

SUMMARY

Title	Research and discovery of innovative ways to treat and prevent influenza (adjuvant)
Investigators	Yoshihiro Kawaoka, Professor Makoto Yamashita, Project Professor Division of Virology, Institute of Medical Science, The University of Tokyo
Abstract	<p>Influenza is a serious, often debilitating respiratory illness that can cause complications that lead to hospitalization and death, especially in elderly individuals. Two countermeasures, vaccination and treatment with antivirals, are available to control human influenza. The efficacy of the current influenza vaccines remains inadequate. Given that the targets of all currently approved antivirals are viral proteins, the spread of drug-resistant viruses is a great concern. To control influenza, new measures to increase vaccine efficacy and develop drugs with a low propensity to generate resistant mutants are needed.</p> <p>To increase vaccine efficacy, we discovered adjuvants by in vivo screening libraries of compounds that are approved for use in humans. The adjuvants enhanced antibody production induced by influenza vaccine in mice and protected mice from lethal infection. The discovered compounds may be safe for humans because all of them are already approved for human use.</p>
Applications	<ul style="list-style-type: none">• Influenza prophylaxis• Vaccine efficacy enhancement to VPD (vaccine preventable disease)• Efficacy enhancement of animal vaccines
Advantages	<ul style="list-style-type: none">• More effective vaccine• Safe and novel adjuvant
Market Overview Japan	<ul style="list-style-type: none">• Annually about 25 million people receiving influenza vaccination• About 65 billion Japanese yen spent for influenza vaccination• More than 270 billion yen spent for the vaccine market
Stage of Development	<ul style="list-style-type: none">• Preclinical• Find a company to develop the influenza vaccine including our novel

adjuvant and conduct the necessary research experiments as determined in discussions with the company.

Patent Information
Publication

- In preparation for patents and manuscripts

Business Opportunity

- Find a company to develop the vaccine including the adjuvant.
- Licensing
- University: Implementation of the necessary research experiments as determined in discussions with the company.
Company: GMP production of the vaccine including the adjuvant and clinical trials including safety studies.

Contact to

Division of Virology, Institute of Medical Science, The University of Tokyo

Yoshihiro Kawaoka, D.V.M. Ph.D.

Tel: 03-5449-5504

e-mail: yoshihiro.kawaoka@wisc.edu

Makoto Yamashita, Ph.D.

Tel: 03-6409-2207

e-mail: yamakoto@ims.u-tokyo.ac.jp

Appendix

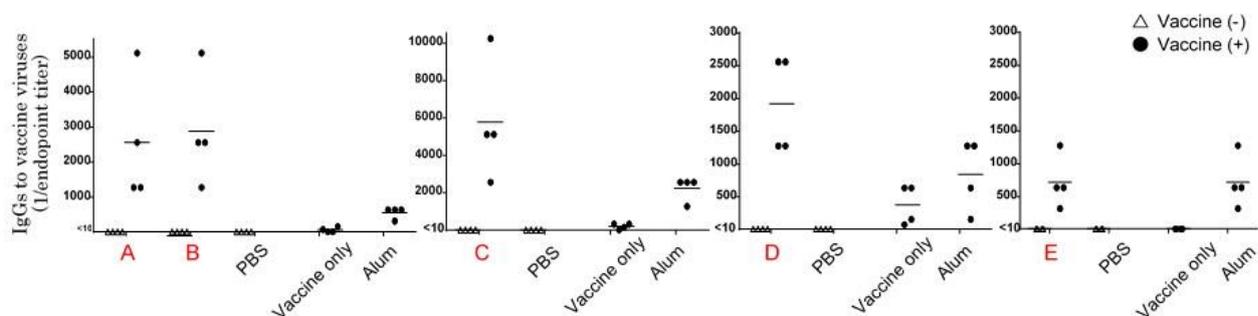


Figure 1. Compound enhancement of antibody production induced by influenza vaccine

Mice were immunized with a commercially available influenza vaccine plus compounds A–E, as selected candidates from the libraries of compounds approved for human use. Two weeks later, the mice were boosted. Antibodies titers in blood were determined after two weeks of boosting.

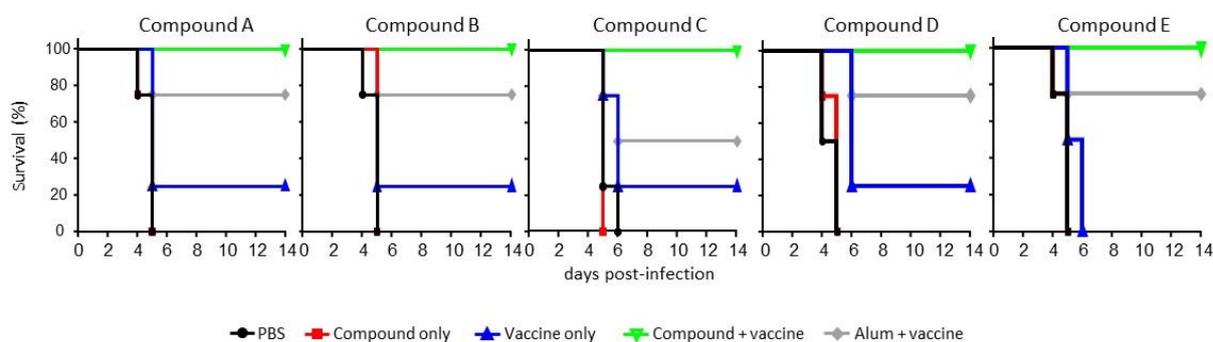


Figure 2. Effect of the adjuvants on lethal infection of mice

Mice were treated as described in the legend of Figure 1 and after two weeks of boosting, they were infected with a lethal dose of influenza virus. Mice survival was monitored 14 days post-infection.