

TESTING THE VIRUCIDAL ACTIVITY OF APT™ T3X AGAINST HUMAN CORONAVIRUS NL63

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for
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Contents

SUMMARY.....	4
INTRODUCTION AND AIMS.....	5
METHODS.....	6
RESULTS.....	7
CONCLUSIONS.....	8

Summary

Aim: To determine the antiviral activity of APT T3X against human coronavirus NL63 (NL63).

Methods: To determine the antiviral activity of APT T3X on human NL63, the virus was incubated with APT 3TX for 30 seconds, and the virucidal activity was determined by quantifying the number of infectious virus units recovered.

Results: Upon treatment with APT T3X for 30 seconds, a decrease of at least 3 log of infectious particles was measured, confirming the virucidal activity of APT T3X on NL63.

Conclusion: Under the conditions tested, APT T3X displays 99.9% virucidal activity against human coronavirus NL63.

Introduction and Aims

In the past 20 years the world has seen a rise in the number of viral outbreaks. In 2020, SARS-CoV2, the agent of the COVID19 pandemic, suddenly forced the world into lockdown with severe and long lasting consequences both on the economy and on global health. Therefore, it has become of paramount importance to identify new therapeutic and prophylactic treatments against infectious diseases, and especially respiratory viruses.

Human coronavirus NL63 belongs to the same family as SARS-CoV2 and it is one of the viruses responsible the seasonal colds. Besides sharing a similar structure, NL63 uses the same cellular receptor as SARS-CoV2, ACE2, to infect the host cells. Together with other human coronaviruses, it is considered a good model for SARS-CoV2.

APT™ T3X is a proprietary topical formulation utilising the “Advanced Penetration Technology™” platform, combined with 3% Tetracycline HCl. The APT™ T3X is an FDA registered, over-the-counter, first aid antibiotic formulation in the USA.

Aim of this study was to test the antiviral activity and virucidal properties of APT™ T3X against human coronavirus NL63.

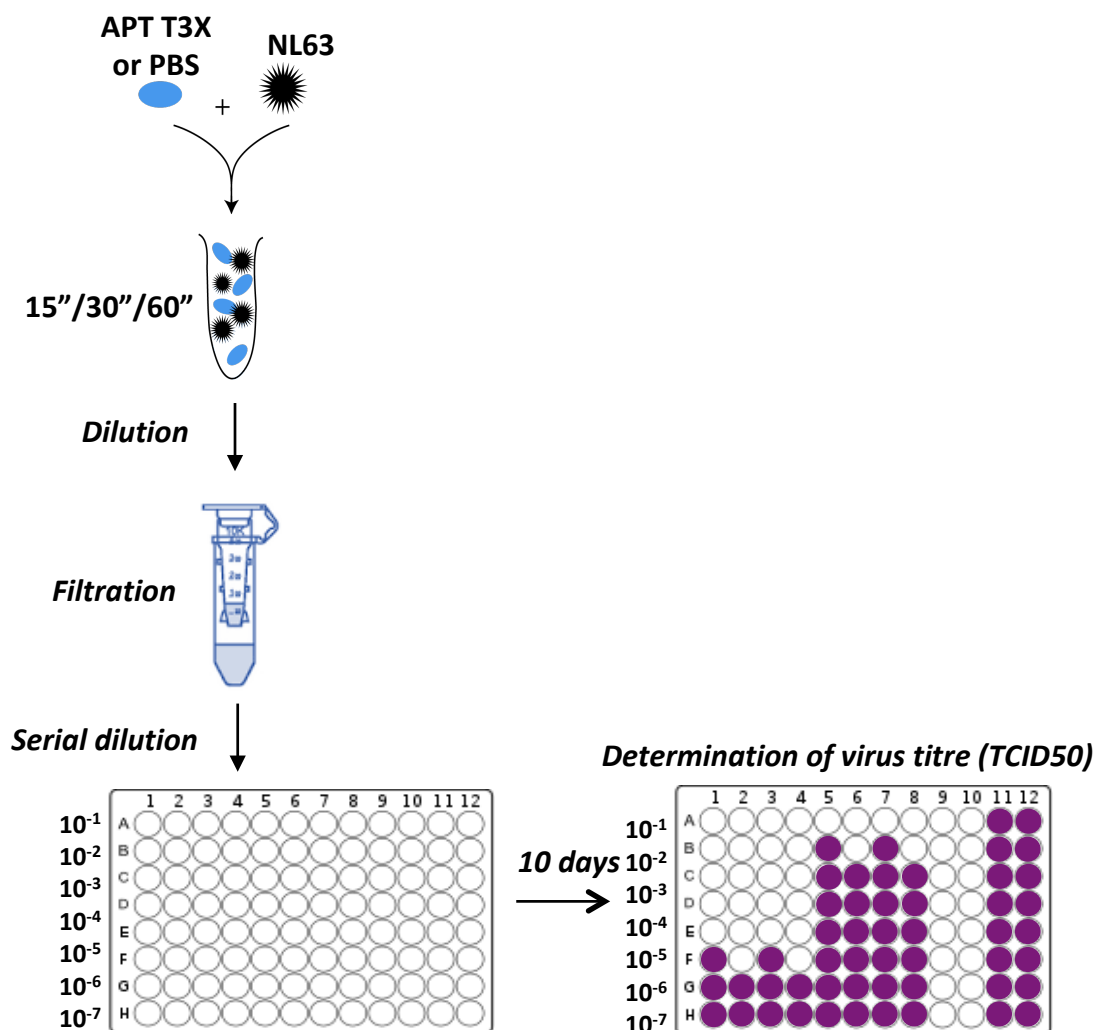
Methods

Suspension test – Virucidal activity

To test whether APT T3X treatment has a virucidal activity on NL63, 5×10^3 infectious units of NL63 were incubated with 4 volumes of undiluted APT T3X or a PBS control.

After 30 seconds, an excess of cold media was added. Preliminary studies had shown that, due to the lower titre of NL63, quantification of infectious virus wouldn't be possible at concentrations of APT T3X that are not toxic for the assay cells. To solve this issue, virus and APT T3X (or PBS control) were physically separated through the use of a filter, with a cut-off sufficient to retain the virus and eliminate most of the formulation. After additional washing, the recovered virus was quantified through a serial dilution on a monolayer of LLC-MK2 cells.

Ten days after infection, virus titre was quantified by determining the dilution at which half of the cells displayed virus-induced cytopathic effect (TCID₅₀).



Virucidal activity

The results of the virucidal test for NL63 are summarized in Figure 1. After incubation with the PBS control for 30 seconds, between $1.18\text{E}+03$ and $1.51\text{E}+03$ TCID₅₀/ml of NL63 were recovered. Conversely, the infectious virus recovered after incubation with APT T3X for the same lengths of time was below the assay detection limit ($1.0\text{E}+01$ TCID₅₀/ml), corresponding to at least a 3-log decrease in infectivity. This corresponds to a virucidal activity of at least 99.9%.

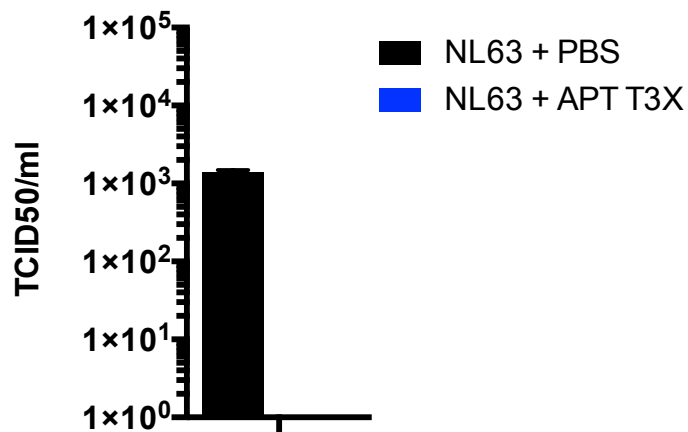


Figure 1. Averages NL63 titres recovered after incubation with PBS or APT T3X for 30 seconds.

Conclusions

Based on the findings reported here, exposure of human coronavirus NL63 to APT T3X for 30 seconds caused a reduction of infectious virus titre of at least 3 logs, corresponding to a virucidal activity of 99.9%.



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