

Synergy Center Overview

Establishment of quick providing system of domestic vaccines by “preemptive strategy”

- ◆ Preparation of pathogen libraries for pandemic of emerging and re-emerging infectious diseases
Research for zoonoses: strong point of HU
- ◆ Promotion of basic research for vaccine development and its social implementation



Establishment of structure for R&D of vaccines

Collaboration with HU Hospital & other related-facilities on HU campus –“ALL HU”

Vaccine R&D for zoonotic diseases, including respiratory infections

Promotion of vaccine R&D for the next pandemic candidates, such as **influenza**, **coronavirus infection**, and **tuberculosis**

Influenza	Coronavirus Infection	Tuberculosis
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1. Viruses and other pathogens

- Establishment of **pathogen libraries**
- Analysis of pathogenesis & transmission

2. Structural Biology Research

- Structural analysis of pathogens and its proteins by **cryoEM at BSL3**

3. Basic research on vaccines 1

- Analysis of **innate and acquired immune responses** in hosts

4. Basic research on vaccines 2

- **Whole particle vaccine** as seed vaccine
- **Lipid nanoparticles** as DDS for vaccine
- **New adjuvants** for vaccine

5. Evaluation Systems

- **Evaluation system** for developed vaccine
- Development of **new diagnostic techniques**

Vaccine development

Vaccine for Infectious Disease

Target	Type and Features
Influenza	<ul style="list-style-type: none"> • Inactive whole particle • mRNA
Coronavirus Infection	<ul style="list-style-type: none"> • Inactive whole particle • Modified BCG
Tuberculosis	<ul style="list-style-type: none"> • Recombinant Proteins • Modified BCG bacteria

New modality

Modality	Features
CTL-induced adjuvant	CTL promoting adjuvants
Lipid nanoparticles	Excellent efficacy as DDS
Modified BCG	Excellent efficacy

Organization Structure



Companies



Overseas



R&D Overview

Preparation of prototype vaccine

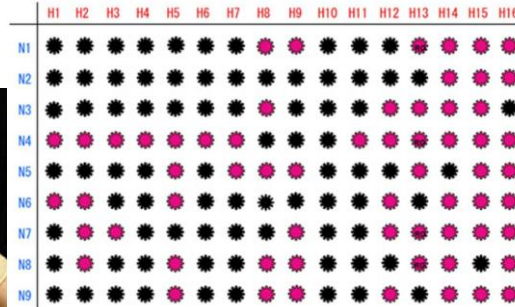
◆ The first isolation of H5N1 subtype highly pathogenic avian influenza virus from a mammal in Japan



Ezo Red Fox



Stored in the Hokkaido University Influenza Library



Analysis of pathogenicity of the virus at the National Institute of Infectious Diseases (NIID)



A/Ezo red fox/Hokkaido/1/2022 was approved as “Available” strain at the WHO VCM (2024.2)



- ◆ **First H5N1 HPAIV (clade 2.3.4.4b) from mammal in Japan**
- ◆ Emergence of **HPAIV (H5N1 clade 2.3.4.4b) in dairy cattle results in a serious threat** to the dairy industry in USA.
- ◆ Related viruses continue to be detected in poultry and wild birds in Japan during the 2022–2023 winter season.
- ◆ Infection cases in mammals continue to be reported in Europe, North and South America.
- ◆ **Health Sciences Council, Ministry of Health, Labour & Welfare** on May 1st, 2024: The A/Ezo red fox/Hokkaido/1/2022–like was selected as “**pre-pandemic vaccine**”, **stockpiled for up to 10 million people**.
- ◆ This vaccine was already started preparation by a pharmaceutical company.



5 million dose will be prepared.

Candidate vaccine viruses*

Antigenic prototype	Clade	Candidate vaccine virus	Developing institute	Available from
A/American wigeon/South Carolina/22-000345-001/2021-like	2.3.4.4b	Wild type virus		CDC, USA
		IDCDC-RG78A*	CDC, USA	
A/Ezo red fox/Hokkaido/1/2022-like	2.3.4.4b	NIID-002**	NIID, Japan	NIID, Japan

*New CVV shown in blue

**These viruses are candidate vaccine viruses which have passed relevant safety testing and two-way haemagglutination inhibition (HI) tests. They can be handled under BSL-2 enhanced containment¹.