

Synergy Center Overview



Director

Dr. Kouichi MORITA

The [Vaccine Research and Development Center \(VRDC\)](#) is operated at the [DEJIMA Infectious Disease Research Alliance \(DIDA\), Nagasaki University](#). DIDA was established in April 2022 to integrate the management of five university bodies engaged in infectious disease research and clinical practices. These are the Institute of Tropical Medicine; the National Research Center for the Control and Prevention of Infectious Diseases, which has the BSL-4 facility; the Graduate School of Biomedical Sciences; the Graduate School of Tropical Medicine and Global Health; and Nagasaki University Hospital.

The **nine teams** in the VRDC project are working with Shionogi & Co., Ltd., NEC OncoImmunity AS, ADTEC Co., Ltd., Asahi Kasei Corporation, and KM Biologics Co., Ltd. to develop vaccines targeting highly pathogenic pathogens (dangerous pathogens that cause diseases such as Ebola hemorrhagic fever) and tropical pathogens (pathogens of infectious diseases that spread in tropical regions, such as dengue fever and malaria). We are utilizing lipid nanoparticles (LNP), for which the university and participating companies hold patents. We are also engaged in research and development that makes full use of artificial intelligence (AI) for searching vaccine candidate proteins, as well as establishing a system for collecting and analyzing information on infectious diseases worldwide in collaboration with the London School of Hygiene & Tropical Medicine.

Vaccine development

Vaccine

Pathogen / infectious disease	Characteristics
Dengue fever	Live vaccine/mRNA
Severe Fever with Thrombocytopenia Syndrome(SFTS)	Attenuated live vaccine
Ebola hemorrhagic fever	mRNA
Crimean-Congo hemorrhagic fever (CCHF)	Pseudo typed virus, mRNA
Malaria	mRNA
Invasive non-typhoid salmonella	mRNA

Modality

Modality	Characteristics
mRNA	Development using AI
Nanoball	Efficient and with few side effects
Subunit vaccine	The efficient production of goods utilizing silkworm cells is a viable proposition.

Organization structure

AsahiKASEI

kmb
KMバイオロジクス

SHIONOGI



長崎大学
NAGASAKI UNIVERSITY



DIDA
DEJIMA ID Alliance



DEJIMA ID Alliance
VRDC



BSL-4 Facility

Overseas Stations
• Viet Nam
• Kenya
• Philippines
• London
• Brazil

NEC
NEC OncoImmunity AS

ADTEC

LONDON SCHOOL of HYGIENE & TROPICAL MEDICINE

R&D Overview



SHIONOGI

KIYAMA Ryuichi

Senior Executive Officer, Senior Vice President, Administration Division, Shionogi & Co., Ltd.

Director



MORITA Kouichi

Director, DIDA, Nagasaki University

Vice-Director

Vice-Director

YAMAMOTO Hiroshi

Director, Clinical Research Center, Nagasaki University Hospital



Target 1: Rapid development system establishment through R&D of vaccines for highly pathogenic and tropical infectious diseases

Target 2: Development of T-cell and B-cell vaccines starting with AI: From design to evaluation

① Highly pathogenic virus R&D Team

Prof. Jiro Yasuda

Target and Modality

Severe Fever Thrombocytopenia Syndrome (SFTS)

Crimean-Congo Hemorrhagic Fever (CCHF)

Ebola Hemorrhagic Fever

SFTS Diagnostics Development

Live Vaccine

LNP-mRNA

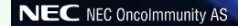
LNP-mRNA



⑥ AI vaccine design Team

Prof. Kaidre Bendjama

Universal B and T Cells Epitope prediction using AI



⑨ Immune response evaluation Team

Prof. Shinjiro Hamano

Immunological validation of candidate proteins for vaccines using human clinical specimens



④ Vaccine modality R&D Team

Prof. Yoshimasa Tanaka

COVID-19 Recombinant Protein, LNP-mRNA, Nanoball-mRNA



② Tropical virus R&D Team

Prof. Kouichi Morita

Dengue Fever

Live Vaccine, LNP-mRNA



③ Parasitic disease R&D Team

Prof. Osamu Kaneko

Malaria

LNP-mRNA



⑧ Bacterial Pathogen R&D Team

Prof. Toshio Kodama

Invasive non-typhoidal Salmonella (iNTS)

LNP-mRNA



Target 3: Research on the efficient implementation of vaccine development: from epidemiological information to sample collection

⑤ Oversea field Team

Prof. Satoshi Kaneko

- Collection and isolation of pathogens for genome sequencing
- Human clinical specimens with epidemiological information and clinical findings



⑦ Infectious Disease Epidemiology Team

Prof. John Edmunds

- Early identification of signs of an infectious disease pandemic
- Optimization of vaccine clinical trial design and vaccine administration strategies



Derivation of new vaccines