

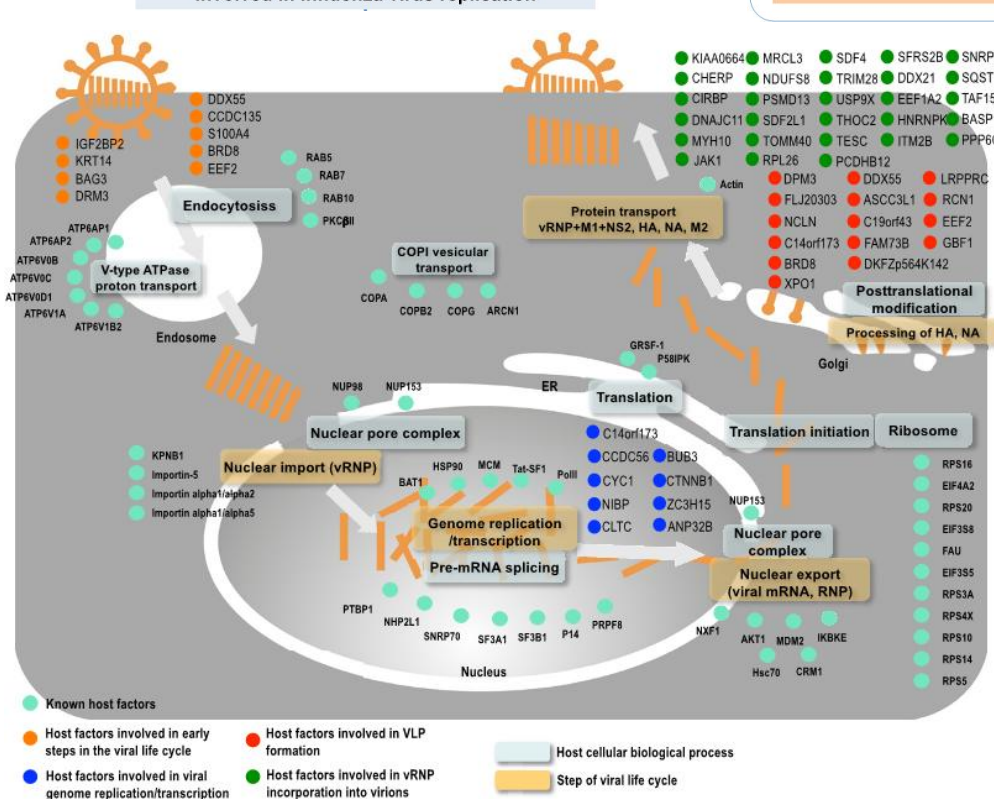
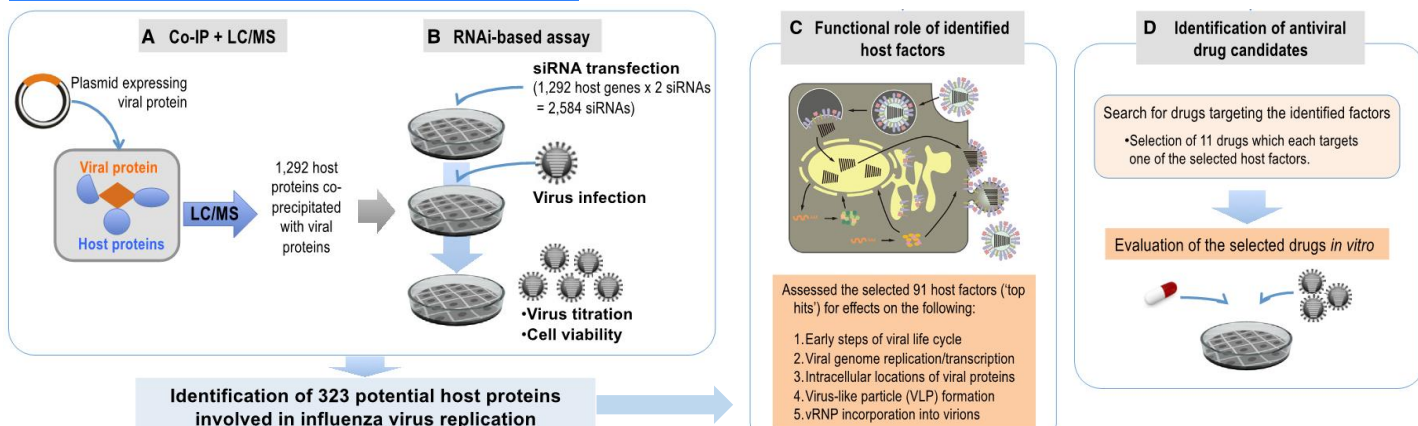
Anti-influenza virus agent

- Targets for anti-viral therapy based on 299 host cell factors whose suppression reduced influenza virus replication -

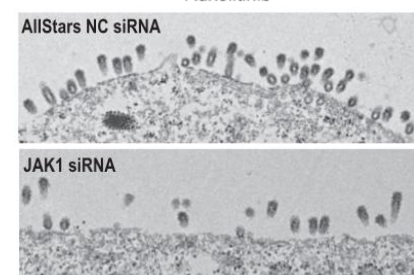
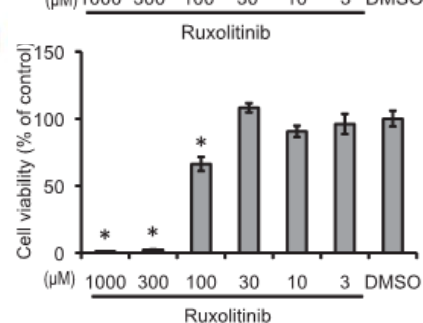
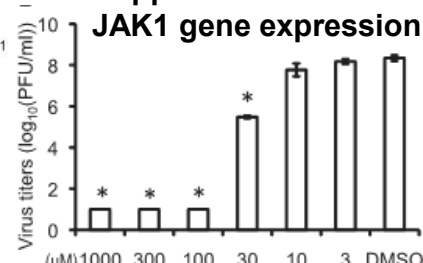


Summary of the inventions

Cell Host & Microb 2014;16:795-805



Suppression of JAK1 gene expression



Major advantages of the patented technology

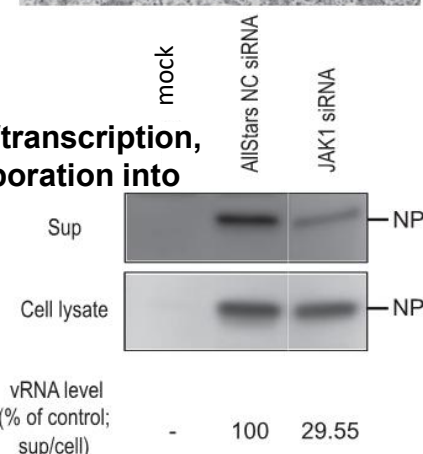
Influenza virus - host cell interactome screens identify targetable host factors and guide antiviral drug development.

◆ Host factors involved in;

- 1) Early steps in the viral life cycle, 2) Viral genome replication/transcription, 3) Virus-like particle formation, 4) Viral ribonucleoprotein incorporation into virions

◆ Cells with high ability to propagate influenza virus, suitable for producing the virus for manufacturing a vaccine

- 1) More easily scaled up with reduced risk of mutations
- 2) Absence of egg proteins with less potential allergies
- 3) Approved for human use in US and EU
- 4) High vaccine virus yield



Inventor: Yoshihiro Kawaoka, Prof. University of Tokyo

Licensable Patent International Pub. No.: WO2016047595/WO2016047592

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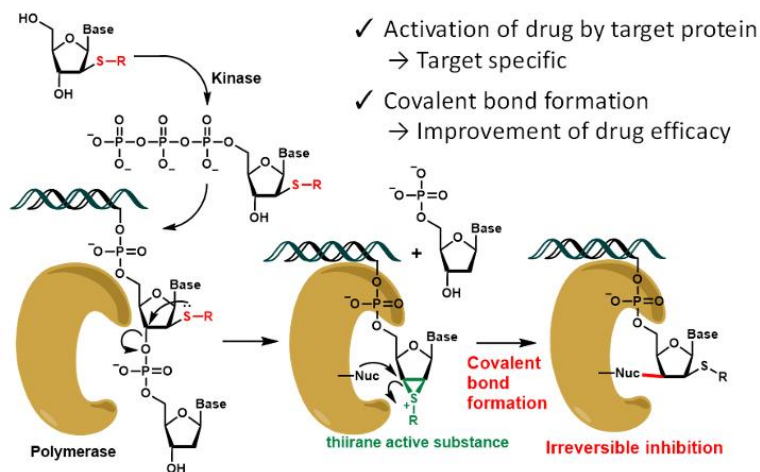
Irreversible DNA polymerase inhibitor

- Novel mechanism of action as anti-virus/anti-tumor drug -

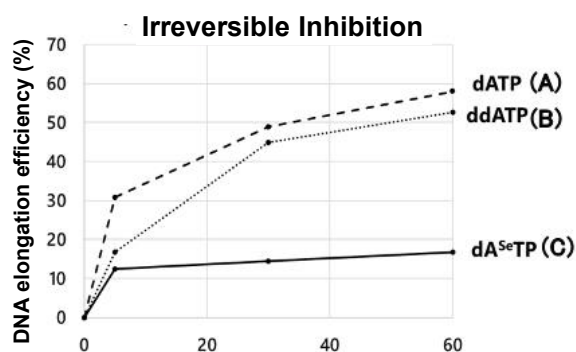
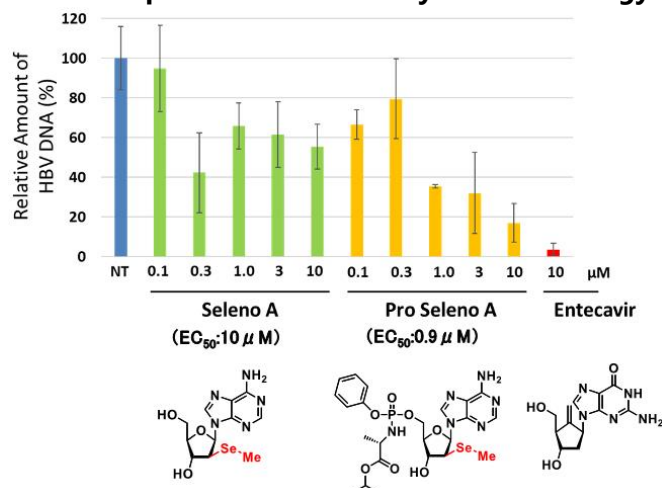
Overview and efficacy of the invention

Irreversible Inhibitors of DNA Polymerase

- A group of compounds that irreversibly inhibit polymerases by **forming covalent bonds with DNA polymerases**.
- Expected applications include pharmaceuticals with novel mechanisms of action (e.g., antiviral drugs, anticancer agents). Effective even against drug-resistant viruses.



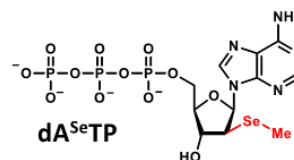
HBV Replication Inhibition by This Technology



AMV reverse transcriptase was incubated with compound (A), (B), or (C). The protein solution was concentrated, and chain-elongation reactions were performed again.

AMV: Avian Myeloblastosis Virus

dASeTP: (chemical name preserved as in the source)



Advantages over Conventional Technologies

Key Findings:

- More than 10 times stronger anti-viral activity against drug-resistant HIV strains than existing drugs
- Low cytotoxicity

Antiviral Activity Against Mutant HIV (EC₅₀)

Virus Types	AZT	Lamivudine	Didanosine	Pro Seleno A
WT	0.042	1.2	3.2	0.98
M184V	0.033	> 100	8.3	2.0
M41L/T215Y	0.12	1.7	5.6	1.3
M41L/T69SSG/T215Y	18	24	17	1.4

(μM)

Cytotoxicity (CC₅₀)

AZT	Pro Seleno A
45	> 100

(μM)

Potential Applications

- DNA Polymerase Inhibitors** → Anticancer drugs, antiviral drugs
- RNA Polymerase Inhibitors** → Antiviral drugs against COVID-19 and others
- Mevalonate Kinase & 5-Phosphomevalonate Kinase Inhibitors**
→ Treatments for hyperlipidemia and hypercholesterolemia
- PI3 Kinase Inhibitors** → Treatments for cancer, malignant lymphoma, leukemia, rheumatoid arthritis, etc.

Lead Inventor: Hiroshi Abe (Professor, Graduate School of Science, Nagoya University)

Title of Licensable Patent Invention:

β-Modified Phosphate Compound Precursors, β-Modified Phosphate Compounds, Reaction Inhibitors, Pharmaceuticals Containing the Same, and Reaction Inhibition Methods

Publication Number: WO 2019/172394

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