

# THE PARTNERSHIP BETWEEN HUE UNIVERSITY OF MEDICINE AND PHARMACY AND TOKYO METROPOLITAN UNIVERSITY ON FIGHT AGAINST EMERGING AND REEMERGING INFECTIOUS DISEASES IN SOUTHEAST ASIA

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## Summary

In recent years, emerging and reemerging infectious diseases (EREID) worldwide spread not only in Southeast Asia but also in Africa and other countries. Therefore, it is urgently required to establish practical system for prevention and making minimum epidemics of EREID in Southeast Asia.

For this aim, the Tokyo Metropolitan University (TMU) and Hue University of Medicine and Pharmacy (HUMP) have decided to be partners to accomplish for multi-focusing research projects against EREID. Since 2011, TMU started to establish the system with research expense supported by Tokyo Metropolitan Government. The final goal is to dissolve the situation of import- or export-EREID among countries of Southeast Asia. For this purpose, HUMP will be key organization in the Central Vietnam, and expanding the network with all other countries of Southeast Asia.

In this article, we introduced the points of whole pictures of our cooperative research project to the all readers of J. of Medicine and Pharmacy. Our research project is constituted with three components:

- i. Call center for infectious diseases - supply information of EREID at website with multi language: Japanese, English, Vietnamese, and Malay.
- ii. Rapid censor for measurement of human vital signs - body temperature, pulse and respiration rate.
- iii. Newly developed nano-immunoassay system - nano-level reaction volume of test sample and reagents, and very short reaction time with high accuracy for detection of concerned pathogens of EREID.

## 1. INTRODUCTION

A member of the TMU project team, Professor Sugamata first visited Hue as a medical advisor of survey team of Japan Bank for International Cooperation (JBIC) and NEC Facilities, LTD. The survey named "Pilot Studies for Knowledge Assistance for enhancing effectiveness of water environment improvement plans through hospital wastewater treatment and water sanitation promotion". This survey proceeded at 14-27, Dec. 2006, 11-28 March, 2007, and 13-19 May 2007. During this survey, we established very practical partnership with Hue University.

Accomplishment detail can be seen in our report in both English and Vietnamese<sup>1</sup>.

In July, 2010, TMU and Hue University exchanged Memorandum of Understanding (MOU) for five years. Now we are also advancing to exchange MOU between TMU and HUMP. The completion is expected at the end of 2013.

For the next step, we invited five medical doctors concerning diagnosis and/or treatment of infectious diseases from Hue College of Medicine and Pharmacy, and the Hue Central Hospital to show the actual conditions in Japan in regulation of infectious diseases (staying period from July

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to September, 2010). The invited doctors are mentioned below, Tran Xuan Chuong MD, PhD, Tran Kiem Hao MD, PhD., Dong Si Sang MD, Truong Quang Vinh MD, Mai Van Tuan MD (degree at 2010). We believe that these scientists will become core members for the fight against EREID in Southeast Asia.

We did field research for evaluation of compact multiple human vital sensor among about 400 (11-15 March, 2013) at the ward of Hue University Hospital. For this trial, we were strongly assisted by doctors and nurses at there.

## 2. MEMBERS

The project members are listed below.

TMU:

1. Ming Yang: PhD, Project leader, professor Graduate School of System Design, TMU
2. Takemi Matui: PhD, professor Graduate School of System Design, TMU
3. Katsumi Uchiyama: Katsumi PhD, Professor Dept. of Applied Chemistry, Graduate School of Urban Environmental Sciences, TMU
4. Hizuru Nakajima PhD, assoc. professor Dept. of Applied Chemistry, Graduate School of Urban Environmental Sciences, TMU
5. Masami Sugamata: DVM, PhD, professor Dept. of Hygiene and Public Health, Graduate School of Human Health Sciences, TMU
6. Tanji Hoshi: professor MD, PhD, Graduate School of Urban Environmental Sciences, TMU
7. Makoto Ito: PhD, professor Division of Social Studies, Social Anthropology, TMU

Our project team has 11 foreign PhD students from China, Vietnam, and Malaysia.

HUMP:

The newest project detail were explained to the Rector, Professor Cao Ngoc Thanh and the Vice-Rector, Professor Tran Huu Dang. According to their recognition of significance of the project, our joint survey is now ongoing.

An instrumentality for international relationship between HUMP and TMU is advanced by Dr. Nguyen Vu Quoc Huy, Deputy Head. Actual project steps are discussed firmly and modification will be made between Dr. Tran Xuan Chuong and Dr. Sugamata.

1. Cao Ngoc Thanh, Professor, Rector of HUMP

2. Tran Huu Dang, Professor, Vice-Rector of HUMP

3. Nguyen Vu Quoc Huy, Assoc. Professor, Office of Scientific Researches and International Relations, Department of Obstetrics and Gynecology

4. Tran Xuan Chuong, Assoc. Professor, Vice-Head, Department of Infectious Diseases

5. Le Van An, MD, PhD, Head, Department of Microbiology

6. Truong Quang Vinh, MD, PhD, Head, Department of OBS/GYN

7. Nguyen Lo, MD, PhD, Head, Department of Infectious Diseases

Other cooperative organization:

1. National Institute of Infectious Diseases, Japan
2. National Tokyo Medical and Dental University, Japan
3. Ministry of Health, Malaysia
4. WHO Hanoi, Vietnam.

## 3. BASIC FEATURE OF PROJECT

1). Call center for infectious diseases - supply information of EREID at web site with multi language, Japanese, English, Vietnamese, and Malay.

As we know that in general, it is impossible to eradicate EREID in the world. Therefore it will be very important to detect the suspicious patients in the early stage of onset suffering from EREID. For this purpose, it must be considered to enlighten to the workers related in medical area such as medical doctors, nurses and the people of paramedical area, also even for common people. So we developed a system for supplying fundamental information of about 80 EREID with easy explanation onto website (<http://www.npo-bmsa.org/kansen/ID> and Pass word required). Also using the prepared information source of EREID, call center is open now. You can get the information that you want know about EREID by talking with operators.

According to the effort of the team HUMP, the translation from English to Vietnamese is now ongoing. As an example, outline and exponent Q&A of dengue are shown.

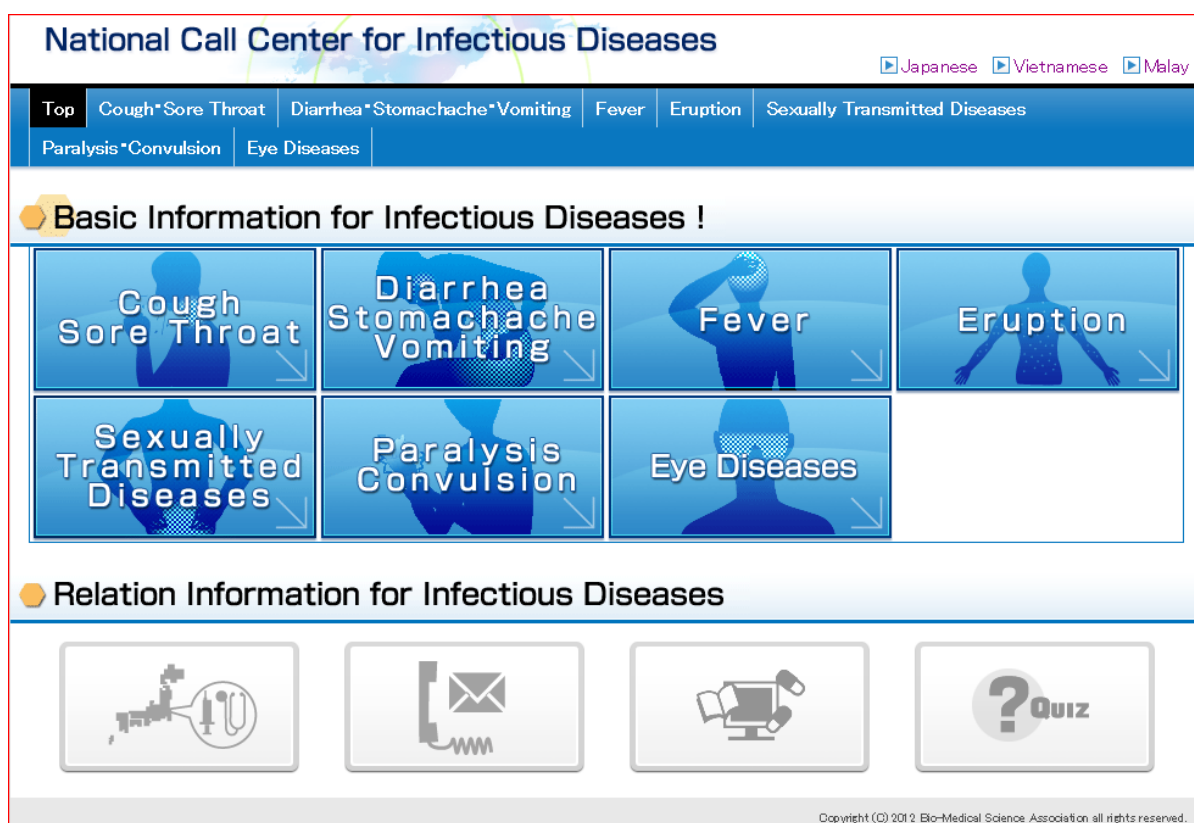


Figure 1. Top page of web site

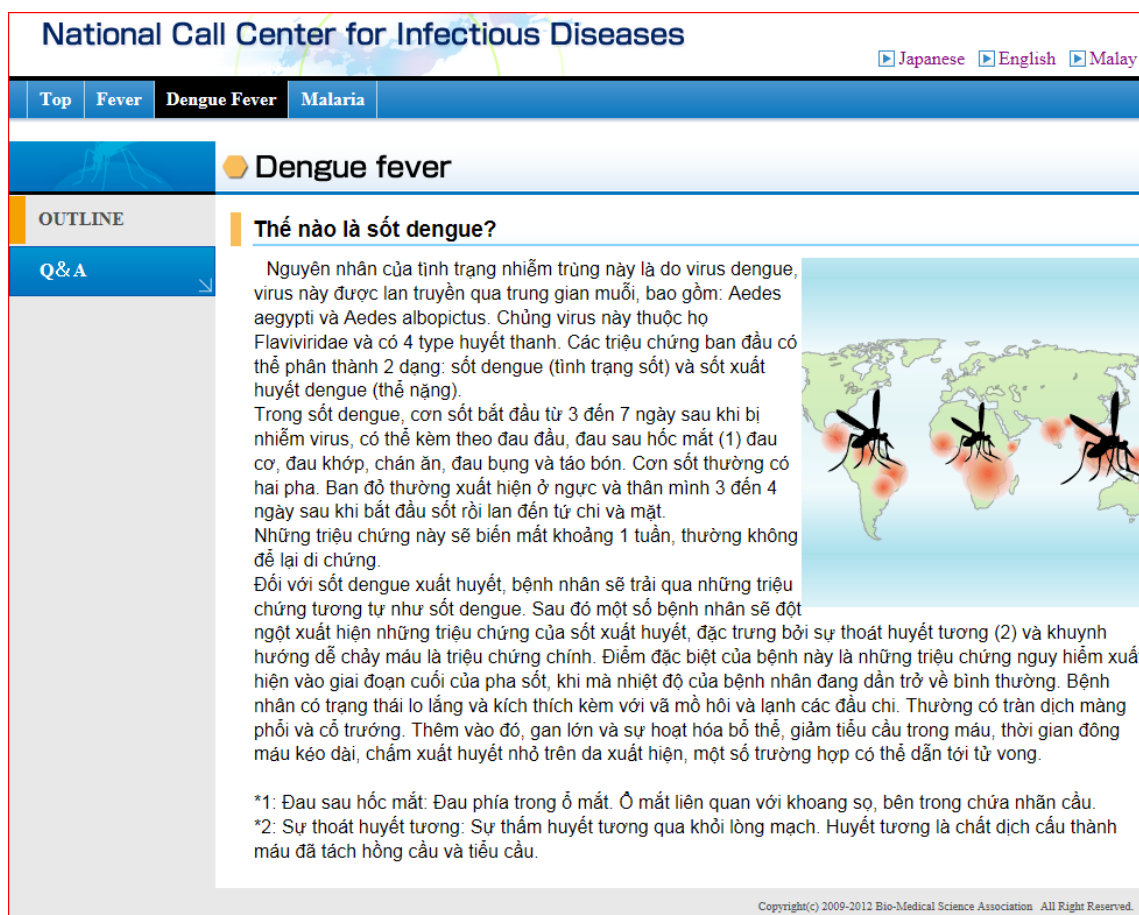
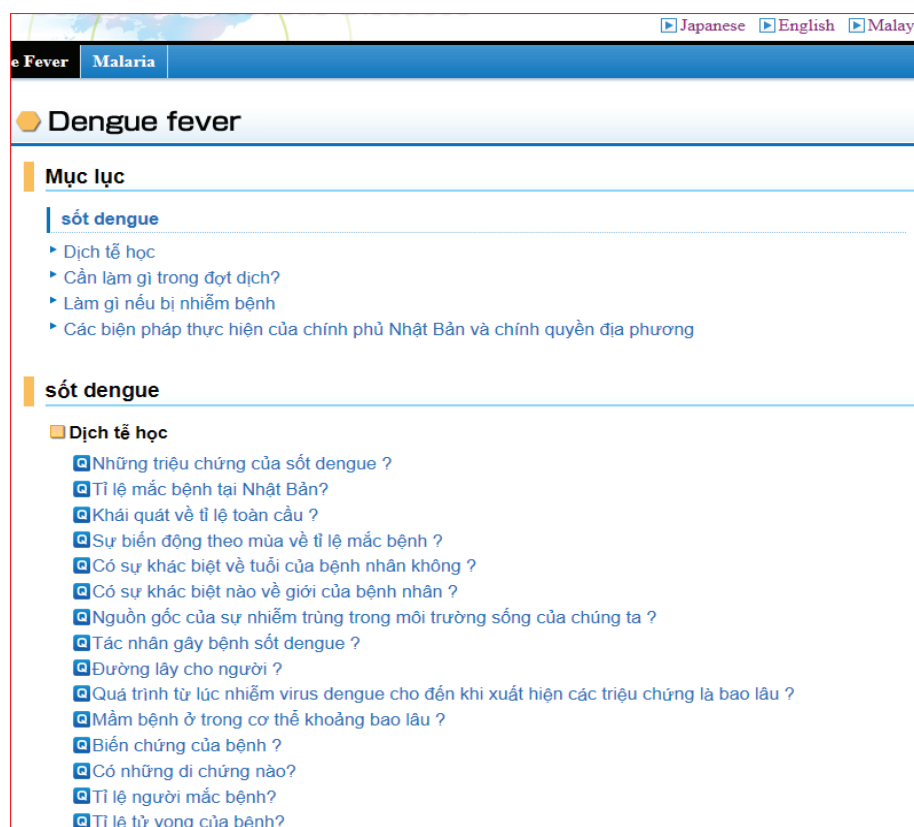


Figure 2. Outline of Dengue fever in Vietnamese



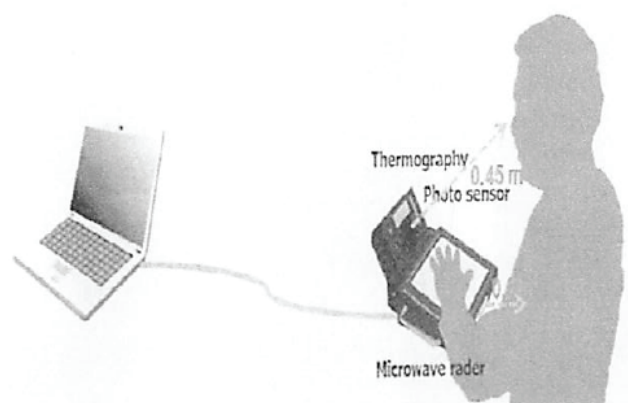
**Figure 3.** Exponent Q&A of Dengue fever in Vietnamese (partial)

2). Rapid sensor for measurement of human vital signs - body temperature, pulse and respiration number.

Although it is impossible to prevent entry of people infected with EREID, trying to find such people could be warning to the publics. We can take actions quickly for prevention of EREID spread. So we developed human vital sensor for measurement of body temperature, pulse and respiration number at once within about 15

seconds<sup>2</sup>. You can image of the sensor operation (Figure 4). Also you can see the sensor itself at HUMP. Once epidemic occurred, it is necessary to distinguish people with high fever from public mass, such as airport, train station, clinic and so on.

We have evaluated prototype and modified sensor at airport, hospital, etc. in Japan<sup>2</sup>. We also have done at Hue University Hospital mentioned in the beginning part.

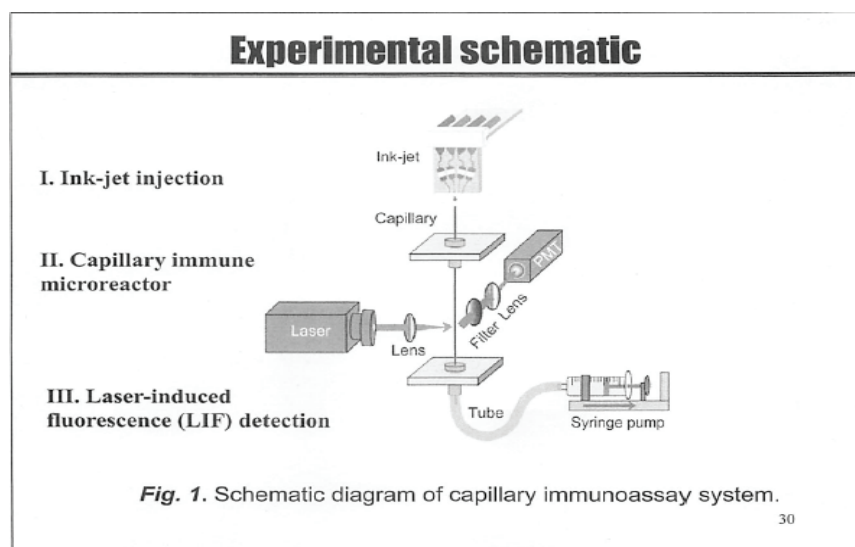


**Figure 4.** The illustration of the portable screening system  
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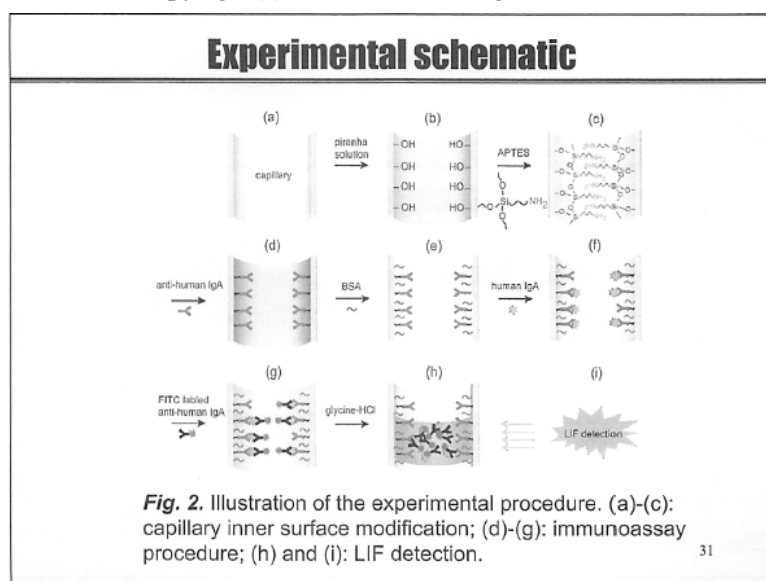
3). Newly developed nano-immunoassay system - nano-level sample volume and very short reaction time with high accuracy for detection of concerned pathogens of EREID.

Enzyme-linked immunosorbent assay: ELISA with 96-well plate is a well spread method for diagnosis, or research of EREID. This system required microliter level of specimens, such as

serum, CSF, etc. If it is possible to reduce sample volume from microliter level to nanoliter level. There are several definite advantages, such as reducing volume for sample collection, reduce total reaction volume induced shorten reaction time dramatically. This means that precise results could be available in a short period<sup>3</sup>. The schematic summaries are indicated below (Figure 5 and 6).



**Figure 5.** Schematic diagram of capillary immunoassay system - 1  
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**Figure 6.** Schematic diagram of capillary immunoassay system - 2  
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#### 4. FOLLOWING STUDY SCHEDULES

For the next two years, we are planning to do multi-focusing studies in Tokyo and Hue

Listed below.

Call Center Project:

(1): Translation of EREID to Vietnamese, outline and Q&A for about 80.

(2): Construction of website with Vietnamese.

(3): Test run of website.

Human Vital sensors:

(1): Accumulation of data at various place, such as airport, hospital, school etc.

Nano immunoassay system

(1): Serum sample collection from healthy people living in central Vietnam for sero-

epidemiological data.

(2): Serum and other specimens (saliva, CSF etc.) of suspicious patients with EREID for diagnosis.

(3): Set up of nanoimmunoassay system at HUMP.

(4): Training technologist to maintain the system at HUMP.

International symposium in Hue and Tokyo on cooperation accomplishment on fight against EREID in Central Vietnam.

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