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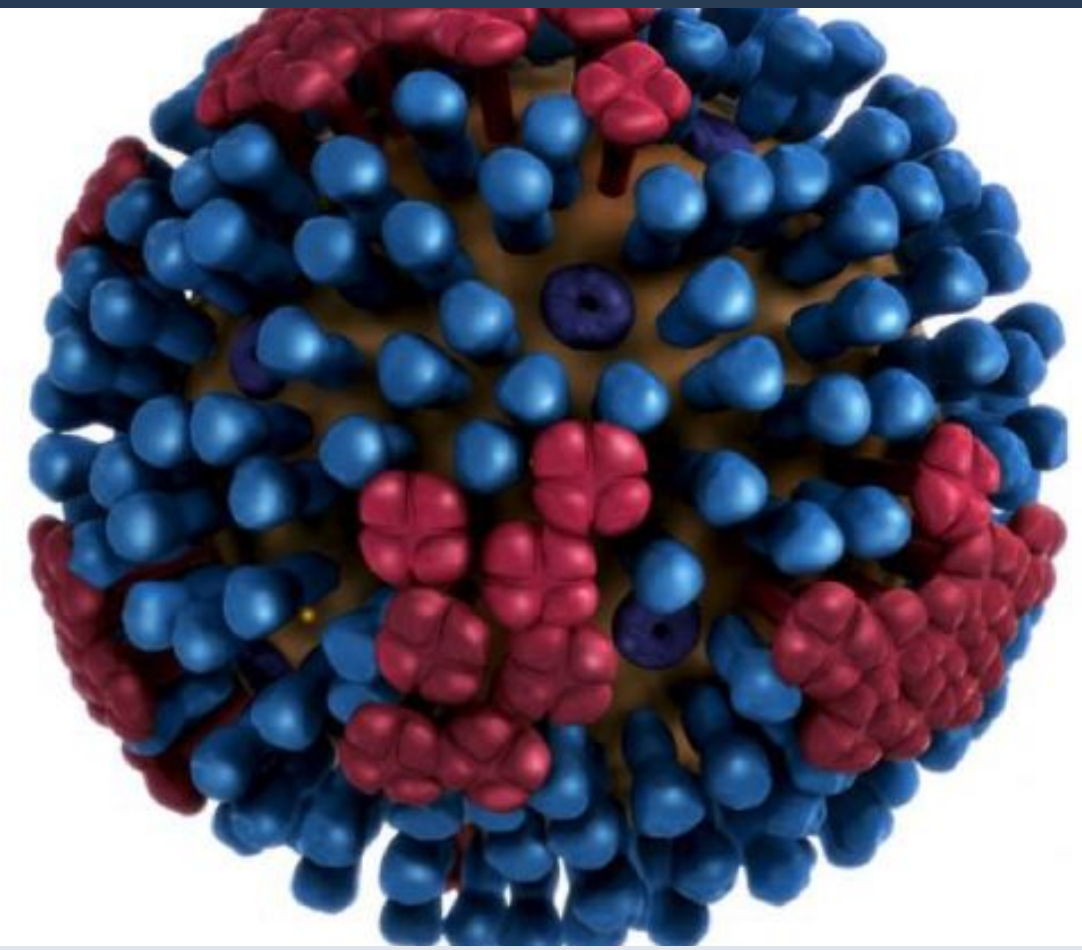
Influenza/RSV immunotherapeutic

A small molecule stimulates a highly effective host antiviral response against influenza virus and respiratory syncytial virus (RSV)



Please note, header image is purely illustrative. Source: Dan Higgins, PIXNIO, CC0

IP Status

Patent application submitted

Seeking

Development partner, Commercial partner, Licensing

About **University of Nottingham**

The University of Nottingham produces world-changing research by focussing on the problems and challenges that affect societies and people on a wide scale. More than 80% of Nottingham research is ranked in the highest categories ‘world-leading’ or ‘internationally excellent’.

Background

Flu virus readily gains resistance to current and new antivirals

Pandemics are an inevitable feature of influenza virus. Current antivirals work by directly targeting influenza virus proteins, such as viral neuraminidase and polymerase, and are highly vulnerable to resistance development due to mutations.

In such eventualities, both seasonal vaccines and existing antivirals are of limited value. Thus, there is the unmet need for antivirals to be more effective and resistant to viral mutations.

Tech Overview

This technology details a small molecule that stimulates a highly effective host antiviral response against influenza virus and respiratory syncytial virus (RSV) which includes interference of viral protein transport and assembly, and enhanced type I and III interferon response.

The compound can be orally administered, and is difficult for virus to overcome by mutation.

Triggering a multi-faceted host innate immune response

The small molecule activates a range of host innate immune mechanisms to block virus replication; such multi-layer defences are difficult for a virus to overcome by mutational changes (Figure 1).

The mode of action of the antiviral compound (X) is completely different from all current and in-development influenza antivirals (Figure 2). X triggers different host innate processes culminating in post-translational inhibition of virus replication.

In vivo studies have shown that the compound is protective against lethal viral challenge, and a relatively low dose is at least as effective as high dose (45mg/kg/day) oseltamivir.

Antiviral small molecule just as effective against RSV infection

These generic but effective host antiviral defences against influenza are just as effective against RSV. X has the potential to be applied to other RNA viruses (Figure 3).

Stage of Development

- Demonstrated protection in mice against lethal influenza challenge
- At least as effective (1.5 μg/kg/day) as high dose oseltamivir (45 mg/kg/day) *in vivo*

- Multi-faceted innate immune response not easily overcome by virus mutation

Benefits

Key features:

- low dose required;
- high selectivity index (high safety margin);
- effective therapeutically and prophylactically
- No cytokine storm or histamine upregulation

Applications

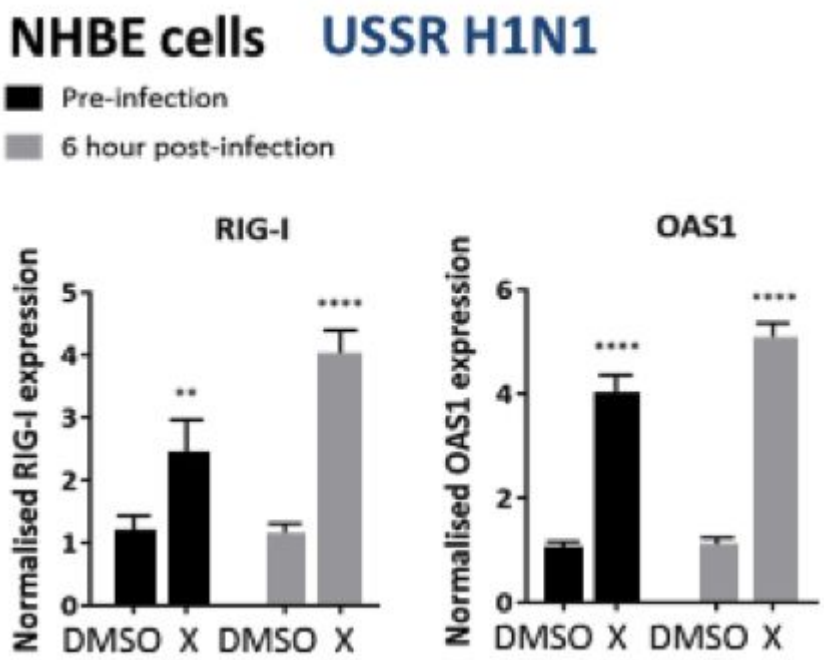
This discovery is targeted at treating populations at risk of influenza pandemic or epidemic where a vaccine is unavailable

Patents

- PCT appl. filed Apr 2019
- GB appl. on further compounds filed Oct 2019

Appendix 1

Figure 1



Appendix 2

Figure 2

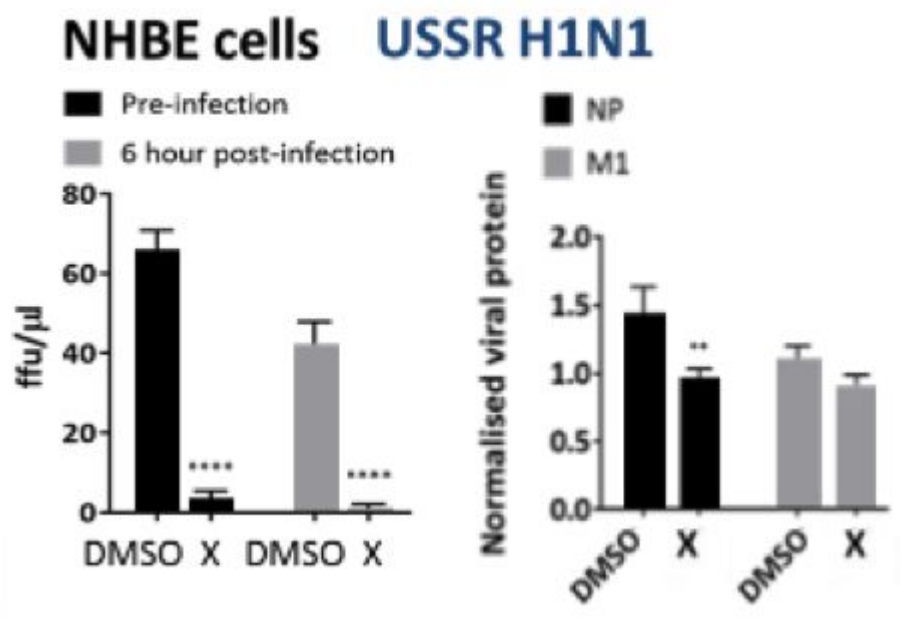
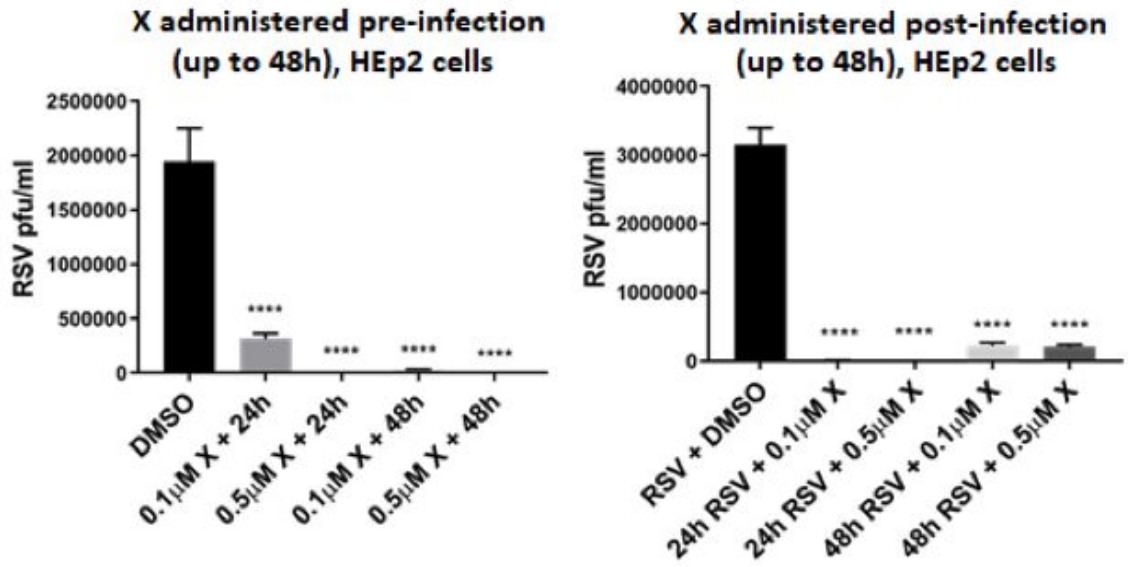


Figure 3


X administered pre-infection
(up to 48h), HEp2 cells
RSV pfu/ml
2500000
2000000
1500000
1000000
500000
0
****
****
****
****
DMSO
0.1μM X + 24h
0.5μM X + 24h
0.1μM X + 48h
0.5μM X + 48h
X administered post-infection
(up to 48h), HEp2 cells
RSV pfu/ml
4000000
3000000
2000000
1000000
0
****
****
****
****
RSV + DMSO
24h RSV + 0.1μM X
24h RSV + 0.5μM X
48h RSV + 0.1μM X
48h RSV + 0.5μM X