



Thai researcher working to develop antibody producing cells using human blood cells



Capturing mosquitos in Yoyogi Park, Tokyo, to prevent dengue fever (Photo courtesy of Tokyo Bureau of Social Welfare and Public Health)



Japanese and Thai officials gathered regularly during the project to check its progress



Left: Japanese experts demonstrating to Thai researchers

Right: Laboratory at Mahidol University was established with Japanese assistance. About 20 people worked on the project.

## Remedy for Tropical Disease that Threatens Japan

**D**engue fever hit Japan last year for the first time in almost 70 years, and the number of patients increased to 160. However, many more people suffer from it around the world. To fight the disease, Japanese researchers stood up to the challenge of developing a remedy.

### PATIENT SPECIMENS – THE KEY FOR THE RESEARCH

In April 2015, workers in long-sleeved uniforms gathered with butterfly nets in Yoyogi Park, Tokyo. In order to prevent dengue fever which affected Japan last year, they captured mosquitos in the park to ex-

amine if they carried the dengue virus and prepare the necessary preventive measures before summer.

Over 100 million people are affected by dengue fever annually across the globe, especially in tropical areas; approximately 250,000 fall gravely ill and can pass away in the most unfortunate cases. However, no effective preventive vaccine or remedy exist, and the only treatment is to rest well. Japanese researchers have been trying to develop a remedy since 2009, long before dengue fever affected Japan.

However, this research project faced a barrier. “Because of risks including bioterrorism, carrying a pathogen from one country to another is difficult, even for research,” explains Dr. Kazuyoshi Ikuta, then a professor at Osaka University Research Institute for Microbial Diseases. Cases of dengue fever were still unknown in Japan and specimens of local patients were thus unavailable, but an antibody of recovered dengue patient’s origin was expected to be highly effective for both prevention and treatment. Thailand, where tens of thousands of people are affected by dengue fever annually, was selected to be the center for the research so that pathogen data was easily available. Dr. Ikuta emphasizes the reasons to work with Thailand: “Japan has a strong relationship with Thailand due to previously assisting in establishing

the Thai National Institute of Health and cooperating in research concerning HIV/AIDS. Thailand also conducts research on infectious diseases with European countries and the United States, and plays a leading role in Southeast Asia.” Japan and Thailand thus started a joint research project as part of the Science and Technology Research Partnerships for Sustainable Development (SATREPS) by JICA and the Japan Science and Technology Agency (JST).

### LEAD TO THE WORLD’S FIRST CHALLENGE

The project also worked to improve technology in Thai research institutes and engaged many local researchers. Dr. Ikuta, the chief-advisor, visited Thailand monthly to check the progress and teach about technology and research. He says creating a sense of teamwork was difficult at first because the research was conducted in 2 centers: the National Institute of Health and Mahidol University. “They initially had different attitudes towards the research. So we made a website where each center could present their progress, helping them have a sense of rivalry while still being a team.” He communicated actively with local researchers and emphasized the importance of teamwork.

The most important process in the research was

making an antibody using the blood samples of dengue fever patients. “We had to do aseptic manipulation for many months to prevent the cells from being contaminated by bacteria, which was a very difficult process.” Apart from Dr. Ikuta, research scientists from Osaka University Research Institute for Microbial Diseases also participated to demonstrate techniques to local researchers who started to acquire them little by little. After repeated experiments, local researchers finally succeeded in creating an antibody that could contain the dengue virus for both prevention and treatment.

The Japanese manufacturer that participated in the project with Osaka University is negotiating with overseas pharmaceutical companies that are interested in the research results to produce the world’s first medicine for dengue fever. Dr. Ikuta says, “Infectious diseases now move beyond developing countries because of changes in the world such as globalization, urbanization and global warming. Japan cooperating in research and building relationships with other countries is important in order to cooperate with them in case of a domestic outbreak.”

The day may soon come when advanced Japanese technology will be a savior for patients of dengue fever that continues to spread across the globe.