TMPRSS2 protease reaction.

In vitro Antiviral Testing

Three modes were tested for antiviral activity. Each mode added the formulation at a different point in the viral infection process.

In the first mode tested, virus was pre-incubated with the formulation before exposure to the cells. The formulation is not removed when cell infection occurs. All the production batch 2 formulations demonstrated antiviral activity in this test.

In the second mode tested, the cells are pre-incubated with the formulation before viral infection. Two of the production batch 2 formulations tested were effective at inhibiting viral infection in this assay, while the third formulation was not.

In the third mode tested, the cells are infected with virus and then exposed to the formulation. All the production batch 2 formulations demonstrated antiviral activity in this test.

The formulations were active in the three modes which tested exposure at different points during viral infection and replication. Antiviral activity was demonstrated with exposure both before and after viral entry into cells. Both the cellular data and the in vitro enzyme data support the hypothesis that the formulations may target the host cells to prevent viral entry. However, the mechanism of action cannot be definitively determined from these results, and it could be via multiple mechanisms or via one central mechanism.

Overall, these formulations are potential candidates for the treatment of SARS-CoV-2 infections.