PANDEMIC
COVID-19

Co-expression of PML-II and Spike proteins Augments type I interferon response

(Tackling viruses by antiviral cellular proteins)

The 3rd International conference of ArPHA
The Health sector Post Covid-19, Challenges and Opportunities
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By
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Introduction

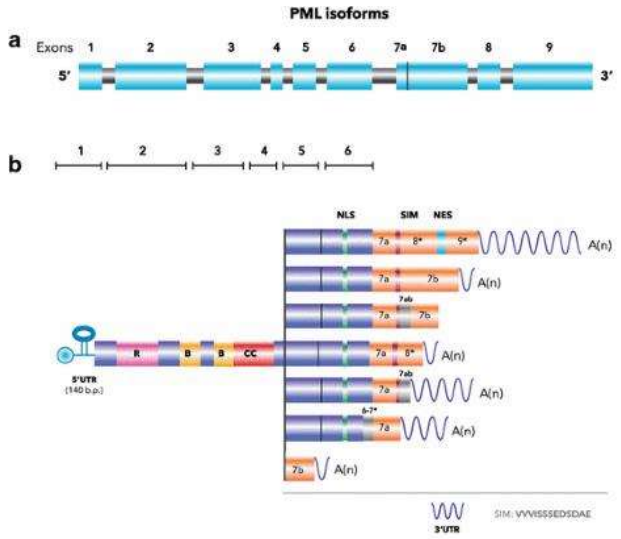
Anti-InfectiousCellular Proteins

Many cellular genes exhibit specific virus gene inhibitory activity either by preventing the binding of them to cells, or by inducing or repressing cellular factors that in turn influence viral gene expression.

Introduction

Promyelocytic Leukemia proteins (PML)

PMLs are crucial for apoptosis, transcriptional regulation, tumor suppression, and innate immune responses. PML affects the innate immune signaling as a suppressor of viral gene expression and regulator of interferon (IFN) responses. PML-II isoform inhibits the replication of many viruses such as adenovirus and rotavirus through regulating the interferon response



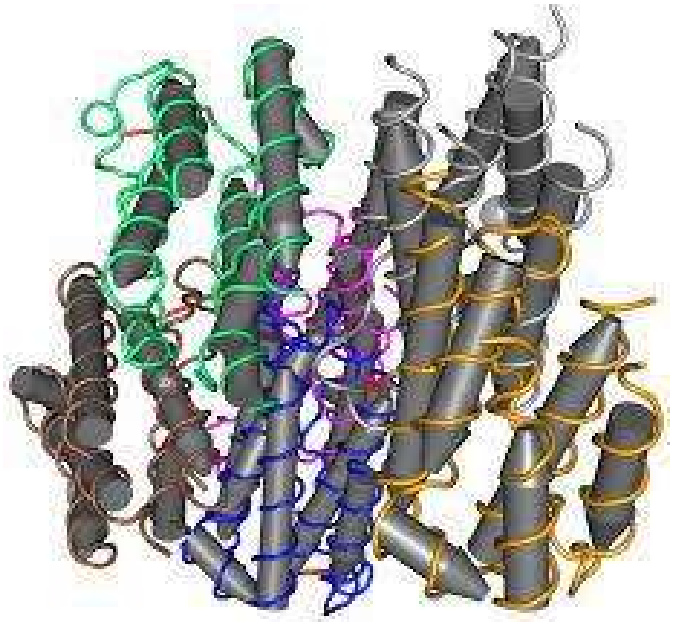
An Introduction

COVID-19

Use of interferon in treating virus infections

IFNβ is an antiviral cytokine secreted by host cells in response to virus infection (PML-II affected and affecting gene)

Recombinant IFN-α is used to treat chronic hepatitis C virus infection certain forms of chronic hepatitis B virus infections. IFNs have also been used in other viral infections



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Aim of study

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The aim of the study

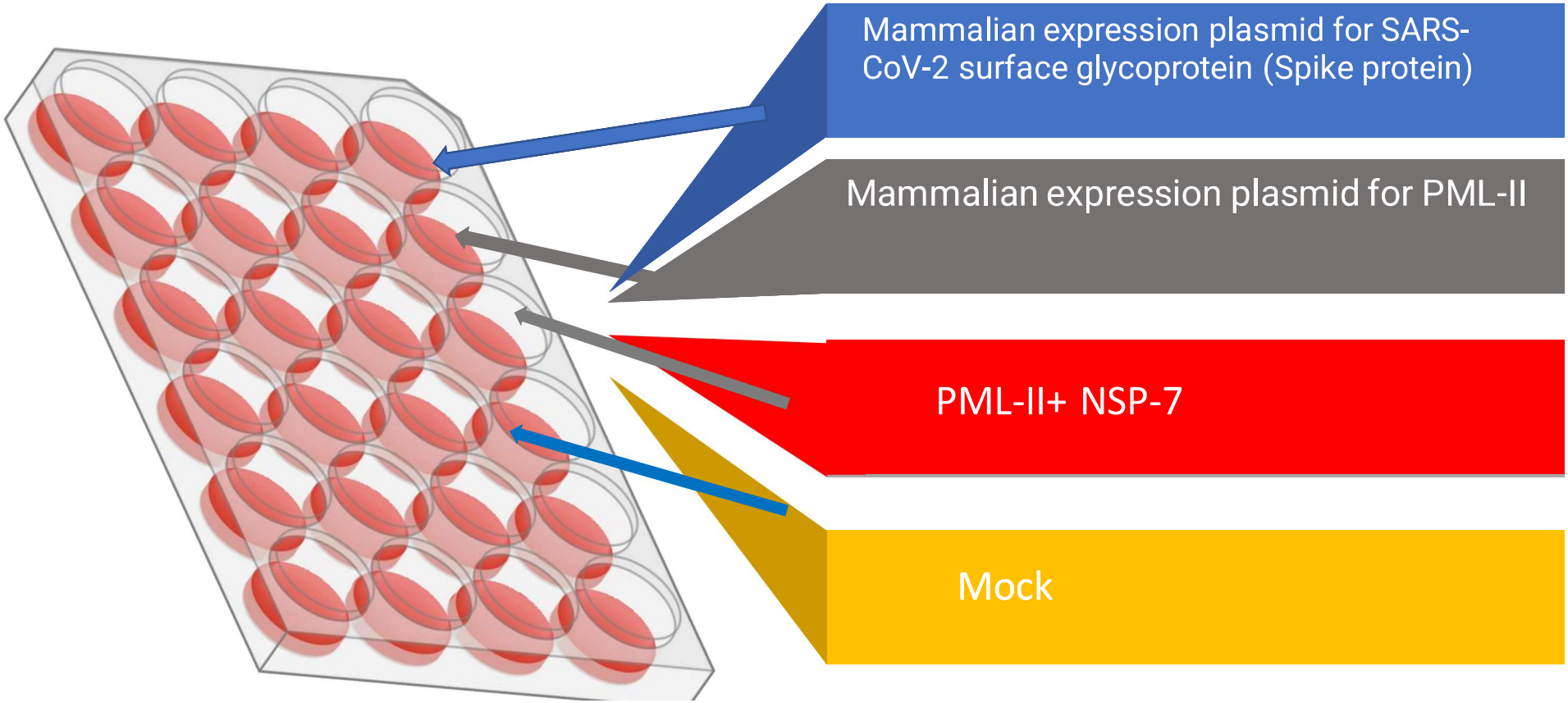
Is to investigate the effect of overexpression of PML-II coincides with the expression of the SARS-CoV-2 Spike on innate immune response including IFN, ISG20 IFITM2, IFITM3 in Colon cancer SW 1417 and 293HEK cells.

Material and Method

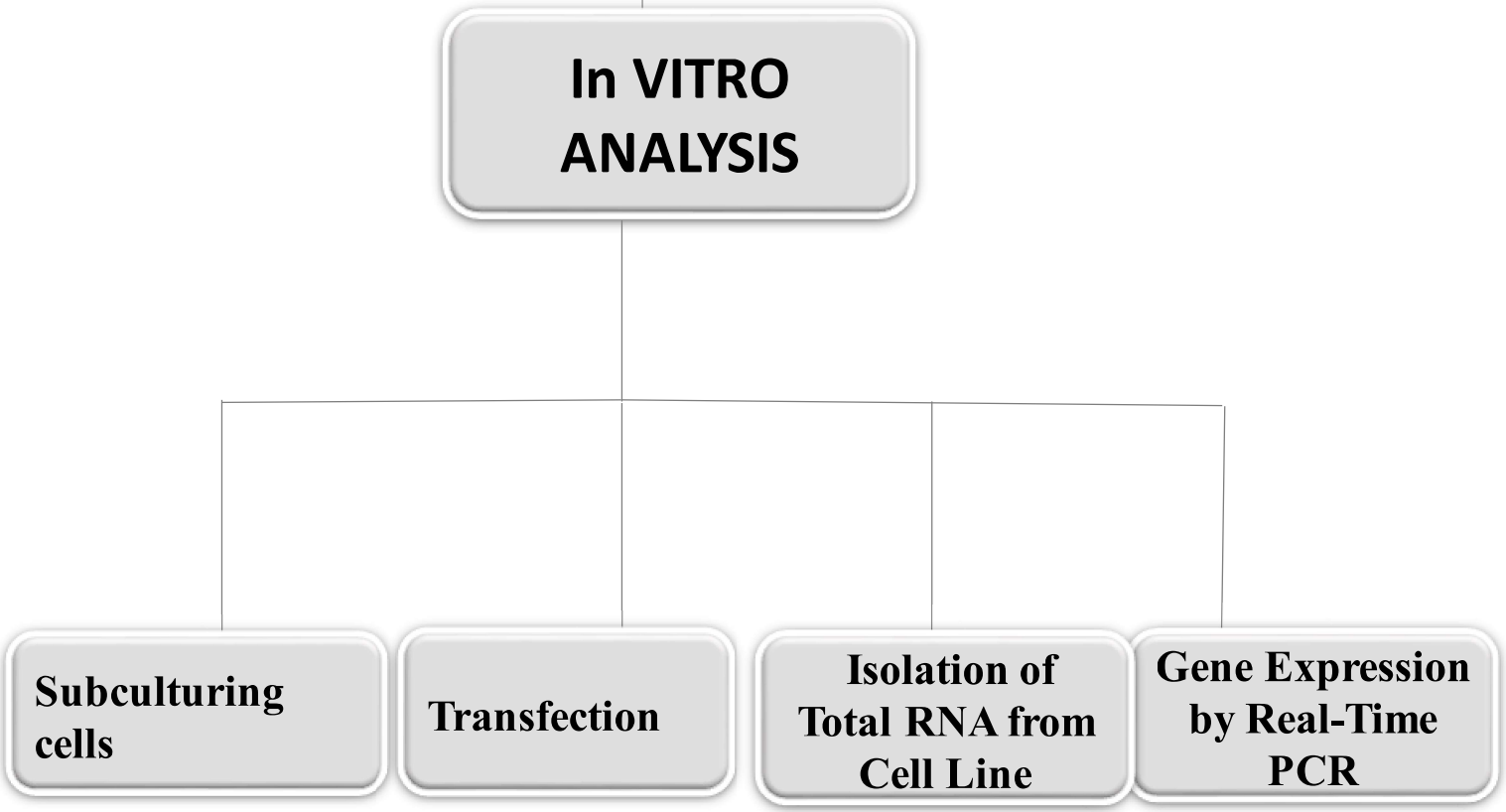
The Experimental Design

COVID-19

SW1417 were grown in 24-well plate



DESIGN OF STUDY



The Results

The Results

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Calculation of expression Results

- **First step**

ΔCt: Normalisation to Endogenous Control

- **Second step**

ΔΔCt: Normalisation to Calibrator

IFIT-2

COVID-19

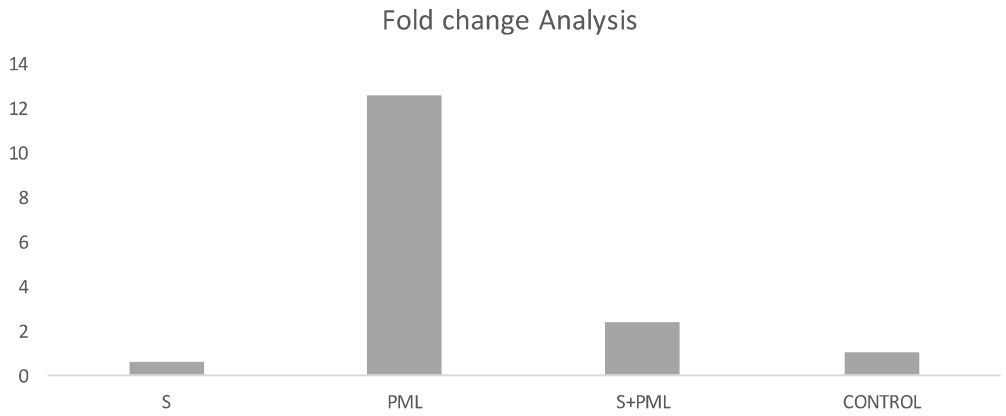

Figure (2): *IFIT-2* fold change analysis with or without the overexpression of S or PML-II or S+PML-II plasmids in 293 cells.

Equivalent cultures of 293 were transfected with S, PML-II, S+PML-II, or left as control without any treatment. Total RNA was extracted at 24 hours post transfection, reverse transcribed and the synthesized DNA were used as a template for qPCR relative expression assay using SYBR green master mix. Data were analyzed by ΔΔ.CTs and normalized to (GAPDH) house-keeping gene.

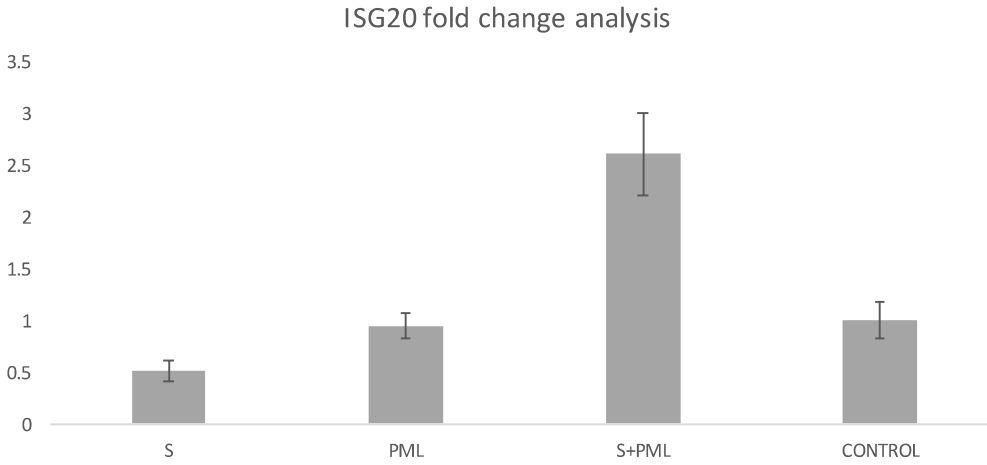

Figure (4): *IFIT-2* fold change analysis with or without the overexpression of S or PML-II or S+PML-II plasmids in 293 cells.

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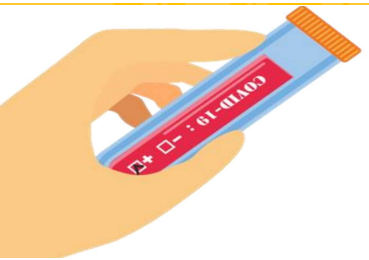
Conclusions and Recommendations



Conclusions & Recommendations

Elevated levels of type I IFN and IFN stimulated genes due to the overexpression of PML-II is critical to control the virus at very early stages.

IFN alpha & Beta could be considered as a bridge between the innate and adaptive immune response and hence this could be considered in treating Covid-19 cases.

We recommend

Verifying the idea using more techniques
Use of normal cell lines

THANK YOU