A Rapporteur's Summary: International Research Collaboration on Dengue

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When Dr. Igarashi, Chairman of the Organizing Committee, invited me to participate in this symposium, I thought I should decline his gracious offer because I am not a dengue specialist. I was afraid I would not be able to contribute to this symposium. But after reading some of his review articles on dengue virus infection, I immediately understood why he so insisted that I attend this meeting. I now realize how important and necessary it is for us, NIH researchers, to play a greater role in the research of dengue haemorrhagic fever (DHF)/dengue shock syndrome (DSS).

Frankly speaking, after hearing so many interesting and stimulating presentations and enthusiastic discussions concerning prevention and control of dengue virus infection, I am thankful to Dr. Igarashi for inviting me to attend this meeting.

On the first day of this symposium, recent epidemiological features of dengue were reported from a global point of view by Dr. Scott Halstead and Dr. Nobuhiko Okabe, and country reports were made by many speakers who were invited from both tropical and subtropical countries. All of the data attests that DHF is one of the major public health problems in the South-East Asian and Western Pacific regions, and Central and South America.

First of all, I was very interested to discover through the symposium that there have been many observations concerning dengue which are presently hard to explain and so remain yet unanswered. For example,

1) Variable case fatality rates of DHF/DSS have been reported among different countries as well as in different years in the same country.

2) No noticeable differences have been found in both genetic analysis and biological marker tests among isolates from severe and mild dengue cases, suggesting that the same virus could develop a variety of clinical manifestations from unknown host factors of different circumstances, or that genetic analysis may be inadequate to prove the presence or absence of more virulent strains, even if they exist.

3) Viral virulence, or manifestation of clinical symptoms, may possibly be associated with genetic factors as suggested by epidemiological observations of the relative absence of severe cases of the disease among Blacks during the Cuban outbreaks of dengue in 1981.

4) It has not yet been clarified whether the virus itself, or a certain specific condition of the host, such as immune-enhancement mechanism, plays the dominant role in the path-
and other developed countries are far ahead of Japan in these respects. In fact, there are many American scientists who specialize in international medical cooperation for developing countries. In contrast, there are very few such institutes in Japan. However, our Ministry of Health and Welfare has just founded the National Medical Center for International Cooperation in Tokyo. We greatly hope for its success in the future.

Now I would like to refer to a more fundamental problem we have in pursuing international cooperation. That is the absence of effective communication between two nations working together. In most cases, this problem arises from language barriers. But it is also a result of a lack of knowledge about other countries. For most Japanese, English is the only other language they can use to communicate with the people from other countries. This limitation compounds problems as, in most cases, English is not the native language for both collaborating countries. In addition, traditionally, many Japanese tend to be shy and bad at socializing. These factors often lead to misunderstanding in international settings. These cultural misunderstandings can raise serious problems and cause conflicts among collaborating nations. Therefore, it is of the utmost importance to make efforts to study and understand the cultural backgrounds and the differences in customs and manners of our international partners in order to foster a more favorable environment for collaboration. Presently, this type of education is the individual's responsibility. However, I strongly believe that the aforementioned efforts should be made collectively through overseas research training.

Regarding dengue, in particular, work at the Institute of Tropical Medicine, Nagasaki University and the International Center for Medical Research in Kobe, and a few other institutions form the core of its research efforts. All these institutions are, however, under the tutelage of the Ministry of Education, Science and Culture and at this moment there are few dengue virus specialists in laboratories under the supervision of the Ministry of Health and Welfare. I must admit we are entirely responsible for this matter, and honestly, I'm grateful to Dr. Igarashi for giving me the opportunity to reassess our current stance towards the international collaboration on dengue research. In the future we must approach this situation more seriously, and make efforts to change it.

Finally, after hearing so many well articulated and cogent presentations and discussions, I am now convinced that we must make stronger appeals to the government and NGO to unite with us towards an international collaboration on dengue research.

Now, I would like to conclude my speech adding some words of appreciation as one of the organizing committee members.

I am extremely pleased that all of us today were able to obtain the most up-to-date information on epidemiology, and prevention and control of dengue virus infection. Also, we were supplied with the productive opinions of experts from such diverse fields as virology, immunology, entomology, clinical medicine, and public health administration. Needless to say, our guest speakers' excellent presentations and our participants' enthusiastic discussions over the past two days made these accomplishments possible. Symposiums of this nature are indispensable for the promotion and achievement of our goals.
ogenesis of severe dengue.

To answer these questions, WHO's global strategy for dengue prevention and control emphasizes the importance of improved surveillance and well designed epidemiological investigations using more advanced techniques. We believe that the organization and implementation of the international collaborative research project on dengue epidemiology will provide valuable and indispensable information for planning vector control measures and vaccine development strategies, as well as for understanding the pathogenesis of DHF/DSS.

Second, thus far we have had many heated discussions on strategies for efficient dengue vector control and its research. Consequently, as there is an urgent need for one, professional vector control organization through international cooperation has been proposed. In addition, although it was noted in recent discussions that *Aedes aegypti* plays the predominant role in transmitting DHF, the role of *Ae. albopictus* still remains ambiguous and needs to be more carefully studied.

Third, international collaboration on vaccine development research has been fervently promoted by WHO. In addition, on-going vaccine studies and future plan have been described by Dr. Natth Bhamarapravati and Dr. Kotaro Yasui, and then summarized by Dr. Takashi Kitamura. I would like to particularly emphasize that the establishment of a good animal model in which the efficacy and safety of dengue vaccines can be tested is essential for the development of high quality, safe vaccines to meet WHO's minimum requirements.

My greatest concern is how international research cooperation has been conducted in countries where dengue is endemic. In this respect, I would like to talk about some problems or issues we face in international research cooperation. To begin, a problem lies in the fact that the number of experts on infectious diseases, with the exception of AIDS, is generally decreasing among industrialized nations. Japan is a prominent example. In other words, there are not enough medical scientists or researchers who are available for research cooperation. In addition, most of the few, qualified experts are enormously busy with their own research and institutional duties. Consequently, they are unable or rather reluctant to devote their time to important work such as transferring technology to developing countries. This practice is a prerequisite for the successful implementation of international research collaboration. Since DHF is prevalent primarily in tropical and subtropical countries, the importance of locating bases for dengue research in these actual risk areas is clear. Therefore, it is necessary for experts to visit and stay for long periods of time sufficient to share technology and collaborate on research. Regrettably, most Japanese research institutes still do not properly acknowledge such activities as significant accomplishments in one's research career. Ironically, these activities inadvertently discourage promotions as they monopolize time that would be otherwise spent writing research papers. Moreover, it is generally difficult for one to even return to the same work place after working abroad for an extended period of time. Perhaps, we must reassess the criteria for the evaluation of one's scientific career. It seems that the USA
As Dr. Norman Gratz of WHO commented on the first day, "This conference is only the beginning of dengue control study." I strongly believe the final objective of dengue control will only be met efficiently and successfully through international research cooperation.

Again, I would like to close my presentation by thanking Dr. Igarashi and his colleagues here in Nagasaki.