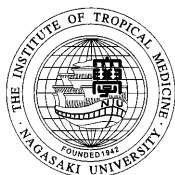


# INSTITUTE OF TROPICAL MEDICINE NAGASAKI UNIVERSITY

through Scientific Discovery and its Application Solving the World Health Problem



JULY



2011

# MISSION STATEMENT

Institute of Tropical Medicine (ITM), Nagasaki University

The tropics, the most ecologically diverse region on the Earth, presents an ongoing complexity of tropical diseases and other health problems. In view of the remarkable advances made in the field of international exchange in recent years, it is imperative that these problems be addressed from a global perspective.

Based on this understanding, the Institute of Tropical Medicine, Nagasaki University, aims to overcome tropical diseases, particularly infectious diseases, and the various health problems associated with them, in cooperation with related institutions, to strive for excellence in the following areas:

1. Spear-head research in tropical medicine and international health
2. Global contribution through disease control and health promotion in the tropics by applying the fruits of the research
3. Cultivation of the researchers and specialists in the above fields



General View of the Institute



## Preface

Our Institute of Tropical Medicine (ITM), established in 1942, is a unique government-assisted institution for the research on tropical medicine, both in the basic and applied fields. Its reorganization led to the first collaborative institute in medical science in Japan in 1989, and designation as one of the Centers of Excellence in 1995 by MEXT. Present organization of the institute is composed of 4 major research fields (15 departments, 1 domestic visiting department, 1 overseas visiting department), 3 centers, and 1 clinical unit.

ITM has been authorized as "Tropical Medicine Research Center" of Joint Usage supported by Ministry of Education, Culture, Sports, Science and Technology last year and it empowered our function as an open institute to the researcher in the whole country. Center for Infectious Disease Research in Asia and Africa, Kenya and Vietnam research stations have completed their basic infrastructure in the first five years and started substantial research activities in the second term. Moreover, it has been introduced systems of appraisal by outsiders who are global experts in their fields and has published its report.

ITM set its General Goals: Mission Statement in May 1999. Diverse activities below are underway to achieve these general goals, with the indication of asterisk.

\*Spear-head research in tropical medicine and international health

1. Strategic research activities have been conducted to develop new countermeasures against tropical diseases. These activities include analysis of base sequences of Japanese encephalitis and dengue virus genes, unraveling of structure and mechanism of host receptors for bacterial toxins, analysis of cell invasion by malaria parasites at molecular levels, and immunological analysis of tropical infectious diseases.
2. Epidemiological studies and research on malaria, dengue fever/dengue hemorrhagic fever, emerging viral infectious diseases, AIDS, acute respiratory infections, schistosomiasis, tropical infectious diseases, etc., in Southeast Asia, Eastern Africa, and other countries/regions.
3. Environmental factors, such as vector and socio-economic problem, which cause the spread of tropical diseases in the developing countries have been studied.

\*Global contribution through diseases control and health promotion in the tropics by applying the fruits of the research

1. When the world was suffering from a severe outbreak of SARS in 2003, ITM dispatched 3 researchers to P.R. China and other countries in respond to a request of WHO.
2. And in 2005, ITM dispatched the investigation team to make a survey of possible outbreak of infectious diseases in Indonesia and Sri Lanka, the countries that met disaster of tsunami. Thus the staffs have given their technical co-operation to disease control program in developing countries as WHO short-term consultants, JICA experts and other consultants.
3. Implementation project for Strengthening EPI in Pacific Region in 2005
4. Promotion of Community Health Care Project by JICA Grassroots Innovations for sustainable development in Kenya in 2007
5. ITM staff members are sent to the earthquake in Haiti as a member of Japan Disaster Relief Team in 2010
6. ITM sent staff members for Medical Cooperative Service soon after Tohoku-Kanto Earthquake had happened in 2011 March.

\*Cultivation of the researchers and specialists in the above fields

1. ITM offers training to graduate students (in doctor's and master's courses) through collaborative courses with Nagasaki University Graduate School of Biomedical Sciences (GSBS). In 2006, ITM launched a one-year master's course in tropical medicine for MD students and in 2008, started to offer programs for students (capacity: 10) as an entity closely related to the master's course at Nagasaki University Graduate School of International Health Development (an independent graduate school).
2. Since 1978, ITM offers a 3-month course of Tropical Medicine and Related Studies.
3. Since 1983, ITM holds one year training course for foreign participants entitled Research in Tropical Medicine sponsored by JICA.
4. Since 2006, by the cooperation of WHO/TDR, ITM started Diploma Course on Research & Development of Products to meet Public Health Needs (3 weeks) which 6 universities in 4 countries (Japan, Thailand, China, and Colombia) cooperated to hold the course.

Based on the achievement mentioned above, in 1993, Department of Virology has been designated as WHO Collaborating Centre for Reference and Research on Tropical Viral Diseases, and since 2000 NEKKEN has played a role of core university in JSPS cooperative research program with Vietnam.

In 2003, ITM and GSBS made a joint application to the 21st Century Center of Excellence (21c COE) Program supported by MEXT. Our research program Global Control Strategy of Tropical and Emerging Infectious Diseases successfully obtains a Government Grant of 5 years.

In 2005, the overseas research laboratories of ITM has been established in Kenya Medical Research Institute (KEMRI), Nairobi, Kenya and National Institute of Hygiene and Epidemiology (NIHE), Hanoi, Vietnam. In 2008, ITM's proposal was approved as a Global COE Program, an advanced form of the 21st Century COE Program.

In March 2009, the institute staged an eight-day special exhibition entitled Africa's Nature, Development, and People—Nagasaki University Fighting against Tropical Infectious Diseases at the National Science Museum, Tokyo, which attracted over 10,000 visitors. A special open lecture, which was held as part of the exhibition, was attended by many participants.

In addition, the institute has a home page by which we appeal the public how tropical medicine is important for the well being of humankind and offer the information on the tropical diseases.

This pamphlet is one of our advocacy efforts to the public. It offers a brief but intelligible explanation on our research activities and other related social activities. Any suggestions and supports will be gratefully appreciated.

July, 2011  
Tsutomu Takeuchi  
Dean and Professor  
Institute of Tropical Medicine (ITM)  
Nagasaki University

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## Historical Review

The Institute of Tropical Medicine, Nagasaki University was originally founded in March 1942 as the East Asia Research Institute of Endemics, Nagasaki Medical College in order to perform basic and applied studies on endemic diseases in East Asia. At the beginning, most of its research activities were field studies conducted in mainland China by the Departments of Pathology, Bacteriology, Internal Medicine, and Dermatology of Nagasaki Medical College. August 9th, 1945, the atomic bomb was dropped in Nagasaki, and the Institute's all the facilities and research materials were completely destroyed together with Medical School. Consequently, the development of the Institute and its research activities had lagged significantly behind.

In April, 1946, the Institute changed its name to the Research Institute of Endemics, Nagasaki Medical College, and moved to Isahaya City in May to resume research activities. Yet in accordance with the National School Establishment Law issued in May, 1949, the Institute once again changed its name to the Research Institute of Endemics, Nagasaki University. In 1957, the Institute was affected by another disaster of massive flooding, and its facilities, equipment, and research materials were severely damaged. Thus, construction of a new building started in Sakamoto, Nagasaki City in 1960, and the Institute moved to the building in April of the following year. The Institute's Departments, which were only two at the time, Pathology and Clinics, increased its number every year after 1963, including Epidemiology, Parasitology, and Virology. The Sakamoto building finished its first expansion at the end of 1966.

In June, 1967, with the partial alteration of the National School Establishment Law, the name of the Institute was changed for the third time to the present one to carry out basic and applied studies on tropical medicine. Around the same time, the Department of Internal Medicine, Institute of Tropical Medicine, equipped with 20 beds, was opened in the University Hospital. In 1974, the Department of Bacteriology and the Reference Center were attached, and in 1978, the Department of Preventive Medicine, consisting mainly of visiting professors,

associate professors, and researchers, and the Tropical Medicine Training Course were launched. In the ensuing year, the Infectious Animals Deprivation Experiment Laboratory was promoted to become the Animal research Center for Tropical Infections, and the second building expansion was concluded in March, 1980. In September, 1983, a JICA-sponsored group training program Tropical Medicine Research Course was opened, the Department of Protozoology was established a year after, and the third building extension was finished in July the year after that. Two years later, the Department of Medical Entomology was created and the Institute was reorganized into the collaborative institute in another two years. In 1991, the Department of Biochemistry was added, and the fourth building expansion was ended in March, 1994. In April, 1994, the Institute was divided into three big Divisions, Tropical Microbiology, Pathogenesis and Clinical Sciences, and Environmental Medicine, with the establishment of two new research Departments, Thermal Adaptation and Social Environment, which have expanded to 12 Departments at present. The Institute was design-nated as Center of Excellence in the forefront of scientific research in 1995, and a new research Department, Molecular Epidemiology, was established under the Research Field of Microbiology in 1996 to invite overseas visiting professors. In 1997, the Reference Room for the Tropical Medicine was replaced by the Tropical Disease Information and Reference Center, and it was again succeeded by the Research Center for Tropical Infectious Disease in 2001. In March, 2003, when the Sakamoto building finalized its fifth expansion, its extension work of almost 40 years came to an end. In March, 2006, the main building's repair work was completed. In April, 2008, the Research Center for Tropical Infectious Disease for the Tropical Medicine was replaced by the Center for Infectious Disease Research in Asia and Africa and Tropical Medicine Museum. In June, 2009, the institute was authorized as the Collaborative Research Center on Tropical Disease by the Ministry of Education. More recently, two additional departments on clinical medicine, i.e., pediatric infectious diseases and clinical pharmaceutical science, were admitted for installation.



## Successive Deans of the Institute

### (East Asian Research Institute of Endemics)

Susumu Tsunoo	May. 4, 1942 - Aug. 22, 1945
Kohei Koyano	Dec. 22, 1945 - Jan. 23, 1948
Kiyoshi Takase	Jan. 24, 1948 - Aug. 31, 1948
Noboru Tokura	Sept. 1, 1948 - May. 30, 1949

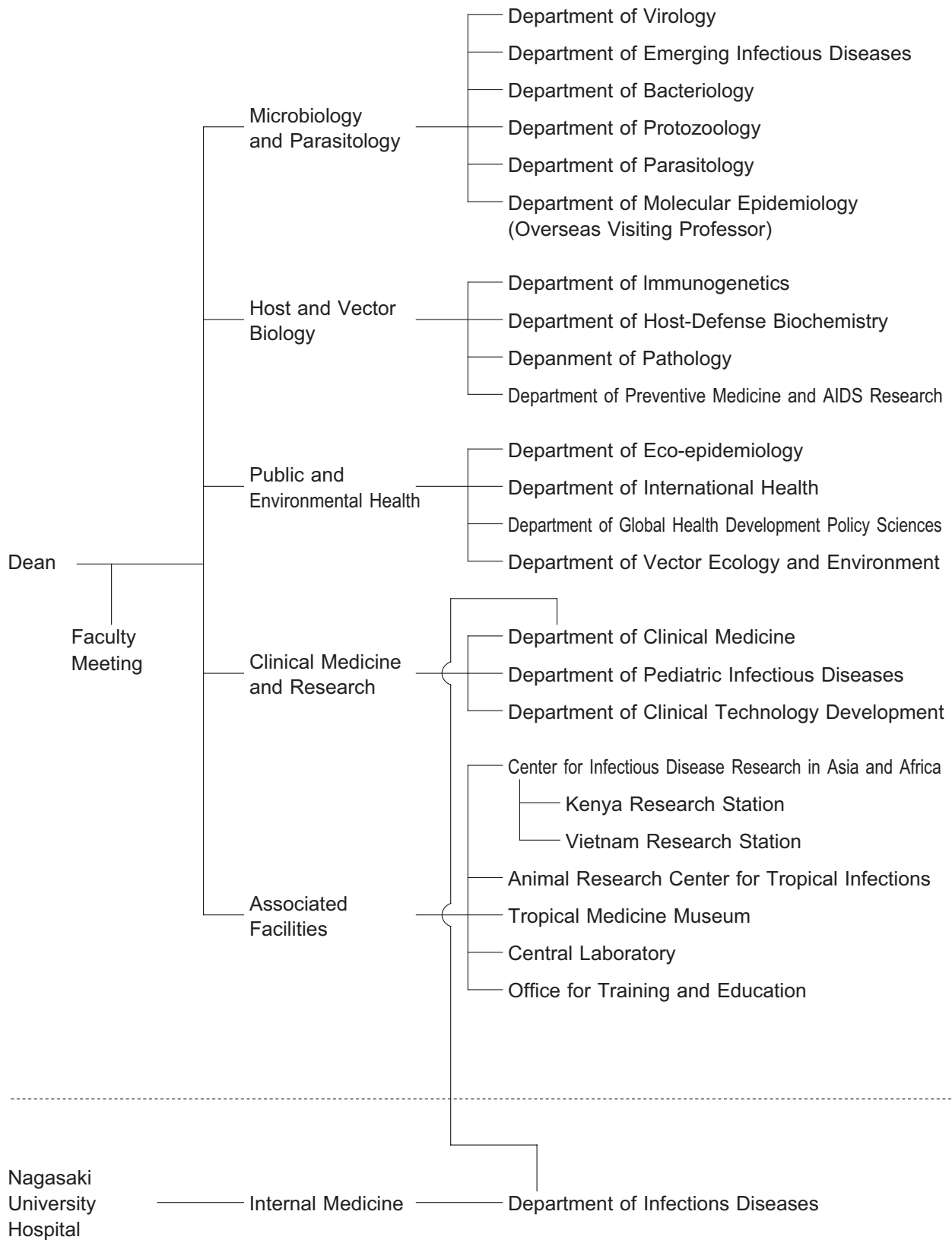
### (Research Institute of Endemics)

Noboru Tokura	May. 31, 1949 - Aug. 31, 1958
Nanzaburo Omori	Sept. 1, 1958 - Nov. 30, 1963
Hideo Fukumi	Dec. 1, 1963 - May. 31, 1967

### (Institute of Tropical Medicine)

Hideo Fukumi	June. 1, 1967 - Nov. 30, 1969
Daisuke Katamine	Dec. 1, 1969 - Nov. 30, 1973
Kaoru Hayashi	Dec. 1, 1973 - Nov. 30, 1977
Tatsuro Naito	Dec. 1, 1977 - Nov. 30, 1979
Daisuke Katamine	Dec. 1, 1979 - Apr. 1, 1981
Keizo Matsumoto	Apr. 2, 1981 - Apr. 1, 1991
Hideyo Itakura	Apr. 2, 1991 - Apr. 1, 1993
Mitsuo Kosaka	Apr. 2, 1993 - Apr. 1, 1997
Akira Igarashi	Apr. 2, 1997 - May. 31, 2001
Yoshiki Aoki	Apr. 1, 2001 - May. 31, 2007
Kenji Hirayama	Apr. 1, 2007 - May. 31, 2011
Tsutomu Takeuchi	Apr. 1, 2011 - Up to the present

## Organizational Chart





## Research Center on Tropical Diseases

Our institute is the one and only public sector supported by MEXT (Ministry of Education, Culture, Sports, Science and Technology, Japan) that aims to do the research on tropical diseases, and identified as the Collaborative Research Center on Tropical Disease.

### **(1) The Goal of the Center**

The infectious diseases are caused by the collapse of symbiosis with other creatures, which cannot be avoided if we, human being, live in the nature. Although the ultimate aim of this center is to eradicate infectious diseases, it is needed rather to establish reciprocal relationship with other creatures than to eliminate them. Such establishment of reciprocal relationship requires the collective knowledge, which can be achieved combined only by combining a broad aspect of disciplines.

The Tropical Infectious Diseases have been spreading in the tropical area, which is the reflection of environment and socio-economic situation existed there. It is considered to be a big challenge related to health. As a matter of fact, emerging and re-emerging infectious diseases including newly emerging infectious diseases, HIV and tuberculosis have been spreading globally with tropical area being its epicenter. The tropical area is not only the battle field where we, human being, fight against them but also the experimental ground where we newly create and develop our knowledge and technology alike in order to control infectious diseases.

The Research Center on Tropical Diseases is

to accomplish with the members in the diverse scientific communities collaborative researches rooted upon the field where infectious diseases are prevailing, making use of the facilities like Asia and Africa Research Stations internationally recognized. It also serves as a resource center for information and biological samples related to infectious diseases speeding globally.

### **(2) Outline of the Collaborative Research**

The Research Center on Tropical Medicine appeals to the public for the collaborative research, which is either basic or applied research based upon epidemiological, clinical or public health framework.

The Research Center on Tropical Medicine appeals to the public for the research meeting, which promotes and facilitates the research of infectious diseases through exchanging information or technologies necessary.

The Research Center on Tropical Medicine is also to deliver bio-resources including infectious agents, information, and etc. collected and stored here, and thus serves as a resource center on Tropical Medicine.

### **(3) Organizational Chart of the Center**

As for administration of this research center, the dean of the Institute of Tropical Medicine established the Steering Committee for the Collaborative Research Center on Tropical Medicine, which was composed of 10 members, out of whom more than half should be out side the



university concerned. The Steering Committee for the Collaborative Research Center on Tropical Medicine is responsible for adoption of the applications and monitoring and evaluation of the activities in question.

In order to support activities above mentioned, the specific Section supporting the Research Center on Tropical Medicine was newly formed and a professor was designated to be a section chief.

#### **(4) Activities in 2010**

There was 34 applications for collaborative researches, out of which 23 was adopted.

There was 6 applications for research meeting, out of which 5 was adopted.

There was 3 applications for collaborative researches specified research area, out of which 3 was adopted.

## The Steering Committee for the Collaborative Research Center on Tropical Medicine

### Committee Member outside the university

National Research Center for Protozoan Diseases,  
Obihiro University of Agriculture and Veterinary Medicine

Professor Ikuo Igarashi

Research Institute of Tuberculosis, Japan Anti-Tuberculosis Association

Director Nobukatsu Ishikawa

Center for Integrated Area Studies, Kyoto University

Professor Fumiko Oshikawa

Department of Tropical Medicine and Malaria Research  
Institute National Center for Global Health and Medicine

Director ©Shigeyuki Kano

National Institute of Infectious Diseases

Deputy Director-General Ichiro Kurane

RIKEN Center of Research Network for Infectious Diseases

Director Yoshiyuki Nagai

### Committee Member outside the institute

Graduate School of Biomedical Sciences

Professor Osamu Nakagomi

Graduate School of Biomedical Sciences

Dean Shunichi Yamashita

### Committee Member inside the institute

Institute of Tropical Medicine

Professor Toshiya Hirayama

Institute of Tropical Medicine

Professor Koya Ariyoshi

Institute of Tropical Medicine

Professor Taro Yamamoto

© : Chairman

## Character of research organization and activities

Based on the following research organization and intimate linkages with other research institutes and universities, the institute aims at accomplishing a mission Spear-head research in tropical medicine and international health.

- To study comprehensively the tropical diseases which are raging in the developing countries, research organization of the institute consists of 4 major research fields which deal with the classic quad of the human-agent-environment determinant-clinical study of infectious diseases and Overseas Research Station, Animal Research Center for Tropical Medicine, and Tropical Medicine Museum. Other facilities of the institute include a joint research laboratory and a tropical medicine education office.
- The research of tropical medicine faces the inevitable fact that the bench is in the bush. Therefore the institute has a close linkage with the overseas institutes in Asia, Africa and South Americas and continues the joint studies. Memorandums of academic exchange programs were signed between Nagasaki University and 8 overseas institutes. Since the overseas research laboratories of the institute has been established in Kenya Medical Research Institute (KEMRI), Kenya and National Institute of Hygiene and Epidemiology (NIHE) Vietnam in 2005, by the grants from Ministry of Education, Sports, Culture, Science and technology (MEXT), the extensive and longitudinal studies on tropical diseases has been on the progress, and are extended to continue in more 5 or 6 years. We have extended our effort to achieve external funds for this project and obtained the Special Coordination Funds for Promoting Science and Technology and the Science and Technology Research Partnership for Sustainable Development (SATREPS), etc. These funds have expanded the researches at Asia and Africa stations.
- The prevalence of tropical diseases depends on the geographic, social and economic factors. Therefore the institute has established the special research system which helps forward the multidisciplinary studies on tropical diseases.

## Graduate Courses

In April, 2002, the structure of doctoral course in Nagasaki University was re-organized; three Graduate Schools of Medical Science, Dental Science and Pharmacology were integrated into the Graduate School of Biomedical Sciences. The school now runs four doctoral courses. All the departments in the Institute of Tropical Medicine (ITM) belong to the Course of Infection Research. Students who wish to apply for the doctoral course under the supervision of the ITM, are requested to contact the professor of department where he or she wishes to study, prior to the submission of application form to the office of the Graduate School.

### < Master of Tropical Medicine (MTM)>

In April, 2006, the Nagasaki University graduate school of Biomedical Sciences opened the Master of Tropical Medicine (MTM) course, which accommodates 12 students from various countries. The curriculum consists of three parts: (1) 4 months intensive lecture and practice on Clinical Tropical Medicine and Tropical Public Health, (2) 2 weeks oversea group training on tropical clinical medicine and public health in Thailand, and (3) 6 months dissertation preparation for each student's subject. Degree of Master of Tropical Medicine is awarded to successful students. The applicant should have more than two years of clinical experience as a medical doctor, and should have sufficient communication skill in English.

### < Master of Public Health (MPH)>

In April, 2008, the Graduate School of International Health Development was founded at Nagasaki University. The main aim is to cultivate specialists who contribute to the promotion of good health in developing countries. A Master of Public Health (MPH) degree is awarded to students who successfully complete this two-year course. Since tropical medicine plays a pivotal role in promoting good health internationally, four professors from ITM serve as a full-time faculty member in the program. The applicants are required to have sufficient command of Japanese language.

The information on these courses including application form is available through our homepage.  
<http://www.tm.nagasaki-u.ac.jp/nekken/english/index.html>



## Three-month Course on Tropical Medicine

This is a short-course of tropical medicine. This course aims to support medical and co-medical personnel who plan to work in the tropics, by providing opportunities to learn a broad range of skills and knowledge relevant to practicing medicine, directing disease control programs and conducting medical research in tropical and developing countries.

The course began in 1978. As of the 33rd course in 2010, 398 participants (including 153 medical doctors, and 245 co-medical such as nurses, community health nurses, midwives, pharmacists) from all over Japan have completed the course. Fifteen participants are accepted to attend the course in each year. The course is run by the steering committee, which consists of members from both inside and outside the Institute of Tropical Medicine (ITM).

The full-time staff members of the ITM and a substantial number of visiting professors and lecturers provide the 14 weeks (May to July) of lectures, laboratory practicals and field work in the fields of virology, bacteriology, protozoology, parasitology, medical entomology, pathology, immunogenetics, epidemiology, human ecology, social medicine, clinical medicine and also geography and culture in tropics. Participants who completed the course successfully are awarded the Diploma in Tropical Medicine.



Admission ceremony in 2010

## Clinical Medicine and Research for Tropical Doctors (JICA Training Program)

As a part of Japan Government Technical Cooperation Programs for contributing to upgrading the levels of tropical medicine research, to improv-

ing medical standard, and to promoting friendly relations to the developing countries, this training course was established in 1983, in collaboration with the Japan International Cooperation Agency (JICA). As of 2010, the ITM has trained 209 trainees from 49 countries in Asia, Africa, Latin America etc.

The objective of this course is to provide trainees with various opportunities to enrich their basic knowledge and practical techniques for controlling endemic and epidemic diseases and conducting medical research to improve various medical problems in their countries in the tropics.

Up to 2005, the ITM has accommodated 5-10 trainees per year. Each trainee belongs to a host department where they conduct their research and receive a Diploma from the ITM.

Since April 2006, this training course was formally incorporated into Master of Tropical Medicine course of the Graduate School of Biomedical Sciences, Nagasaki University and students have received higher education in quality.

## Public Communication

Lectures and film shows for citizens are held occasionally. Every year, several groups of high school students with teachers visit our museum, attending lectures and film shows. To accumulate know-how of risk communication on tropical infectious diseases in our institute, we are planning to introduce science cafe sessions where we have frank communication with citizens on the present state and future prospects of research on tropical medicine.

## Publications

Our official publications are as follows;

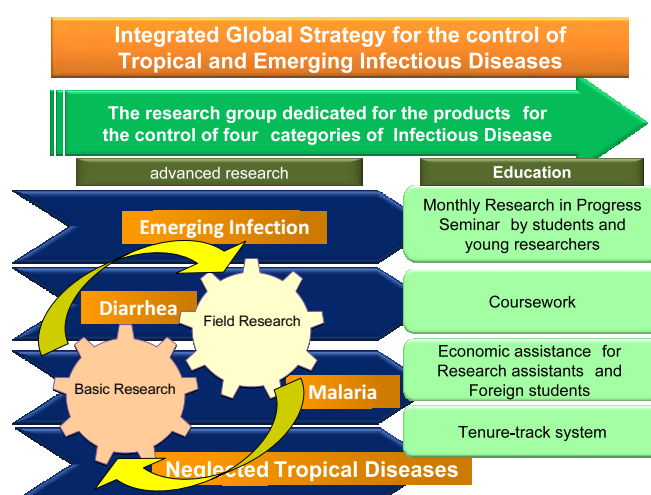
- 1) Bulletin of Nagasaki University Institute of Tropical Medicine (in Japanese, yearly since 1964, PDF files are available at our Web page.)
- 2) English Brochure: INSTITUTE OF TROPICAL MEDICINE NAGASAKI UNIVERSITY (this copy. Yearly since 1977, PDF files are available at our Web page.)
- 3) Japanese Brochure (in Japanese yearly since 1977, PDF files are available at our Web page.)
- 4) Report of Nation-wide Cooperative Research Projects (Information of research activities and achievements as a nation-wide cooperative research center for tropical medicine is compiled.)

## Global COE Program Integrated Global Control Strategy for the Tropical and Emerging Infectious Diseases

The United Nations issued eight development goals in its Millennium Declaration in 2000 as international targets, with the core message being measures against infectious diseases expressed as follow: Stop the occurrence of major diseases including HIV/AIDS by 2015 and decrease the subsequent incident rate. The ultimate goal of this program is to control and conquer these major infectious diseases. We will further advance and internationalize our outstanding achievements in the 21<sup>st</sup> century COE program to create a new center of excellence (COE) toward the accomplishment of these objectives.

For controlling and overcoming infectious diseases, tactical strategies and personnel with appropriate skills to carry them out are absolutely necessary. This new COE will focus on neglected infectious diseases (NTD), which have rarely been considered because most of the cases have been happened in poor developing countries, plus

diseases involving diarrhea, which tend to be treated as curable in developed countries. Of these tropical and emerging infectious diseases, we will lay concepts of a new strategy in a comprehensive manner to control and overcome those diseases which have currently become global issues or major impediments to development, and work on research and development of innovative technology essential for the implementation of our strategy. Moreover, through this process, we will foster promising experts who can play a leading role in the future of this research area.



**Basic and Field research for 4 infections and 11 pathogens**

Groups of Infections	Reseach Approach	Pathogen	Name	Affiliation
Emerging Infectious Diseases	Basic research	Prion	Noriyuki Nishida	Graduate School of Bio-medical Science (GSBS)
		HIV	Masaaki Kai	GSBS
	Field Based Reserch	Mosquito-mediated virus	Kouichi Morita	Institute of Tropical Medicine (ITM)
		Mycosis	Shigeru Kohno	GSBS
		HIV/Dengue	Kouya Ariyoshi	ITM
		HTLV-1	Taro Yamamoto	ITM
Diarrhea	Basic research	Salmonela Typhimurium	Toshiya Hirayama	ITM
	Field Based Reserch	Rotavirus	Osamu Nakagomi	GSBS
		Bacterial Diarrhea	Tetsu Yamashiro	ITM
Malaria	Basic research	Malaria	Osamu Kaneko	ITM
	Field Based Reserch		Katsuyuki Yui	GSBS
			Noboru Minakawa	ITM
NTD Neglected Tropical Diseases	Basic research	Amebic dysentery	Shinjiro Hamano	ITM
	Field Based Reserch	DSS (Demographic Surveillance System)	Satoshi Kaneko	ITM
		Chagas	Kenji Hirayama	ITM

## Department of Virology

This Department has been conducting basic and applied research on mosquito-borne viruses such as Japanese encephalitis (JE) virus, dengue virus and West Nile virus, as well as emerging infectious viruses such as SARS virus and Nipah virus.

### Molecular epidemiology of Japanese encephalitis and Dengue viruses

We isolate JE and dengue viruses in Asia and African regions and conduct molecular epidemiological analysis to clarify international and inter-continental movement of those viruses. We also analyze unique genome sequences that are relevant to pathogenicity.

### Research on animal and organ specificity of Flavivirus

JE virus infects more efficiently in swine, whereas dengue virus multiplies well in humans. We are identifying the molecular basis for such host-specific infection of flaviviruses.

### Research on viral gene functions and vaccine development using reverse genetics

We have developed infectious clones for JE and dengue viruses and identify gene functions by modifying various parts of the genes or constructing chimeric viruses between the two viruses. In addition, we are developing genetically engineered viruses as candidates for live attenuated vaccines.

### Development of rapid diagnosis

Various tools for rapid diagnoses are being developed for flaviviruses and other emerging viruses using PCR, LAMP and nLC/MS technologies. Also, genetically engineered antigens are being developed to provide affordable serological tests for developing countries.

### Research on emerging viral infectious diseases

Epidemiological studies on SARS virus, Nipah virus and H5N1 avian influenza virus are being conducted in Viet Nam, Malaysia and other countries in the South East Asia.

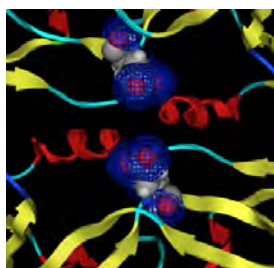
### Activities as a WHO Collaborating Center

Dr. S. T. Han, then Regional Director of WHO Western Pacific Region (WPR), designated the

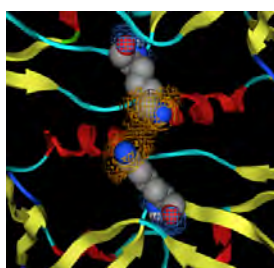
Department of Virology as 'a WHO Collaborating Center for Reference and Research on Tropical Viral Diseases' on 23 Nov. 1993. In 2003, the department was re-designated as 'a WHO Collaborating Center for Reference and Research on Tropical and Emerging Virus Diseases' by Dr. Shigeru Omi, former Regional Director of WHO/WPR. The Department has been collaborating with WHO in training for WHO fellows from many developing countries and deployment of experts as WHO short-term consultants. In addition, Dr. Kouichi Morita was dispatched to WHO/WPRO as Regional Adviser on Communicable Diseases from 16 May 1995 to 15 May 1998. Dr. Futoshi Hasebe was also dispatched for a long term to collaborate in the global emerging infectious disease control program from March 2004 to March 2006. The Department initiated and held the First GOARN/WHO National Training Course in Nagasaki from 25 to 29 February 2008 in collaboration with WHO/WPRO.

Professor	Kouichi Morita
Professor (Project)	Futoshi Hasebe
Assistant Professor	Shingo Inoue
Assistant Professor	Toru Kubo
Assistant Professor	Fuxun Yu
Assistant Professor	Takeshi Nabeshima
Assistant Professor	Daisuke Hayasaka
Research Fellow	Badri Narayan Acharya
Postdoctoral Fellow	Guillermo Posadas Herrera
COE Research Fellow	Mya Myat Ngwe Tun
Assistant	Kazumi Jodai
Assistant	Masaaki Kawazoe
COE Technician	Takako Chiba
Assistant	Shoko Hayashida
Graduate student	Lyre Anni Espada Murao
Graduate student	Tu Nguyen Dong
Graduate student	Kenta Okamoto
Graduate student	Akira Yoshikawa
Graduate student	Muhareva Raekiansyah
Graduate student	Yuki Takamatsu
Graduate student	Luat Le Xuan
Graduate student	Reo Uchida
Graduate student	Sonny Uche Unigwe
Research student	Eugenio Fonzi

VnHcm18/02-C 62 Glu



VnHcm18/02-K 62 Lys



One specific amino acid change of Dengue virus surface protein affect its cell tropism.



P3 level laboratory



## Department of Emerging Infectious Diseases

Emerging infectious diseases are infectious diseases whose incidence in humans have increased in the past 20 years and threaten to increase in the near future. We are working on the basic research to develop and produce countermeasures against emerging infectious diseases, especially viral hemorrhagic fevers and influenza.

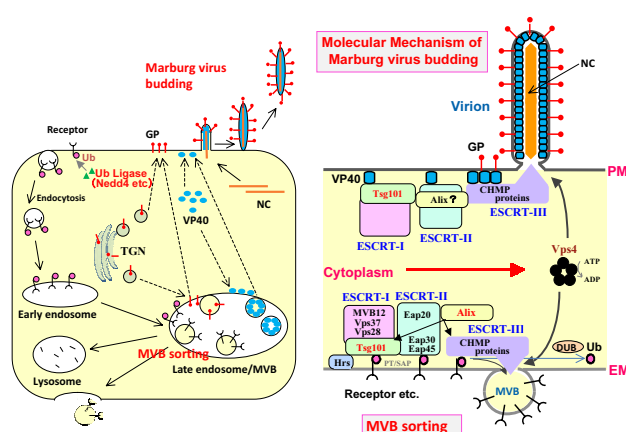
### Research subjects:

#### Analyses of replication mechanisms of highly pathogenic viruses

In infected cells, the viruses replicate using various cellular machinery and release a large number of progeny virions. Our interests are to clarify the molecular mechanisms of virus replication in host cells. We are currently analyzing the molecular interactions between viral proteins and cellular factors in virus infected cells. Especially, we are focusing on highly pathogenic viruses, such as Ebola, Marburg, Lassa and Influenza viruses.

#### Development of novel antiviral strategies

To establish novel antiviral strategies against viral hemorrhagic fevers and influenza, we are identifying the cellular factors which have antiviral activity and analyzing the molecular mechanisms of their antiviral action. We will also start high-throughput screening of organic and chemical compound libraries for antiviral drug discovery against viral hemorrhagic fevers.



Molecular Mechanism of Marburg virus budding

#### Development of detection methods for highly pathogenic viruses

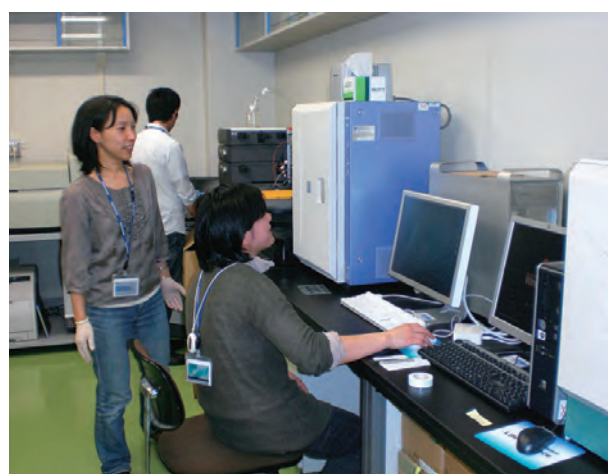
In case of outbreak of emerging infectious diseases, rapid and accurate diagnosis is essential to control infection and to prevent further transmission. We have developed novel diagnostic assay for emerging viral diseases.

#### Studies on endogenous retroviruses

Recently, it has been reported that a portion of live attenuated vaccines for pets, which were produced using mammalian cell lines, were contaminated with infectious endogenous retrovirus. Furthermore, in therapeutic use of animal cells, tissues, and organs derived from pigs as donors for xenotransplants, a major international concern is the possibility of cross-species transmission of infectious porcine endogenous retrovirus from animal donor to immunosuppressed human transplant patients. To reduce the risk induced by endogenous retroviruses in vaccine preparation and xenotransplantation, we are developing the strategies to regulate the production of endogenous retroviruses from cells.

#### Department of Emerging Infectious Diseases

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Laboratory

## Department of Bacteriology

Our major research interest is to elucidate the etiologic agents isolated from pathogenic bacteria related to the worldwide emerging and reemerging diseases and to know the virulence mechanisms of bacterial pathogens.

*Helicobacter pylori* is a bacterial pathogen found in the stomach mucosa of more than 50% of the world population and more common (over 80%) in developing and tropical countries. Infection with *H. pylori* plays a major role in the development of chronic gastritis and peptic ulcer, and is a risk factor for gastric cancer. Pathogenic strains of *H. pylori* secrete a potent protein toxin, a vacuolating cytotoxin, termed VacA, which causes progressive vacuolation of epithelial cells and gastric injury. We found that VacA induces multiple effects on epithelial cells, including mitochondrial damage [1] and apoptosis [2]. These actions of VacA appear to result from activation of cellular pathways, independent of those leading to vacuolation. Similarly, VacA-induced phosphorylation of G protein-coupled receptor kinase-interactor 1 (Gir1), which may be responsible for epithelial cell detachment caused by VacA, leading to peptic ulceration [3], and VacA-induced activation of p38/ATF-2-mediated signal pathway [4] are independent of VacA effects on cellular vacuolation.

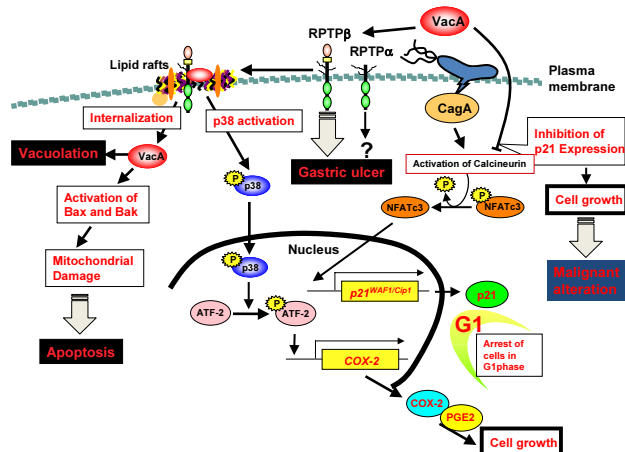
Analysis of VacA receptors provided new insights into the molecular basis of VacA function. We reported that two VacA proteins, termed m1 VacA and m2 VacA, which were defined by sequence differences in the middle of the molecules, interacted with target cells by binding to two types of receptor-like protein tyrosine phosphatases (RPTPs), i.e., RPTP $\alpha$  and RPTP $\beta$ , resulting in toxin internalization and vacuolation of the human gastric adenocarcinoma cell lines AZ-521 and G401 [5, 6, 7]. By analysis of the pathological responses of wild type and RPTP $\beta$ -deficient mice to oral administration of VacA, we found that RPTP $\beta$  functions as a receptor for VacA and produces the disease associated with VacA toxicity including

gastritis and gastric ulcer [3].

To further elucidate the potential mechanism of how *H. pylori* establishes infection, we also investigate the host-parasite relationships of *H. pylori*, focusing on VacA as well as CagA, which is an effector protein injected by its type IV secretion system into host cells. Consistent with suppression of nuclear translocation of nuclear factor of activated T cells, NFAT, in Jurkat T cells, VacA counteracted CagA-induced activation of NFAT in AGS cells, suggesting that the two major *H. pylori* virulence factors inversely control NFAT activity [8]. Deregulation of NFAT, either positively or negatively, may contribute to cellular dysfunctions that underlie diverged clinical manifestations caused by *H. pylori* infection. In addition, VacA activates the PI3K/Akt signaling pathway, resulting in phosphorylation and inhibition of GSK3 $\beta$ , and subsequent translocation of  $\beta$ -catenin to the nucleus, consistent with effects of VacA on  $\beta$ -catenin-regulated transcriptional activity, suggesting the possibility that Wnt/ $\beta$ -catenin-dependent signaling might play a role in the pathogenesis of *H. pylori* infection, including the development of gastric cancer [9]. Surprisingly, in polarized epithelial cells, CagA suppressed p21 expression, whereas VacA did not interfere this effect [10].

**References:** [1] Microb. Pathog. 31:29-36, 2001, [2] J. Biol. Chem. 281: 11250-11259, 2006, [3] Nat. Genet. 33: 375-381, 2003, [4] J. Biol. Chem. 279: 7024-7028, 2004, [5] J. Biol. Chem. 278:19183-19189, 2003, [6] J. Biol. Chem. 279: 51013-51021, 2004, [7] Cell Microbiol 7: 1285-293, 2005, [8] Proc. Natl. Acad. Sci. USA. 102: 9661- 9666, 2005. [9] J. Biol. Chem. 284:1612-1619, 2009, [10] J. Exp. Med.270: 2157-2174. 2010.

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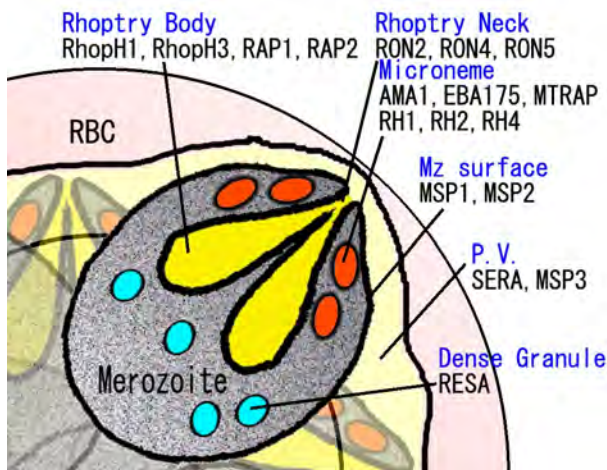
Virulence mechanism of *Helicobacter pylori* vacuolating cytotoxin, VacA.



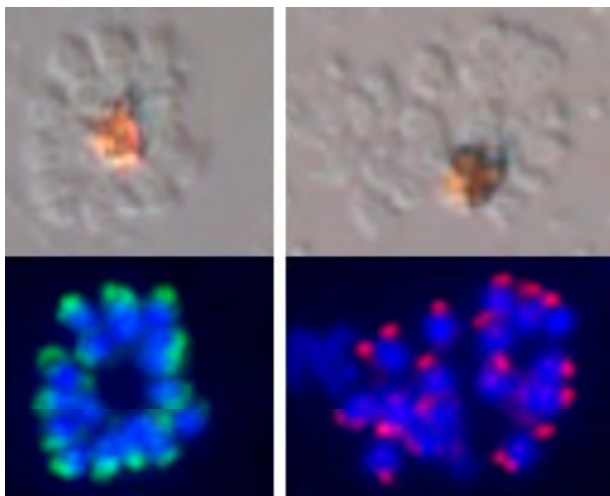
Laboratory

## Department of Protozoology

Malaria is responsible for a huge burden of death and disease in large areas of the tropical and sub-tropical world. Unfortunately, those countries hardest hit by the disease are often amongst the poorest. Despite continuing efforts, there is still no effective vaccine against the disease. In order to design and implement effective disease intervention strategies, we believe that one of the key priorities in malaria research should be the strengthening of our understanding of the basic biology of the parasite. We are currently investigating some fundamental aspects of the parasite's life cycle, such as the mechanisms behind erythrocyte invasion and the phenomenon of cytoadherence of parasite-infected erythrocytes. In addition, we are also conducting research aimed at elucidating the intracellular survival strategy of *Trypanosoma cruzi* that causes Chagas disease and a molecular epidemiology of *Leishmania donovani* that causes visceral leishmaniasis.



Schematic of the malaria merozoite and its invasion-related molecules.



Newly identified malaria proteins were localized to the apical end of the merozoites. Blue is parasite nucleus, green and red are the location of the identified proteins. Upper panels are DIC images of the malaria parasite.

We are actively pursuing the following lines of investigation:

### 1. Malaria

- 1) The molecular basis of host cell invasion by parasites
- 2) The molecular basis of cytoadherence of parasite-infected erythrocytes
- 3) Transcriptional control in malaria parasites
- 4) How different malaria parasite species interact in the host
- 5) Recrudescence of malaria parasites
- 6) Molecular epidemiology of *P. falciparum* malaria in endemic countries
- 7) Prevalence, origins and population genetics of African *Plasmodium vivax*
- 8) Transmission dynamics of *P. knowlesi*, a zoonotic monkey malaria parasite

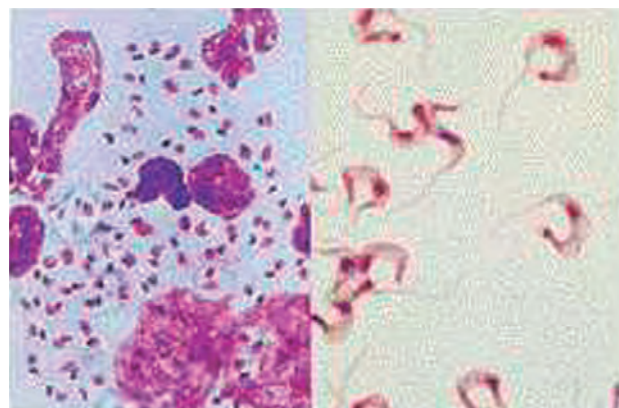
### 2. Trypanosoma

- 1) The function and expression mechanism of trans-sialidase
- 2) Stage specific adaptation mechanisms employed by different *Trypanosoma* species

### 3. Leishmaniasis

- 1) Molecular epidemiology of *Leishmania donovani*

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Graduate Student	Phonepadith Xangsayarath
Graduate Student	Joe Kimanthi Mutungi



Amastigotes (left) and trypomastigotes (right) of *Trypanosoma cruzi*.



## Department of Parasitology

Infectious diseases are still a huge menace to human health and continue unabated in tropical areas under the conditions of poverty and the unique natural and social environments. Various kinds of parasites infect humans for long periods of time without killing them, giving rise to tremendous social and/or economic loss. We would like to develop deep insight into parasitic diseases and the surrounding factors from various points of view through both field and laboratory studies. Our goal is to contribute to new knowledge and to provide an enthusiastic environment for the training of the future generation of investigators.

### Target diseases of our studies

We have been carrying out both field and laboratory studies on several of the most important helminthic diseases, including schistosomiasis, filariasis and intestinal helminthiasis and on important but neglected protozoan diseases such as amoebiasis, leishmaniasis and trypanosomiasis.

#### 1) Schistosomiasis and Filariasis

Since 1981, the research project on *Schistosoma haematobium* has been carried out in Kwale, Kenya, in cooperation with Kenya Medical Research Institute (KEMRI). This year, we started a new research project on parasitic diseases in Mbita and Kwale, Kenya. In the laboratory, we have been maintained *S. mansoni* and intermediate snails and are trying to elucidate immune responses as well as to develop sensitive and specific diagnostic methods through the study on the unique molecules belonging to *Schistosoma* spp.

A research project on filariasis is also carried out in Mbita and Kwale, Kenya, in cooperation with KEMRI. In order to contribute to "Filaria Elimination Program" by WHO, we collaborate with Aichi Medical College. In the laboratory, *Brugia malayi*, *B. pahangi* and the vector mosquito, *Aedes aegypti* have been maintained for many years.

#### 2) Amoebiasis, Leishmaniasis, Trypanosomiasis etc.

Genetic epidemiology and cohort studies on amoebiasis and leishmaniasis are carried out in cooperation with the International Centre for Diarrheal Disease Research, Bangladesh (ICDDR, B.) and the University of Virginia. Field sites include Dhaka and rural areas of Bangladesh. In addition to genetic factors, we aim to elucidate various

environmental factors that determine and/or influence the outcome of the infection. In the laboratory, we study host defense mechanisms against *Leishmania major*, *L. donovani*, *Trypanosoma cruzi*, and *T. congolense*, and in the process, have elucidated the function of the IL-12 cytokine family such as IL-27/WSX-1 during infection. After we developed animal models of intestinal amoebiasis together with Prof. Houpt at University of Virginia, we are now devoting ourselves to the study on pathogenicity of *Entamoeba histolytica*, *E. moshkovskii* and host defense mechanisms to *Entamoeba* spp.

#### 3) Cohort study using HDSS on infectious diseases in Mbita (the eastern lakefront of Lake Victoria) and Kwale area

We will start cohort study of infectious diseases in Mbita and Kwale area using HDSS (Health and Demographic Surveillance System) as the collaboration with Department of Eco-epidemiology. This year, the feasible studies on schistosomiasis, other helminthic and protozoan infections, HIV/AIDS, tuberculosis and so on are going to be carried out.

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One of our field site in Nepal, South Asia

## Department of Immunogenetics

This department is focusing on the pathogenic genetic factors of the host and the parasite in the most important tropical infectious diseases by using immunology and genetics.

### Research activities:

To clarify the molecular mechanisms in the protective and/ or pathogenic host response to human pathogens such as Dengue Virus, Malaria, Trypanosoma cruzi and Schistosoma, the following research projects are going on in our laboratory.

#### 1. Malaria

- 1) Genetic susceptibility to severe forms of malaria (cerebral malaria, severe anemia) is analyzed by case-control study in South East Asia, South Pacific and West Africa.

#### 2. Schistosomiasis

- 1) Immunological regulation of the pathogenic anti egg response in the resistant and susceptible persons, to post-schistosomal liver fibrosis in China and Philippines.

#### 3. Chagas disease

- 1) Genetic susceptibility to different clinical types of chronic Chagas disease, namely, indeterminate, cardiac, and digestive forms, is analyzed by case control study in Bolivia where Chagas disease is still highly endemic.
- 2) Host and Parasite factors influencing on the reactivity to the chemotherapy in the paediatric patients with chronic Chagas Disease.
- 3) Genetic analysis of Trypanosomes in Latin Americas by using local isolates and molecular biology.

### Collaborations:

The research here is performed based on the well arranged collaborative projects with the

following facilities.

1. Malaria: Thammasat University (Thailand), Noguchi Memorial Medical Research Institute (Ghana), Institute of Medical Research (Malaysia), Karolinska Institute (Sweden), Dokkyo University (Tochigi), WHO/TDR (Geneva Switzerland), Kenya Medical Research Institute (KEMRI).
2. Schistosomiasis: Jiangxi Provincial Institute of Parasitic Diseases (China), Jiangsu Provincial Institute of Parasitic Disease (China), Univ. Philippines and RITM (Manila, Philippines), Tokyo Medical Dental Univ. (Tokyo)
3. Chagas Disease: Center of Tropical Medicine and Hospital Japones (Bolivia), IICS University of Asuncion (Paraguay)

#### 4. Dengu virus

##### 1) Pathogenesis of the DHF (Dengue Hemorrhagic Fever)

Host factors will be detected by the Populational genetic analysis of the patients with DHF and non DHF.

### Staffs

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Department of immunogenetics



Experiment scenery

## Department of Preventive Medicine and AIDS Research

This department was newly added to the institute in 1978 as a research division open to visiting professors from other universities and institutes. This department is organized by an assistant professor. We are studying several retroviruses, human immunodeficiency virus (HIV), murine leukemia virus (MLV), and other mammalian retroviruses. HIV is an etiological agent of acquired immunodeficiency syndrome. MLV has been isolated from human patients with prostate cancer or chronic fatigue syndrome.

### Study on the mechanism of viral entry into host cells by retroviruses

Human immunodeficiency virus (HIV) is known to be a causative agent for acquired immunodeficiency syndrome. After the HIV recognizes CD4 and chemokine receptor, for example CXCR4, it enters into target cells mediated fusion between virus envelope and cell membrane. Murine leukemia viruses are divided into four groups according to the infection receptors (ecotropic, amphotropic, polytropic, and xenotropic), and enter into host cells by same manner. It is most likely that the environment around the receptors influences the infection efficiency. We have reported that glycosylation of the infection receptors on host cells inhibits the retrovirus infections, and localization of the infection receptors in raft microdomains enriched with cholesterol and glycolipids are important for the

infections.

On the other hand, there are some evidences showing that actin-dependent clustering of the infection receptors is involved in the retrovirus infection. The receptors, however, do not directly associate with actin. We have reported that ezrin, radixin, moesin proteins expressed in host cells function as the linker molecules between the infection receptors and actin cytoskeleton.

### Study on murine leukemia virus

It has been recently reported that murine leukemia virus (MLV) was isolated from human patients with prostate cancer or chronic fatigue syndrome, suggesting that the MLV is a novel zoonosis infectious agent between human and mouse. We have shown that the infection receptors of MLV have been evolved to become resistant against the MLV infection in several rodent cells. Additionally, we have reported that the MLV infection occurs through acidic endosomes and requires host cathepsin proteases.

Visiting Professor	Naoki Yamamoto
Visiting Associate Professor	Hironori Sato
Assistant Professor	Yoshinao Kubo
Assistant	Yuri Kobayashi



Laboratory for biochemical research



Laboratory for biochemical research



## Department of Eco-epidemiology

April 2008, the Research Center for Tropical Infectious Diseases was reorganized and transformed into four groups i.e. two departments in the Research Field of Environmental Medicine, Tropical Medicine Museum and the Kenya station of Overseas Research Stations.

Eco-epidemiology department is one of the departments in the Research Field of Environmental Medicine.

Professor	Masaaki Shimada (Kenya Station)
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Assistant	Tamami Saeki
Assistant	Junichi Tanaka

The concept of eco-epidemiology is based on the view of recognizing tropical diseases as a system of infection. The aim of our research is to understand the process of interaction between microorganisms, vectors and human beings in the system. Therefore, the staffs mainly work for activities in the Kenya Research station of Overseas Research Stations.

Human beings and vectors, so-called hosts as a niche of pathogens, exist not statically but dynami-

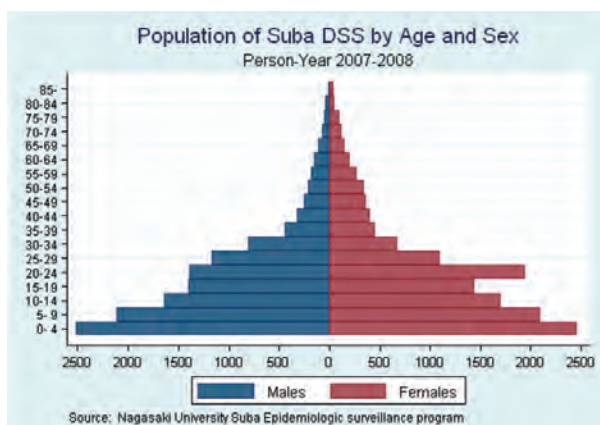
cally in time and space. In addition, there is an infinite diversity in the characteristics of hosts. We study how microorganism survive, maintain, proliferate, diminish, disappear and emerge through the niches.

The ultimate purpose of the department is to form a theory for a better understanding of the interrelationship between hosts and pathogen and its consequences, diseases.

Ongoing activities are 1) the development and maintenance of Health and Demographic Surveillance System (HDSS) in Mbita and Kwale, Kenya, 2) Development of a Concurrent Detection method for a wide range of Pathogens of Neglected Tropical Diseases (NTDs) in Africa, 3) A child health cohort study from the viewpoint of sociology, anthropology and epidemiology in a marginal area of Africa, 4) Development of vital registration system using mobile phone network in a remote region of Africa, 5) Research on polyparasitism and 6) JICA Partnership Program.



Prof. Kaneko, checking field data with James Kopiyo.



The population pyramid of Suba area.



Group photo at a symposium held 4th December 2009 at KEMRI.

## Department of International Health

Department of International Health has started its activities since 2008, following the internal reform of Institute of Tropical Medicine. Department of International Health has its basis on Research Center for Tropical Infectious Diseases (RECTID) of Institute of Tropical Medicine established in 2001, Information and Reference Center in 1997, and Reference Center in 1994.

It says that RECTID, a precursor of our department, had following three activities; 1) developing the museum of tropical medicine, 2) collecting and disseminating information on tropical infectious diseases and 3) promoting joint research projects and doing epidemiological studies. Out of which, Department of International Health takes over research activities and adds to its mandate an international collaboration as a social responsibility anew.

Thus, Department of International Health, as a newly established department, has two pillars, e.g. research and social responsibility.

Research was composed of three units; 1) research on infectious diseases in ecosystem, 2) research on the environment including climate change and Asian dust related to health, 3) research on biological evolution of microorganisms from the adaptation or fitness view point. The umbrella concept or key word linking above three research units is to reconstruct infectious diseases "temporally" and "spatially" alike. Infection is the biological interaction between hosts and microorganisms. In other words, host behavior, social structure as well as culture per se affect microorganisms in fitness and adaptation whereas microorganism has impact on its hosts. Based on that perception, our department aims to get more detailed understanding and insight on infectious diseases.

Another pillar is a social responsibility. Now that even profit oriented organizations are required to have its corporate social responsibility, no need to

say for academia or university. Out of the name of our department, it must be nothing but contribution to international health or people's health in resource limited settings.

Our department raises following three activities as international contribution; advocacy on international health at national and international level, health promotion activities and empowerment at the community/ grassroots' level and emergency relief. What our department thinks of important in those activities is to make solidarity in order to improve people's health and contribute to people's sustainable development. It is our department's goal.

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Graduate Student	Vu Hai Ha
Graduate Student	Etsuko Hatagishi
Graduate Student	Shuko Takahasi





## Department of Vector Ecology & Environment

Our research interests include anything from ecology to molecular biology of medically important arthropods, particularly mosquitoes that transmit diseases such as malaria and dengue. We are also interested in their relationships with environmental variables and development of environmentally friendly vector control strategies.

### 1. Dengue vectors

As dengue vectors are extending their geographic distribution, the spread of the disease is being concerned. It has been suspected that the expansion of vector distribution is due to environmental factors such as climate change. We are currently mapping their distributions in Vietnam and Kenya, and examining the relationship with environmental factors, and examining the key environmental factors that contribute to epidemics in Hanoi and Nya Trang.

### 2. Malaria vectors

Main malaria vectors belong to a group of sibling species, and members within a group are morphologically indistinguishable. We are examining ecological and physiological differences among the members within the *Anopheles gambiae* complex group and the *Anopheles funestus* complex group in East Africa including Malawi. We are also investigating their geographic distributions in East Africa. This extensive field survey was designed to understand the effects of climate and the Great Rift Valley on their distributions and evolution.



### 3. Vector control measures

The coverage of insecticide treated bed nets has considerably increased in Africa. We are investigating whether local residents properly use and maintain bed nets, and how long bed nets last. We are also investigating the effects of bed nets on the species composition of vectors and their behavior, and monitoring their insecticide resistance in Kenya and Malawi. For control tools, we are testing two new types of mosquito nets (ceiling net and eave net).

### 4. Detection of virus in mosquitoes

We collaborate with National Institute of Infectious Diseases in Japan and National Institute of Hygiene and Epidemiology in Vietnam to detect new viruses from a variety of mosquito species.

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Graduate Student	Koji Yamada
Graduate Student	Hanako Iwashita
Graduate Student	Yusuke Sumita



## Department of Clinical Medicine

Our research interests are tropical infectious diseases, respiratory infectious diseases including TB, and HIV/AIDS, all of which causes severe disease burden in the tropics. We conduct basic scientific research using animal models in Nagasaki and also clinical epidemiology studies in the overseas through international collaboration as well as in Japan. Specific research activities are described as follows:

### 1. Respiratory Infections

Our goal is to better-understand mechanisms causing severe and treatment-refractory pneumonias at molecular levels toward development of a novel treatment strategy. We hypothesize that patients with severe and treatment-refractory pneumonia has an impaired process in inducing the cessation of inflammation and re-construction of damaged tissues. We, particularly, focus on the function of macrophage which is responsible for clearing apoptotic cells from the inflammation site using a mouse pneumonia model. We have also developing a rapid and comprehensive assay to identify multiple pathogens causing respiratory infections and an assay to quantify bacterial load, which are being applied for several clinical studies in and outside Japan.

### 2. Pediatric Infectious Diseases in Vietnam

We have, so far, conducted studies on clinical and microbiological diagnosis, antimicrobial susceptibility and molecular epidemiology in collaboration with National Institute of Hygiene and Epidemiology. Since 2005, we started a large-scale of census survey targeting all residents in Nha Trang city and its adjacent Nin Hoa district in the middle part of Vietnam. During the census, we collected information regarding environment and diseases burden (particularly pneumonia, diarrhea, dengue fever), health utilization pattern. Since 2006, a research clinician has been dispatched from our department and monitoring all pneumonia cases admitted to the pediatric ward at Kan Hoa General Hospital in the above city. So far over 2,000 pneumonia cases have been registered and we demonstrated that environmental tobacco exposure is a risk factor for child pneumonia admission. We also determined pathogen specific incidence rates and demonstrated seasonality of respiratory infection in Vietnam. In 2009, we commenced a birth cohort study, recruiting 2,000 pairs of mothers and new-born babies, with the objective of facilitating mother-to-child transmission studies of various infections and studies of host-gene polymorphisms associating the severity of pediatric infectious diseases.

### 3. HIV cohort studies in northern Thailand

In collaboration with National Institute of Health, Thailand and National Institute of Infectious

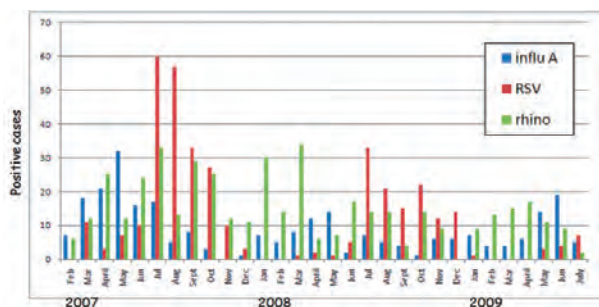
diseases, Japan, a large scale of cohort study targeting HIV-infected individuals and their spouses has been established and maintained in Lampang Hospital, northern Thailand. So far, nearly 2000 people have participated. The main objectives of this cohort are to understand mechanisms of resistance to HIV infection among HIV-exposed but uninfected spouses living with HIV-infected patients and mechanisms of slow-progression among HIV-infected slowprogressors. These studies are being conducted in close collaboration with Thai counterparts and international experts in various fields such as hostgene polymorphisms, molecular immunology, molecular epidemiology and virology. Furthermore, based on this field setting, we are also conducting studies on frequencies of opportunistic infection, the effect of anti-retroviral drug therapy, and social need for children born to HIV-affected parents.

### 4. Others

In collaboration with San Lazaro Hospital, Manila, the Philippines, Bac Mai Hospital, Hanoi, Vietnam and international NGO, we facilitate clinical epidemiology studies concerning pyrexia of unknown origin, leptospirosis, tuberculosis etc.

### Department of Clinical Medicine

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Graduate student	Sugihiko Hamaguchi
Graduate student	Kensuke Takahashi
Graduate student	Reiko Miyahara
Graduate student	Le Nhat Minh
Graduate student	Nobuo Saito
Graduate student	Takaharu Shimazaki
Graduate student	Ikumi Shimada
Graduate student	Satoshi Kakiuchi
Graduate student	Tomoko Ishifuji



Numbers of pneumonia children admitted to the Khan Hoa Hospital



At the Khan Hoa General Hospital (Vietnam)



## Clinic at the University Hospital

Our department is the only one clinical department at the Institute of Tropical Medicine. It has a clinic and a medical ward with about 17 beds on the 11th floor of the Nagasaki University Hospital. We specialized in the Infectious Diseases and Respiratory Diseases; diseases that we handle are systemic infectious diseases, including tropical infectious diseases and HIV/AIDS, tuberculosis and pneumonia, and various neoplastic and inflammatory respiratory diseases. We actively receive consultations regarding diagnosis and management of infectious diseases from other departments. Each year approximately 200 to 300 cases are referred to our department. The outpatient clinic is open two days a week for treating patients with respiratory diseases and infectious diseases. In addition, we are running a travel clinic for international travelers where we can treat tropical diseases with orphan drugs.

For research we are involved in various clinical trials such as chemotherapy for lung cancer, antimicrobial drugs, GM-CSF therapy for pulmonary alveolar proteinosis. Recently we have evaluated the clinical significance of transbronchial biopsy using Endobronchial Ultrasonography (EBUS) with a guide sheath. We are also investigating the pathogenesis of anti-GM-CSF antibody negative primary pulmonary alveolar proteinosis and familial pulmonary fibrosis.

For training and education, in addition to post-graduate training programs for resident physicians and for infectious disease and respiratory disease specialists, we are taking a part in education of undergraduate medical students by providing a number of lectures on infectious diseases and respiratory diseases and by bed-side teaching.

Since April 2006, we have been organizing a clinical case conference for tropical diseases using English as a part of Master of Tropical Medicine course, Graduate School of Biomedical Sciences. Furthermore to accumulate our knowledge and experience with clinical tropical medicine, staff doctors and resident doctors are regularly dispatched for a long-term to San Lazaro Hospital, the Philippines and the infectious disease ward in Bac Mai Hospital, Vietnam.

### Clinic at the University Hospital

Professor	Koya Ariyoshi
Associate Professor	Konosuke Morimoto
Senior Assistant Professor	Yoshiko Tsuchihashi
Assistant Professor	Akitsugu Furumoto
Assistant Professor	Masayuki Ishida
Research Fellow	Masahiro Takaki
Research Fellow	Takeshi Tanaka
Research Fellow	Yoko Tsumori
Research Fellow	Takaharu Shimazaki
Research Fellow	Tomoko Ishifuji
Research Fellow	Maiko Kojiro
Research Fellow	Sugihiko Hamaguchi
Research Fellow	Sohei Nitta
Assistant Professor	Shoko Honda
Assistant	Ayako Kitamura



Infectious diseases conference



Staff members

# Center for Infectious Disease Research in Asia and Africa

## ○Kenya Research Station

Kenya Infectious Disease Research Program: Kenya Station

### Outline

This project started as a "Tropical Medicine, Emerging Infectious Disease and Clinical Epidemiological Research Program to establish Education and Research System for the collaboration of Kenya and Japan" with Special Funds for Education and Research by Ministry of Education, Culture, Sports, Science and Technology-Japan (MEXT) since April 2010. This project has been operated continuously after "Program to Establish Infectious Disease Research Network" which was operated from September 2005 through March 2010 with Special Funds for Education Research Funds by MEXT.

The purpose of this project is to develop Kenya Research station, to provide trainings to young researchers and to research for treatments and prevention of tropical and emerging infectious diseases.

### Progress

#### 1. Establishment of the Station

Kenya research station, Nairobi and research project sites in Mbita and Kwale have been equipped by the last project and under further development such as network systems, lab equipments and vehicles.

#### 2. Dispatch of Japanese Researchers

The members of the station include two professors (including leader), two of administrative staff and a Japan International Cooperation Agency (JICA) program coordinator. Also, four professors, an associate professor, three of assistant professors, and an Industry-Academic-Government Cooperation Specialist have been sent in a short-term for the support.

#### 3. Field Works for Long-term Research and Communities

In Mbita district, Demographic Surveillance System (DSS) has been in operation to collect data of population, death toll, diseases, and malaria surveillance system has been in operation. Consequently, JICA Partnership Program started in Mbita area since January 2009, and the grant assistance for Grassroots Projects (GGP) of Japanese Em-

bassy (for service of Mbita Prefectural Hospital Laboratory) also started in April 2010. A lab, for virus research project was established in KEMRI (Kenya Medical Research Institute) Production Department (Nairobi) with cooperation of a specialist of virology sent by Science and Technology Researchers Dispatch Program by Japan Society for the Promotion of Science (JSPS) in October 2009. Since July 2010, infrastructure has been built to operate DSS and a research of parasitology team in Kware. While vector team started Science and Technology Researchers Program by JSPS in Malawi in May 2010.

#### 4. The Study of Tropical Medicine

The studies held in Kenya Station are on malaria and mosquito transmission in Western Kenya, bacterial and viral diarrheal disease including cholera, septicemia, mosquito-borne hemorrhagic fever and schistosomiasis haematobium.

#### 5. Education Programs

Three of Kenyan researches and doctors have been admitted for Master of Tropical Medicine Course, at the Institute of Tropical Medicine, Nagasaki University. Professors of ITM served as advisors in the JICA-sponsored International Parasite Control in Kenya.

Kenya station has given opportunities to study in research field to students from Nagasaki University School of Medicine and three students from Graduate School of International Health Development every year and students from Shiga University of Medical Science.

### Project Members

Leader and Professor	Yoshio Ichinose (Kenya Station)
Professor	Masaaki Shimada (Kenya Station)
Professor	Noboru Minakawa
Professor	Shinjiro Hamano
Professor	Masahiro Horio
Professor	Satoshi Kaneko
Associate Professor	Hitoshi Kawada
Assistant Professor	Yoshito Fujii
Assistant Professor	Kyoko Futami
Assistant Professor	Kensuke Goto
Industry-Academic-Government Cooperation Specialist	Yoshihide Maekawa
COE Research Fellow	Hu Jinping
JICA Coordinator	Haruki Kazama (Kenya Station)
Administrative/ HR Manager	Yukie Saito (Kenya Station)
Chief Accountant	Tadahisa Sakata (Kenya Station)
Administrative Staff	Tomoka Tawara (ITM)
JICA Expert (Assistant Professor)	Shingo Inoue (Kenya Station)



The Main Office of Kenya Research Station (made in cargo containers, photo taken in 2008)



Kenya Station Staff & Visitors



# Center for Infectious Disease Research in Asia and Africa

## ○Vietnam Research Station

### Outline of the research center

The institute of Tropical Medicine (NEKKEN) and National Institute of Hygiene and Epidemiology, Vietnam (NIHE) have jointly been managing a five-year project, entitled "Collaborative Study on Emerging and Re-emerging Infectious Diseases in Vietnam" since 2005, and achieved the objective of the project at a satisfactory level. Meanwhile, agenda of the next phase five-year project was underlined, which is, clarifying the factors and their mechanisms in causation of emerging and re-emerging infectious diseases. In the second phase project, "Japan Initiative for Global Research Network on Infectious Diseases (J-GRID)", we will develop researches under four research groups (diarrhoea, vector-borne infectious diseases, clinical research, and zoonosis) in the similar framework of the collaborative studies by NEKKEN and NIHE to attain the objective of the project. We wish results from researches in the project render help to the activities regarding public health promotion and medical care.

### Research activities

The objectives of the entire project are to clarify the ecology of pathogens in nature and in human society, to clarify the pathogenic mechanism of human diseases, and to develop an intervention-based method to inhibit the spread of infectious diseases. Four research groups will conduct their researches pursuing their research objectives. Research agenda are as follows:

**Diarrhoea research group:** 1) A molecular epidemiological study on kinetics of enteropathogens after rotavirus vaccine intervention, 2) A molecular epidemiological study of *Vibrio cholerae* in ecosystem in Vietnam, and 3) Human animal interface in causation of diarrhoea in Vietnam.

**Vector-Borne Infectious Diseases Research Group:** 1) Study on biological properties, virulence and ecological significance of dengue viral quasispecies in mosquito vectors and humans, 2) A survey of Japanese encephalitis virus migration, 3) A study of

the influence of arbovirus on seasonal encephalitis of unknown origin, 4) A survey of climate change, mosquito vectors, and virus infection, 5) A study of mosquito vectors, pathogenic mechanism of dengue fever, and anti-infection measures.

**Clinical Research Group:** 1) Pediatric acute respiratory infection cohort research study, 2) A birth cohort study, 3) An immunogenetical analysis of severe dengue fever at Choray Hospital, 4) Establishment of a clinical and epidemiological research data collection system for analysis of the fever of unknown origin

**Zoonosis Research Group:** 1) A viral epidemiological study of bat-borne infectious diseases, 2) A molecular epidemiological study of rabies, 3) An epidemiological study of hantavirus, 4) Development of human monoclonal antibody with neutralizing activity against avian influenza (H5N1) strain, 5) An epidemiological study of avian influenza.

### NIHE-Nagasaki University Friendship Laboratory (NNFL) staff

Leader and Professor	Tetsu Yamashiro
Professor	Futoshi Hasebe
Assistant Professor	Takashi Tsunoda
Assistant Professor	Hiroshi Yoshino
Assistant Professor	Gen-ichiro Uechi
Assistant Professor	Kozue Hotta
Administrative Staff	Jiro Hirau
Research Assistant	Dang Thi Dinh
Research Assistant	Le Thi Thuyen
Research Assistant	Nguyen Thi Yen
Research Assistant	Pham Hoai Linh Ly
Research Assistant	Ung Thi Hong Trang
Secretary	Bui Thu Tra
Assistant (in Nekken)	Yumiko Fukuiwa



Dr. Uechi is providing a basic technique to perform PCR to a Vietnamese staff



Staff of Vietnam Research Center



A surveillance for mosquito which potentially transmit dengue viruses

## Tropical Medicine Museum

Museum of Tropical Medicine was preceded by the Tropical Medicine Reference Centre, which was established in 1974 and was reorganized in 1997 as Tropical Medicine Reference and Information Center. In 2001, it was renamed as Research Center Tropical Infectious Diseases (RECTID) and in 2008 it was established as an auxiliary institution. The institution performs the following 2 functions.

The institute primarily functions as a museum and resource center for tropical disease. Currently, on the 1st floor of the Institute of Tropical Medicine Nagasaki University, there is a general section providing information on tropical diseases, parasites/bacteria/viruses/poisonous insects and specimen of dangerous animals, valuable books, and displays images of the data. Moreover, it has an audio-visual room accommodating a few numbers of people. Furthermore, a system is being developed for using this collection of resources to strengthen public science and risk communication with thousand points relating to the history and philosophy of tropical medicines and infection symptoms. In the near future we would like to expand the exhibition room to the museum of tropical medicine and can be used as an educational resource for society and educators and provide tropical disease related research and successful results for the public. In addition, we displayed Africa's Nature, Development, and People, in March 2009, as part of the Ueno Yama Decade of Information series of National Museum of



Tropical Medicine Museum

Nature and Science, Tokyo.

It also functions as an information center for the dispatch, collection, organization, and analysis of information on tropical medicine. This has become an essential component of the daily research activities related to tropical medicine. Due to infrastructure rearrangement in 2007, network tools were updated with technological innovation and long lasting safety; thus responding to every need of the users. We also serviced various databases, using a research evaluation system and a database of the tropical medicine museum. Moreover, we are trying to provide a similar environment to research universities overseas with VPN by including video conferencing system to promote international conferences and e-learning plans.

Head and Professor	Noboru Minakawa
Professor	Masahiro Horio
Assistant	Kazuo Araki
Assistant	Kiyomi Suda
Assistant	Akiko Akita



The database server



## Central Laboratory

### ○Laboratory of Molecular Biology

Investigation of the interactions between microbial pathogens, vectors and hosts at molecular or gene levels is important for the better understanding of pathogenesis of various infectious diseases. Molecular Biology Laboratory has been equipped with 16- and 48-cappillary sequencers for high-throughput and high-resolution genetic analysis of pathogens, vectors and hosts. In addition to general laboratory facilities such as pure water supply, ultracentrifuge, lyophilizer, Speed-Vac, French press, Bioruptor, sample storage in liquid nitrogen, bio-safety cabinet, autoclave, dark room and cold room, the laboratory is also equipped with several special analyzers such as laser confocal microscope, flowcytometer, digital cell sorter, Luminex bead-array system, fluorescence- and luminescence-multilabel counter, fluorescence- and luminescence-imager, mass spectrometry-based genotyping system to meet a variety of demands of researches of the institute as well as those of visiting investigators. Further, genome sequencer "GS junior" has been introduced in year 2010.

### ○Laboratory of Pathology

Main purpose of our research is fundamentally pathological investigation of tropical diseases, mainly infectious diseases, focused on oncogenic microbes, and establishes the basis of their treatment and prevention. Although many investigators have proposed oncogenesis due to inflammation associated cancer development, the mechanisms underlying the relationship between chronic inflammation and cancer still remain unresolved. Therefore, our research focuses on the potential role of oncogenic microbes in the development of cancers, highlighting the recent advances in the understanding of the molecular mechanisms.

The proportion of total cancer deaths attributable to infectious agents is estimated to be 20% to 25% in developing countries and 7% to 10% in industrialized countries. A causal relationship between chronic inflammation and cancer is widely

accepted. Specifically, there is a strong association between tumor viruses and the development of human cancers. The mechanisms of oncogenesis associated with infection and inflammation have not been elucidated. However, many oncogenic mechanisms have been proposed for infection and inflammation. Activation of NF- $\kappa$ B is also involved cancer development and progression. Therefore, our research focuses on the molecular players during the development from chronic inflammation to cancer.

### ○Electron Microscope Room

Electron microscopy has been applied to the inspection of the ultrastructure of most microbial pathogens including viral, protozoal and bacterial species as well as to the detailed morphological analysis of host-pathogen interactions by means of immuno-histochemical procedures and other modern techniques. The laboratory is equipped with transmission electron microscope (from JEOL), scanning electron microscope (from JEOL), ultramicrotome (from Reichert), vacuum coater, critical point dryer system, and osmium plasma coater in addition to general laboratory facilities for a wide range application of electron microscopy, contributing to various research projects in the institute and collaborations with the other researchers.



Lab for Genetic Analysis

### ○The Malaria Unit

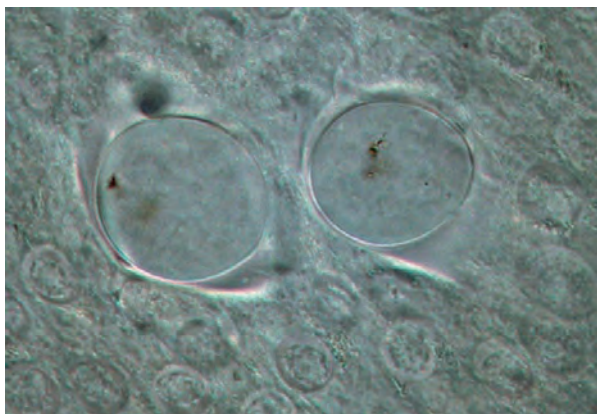
We are a small and highly driven malariology group focusing on many different aspects of malaria. Established in 2011, we believe in a multidisciplinary approach to studying malaria, as this enables a broad understanding of the subject, and therefore facilitates the development of novel

solutions for fighting the disease. Such a holistic approach to disease research can only succeed, however, on the foundation of a solid and detailed understanding of its multi-disciplinary constituents.

Our core belief is that all our research should produce results that are of potential practical use for fighting the disease. We also strive to engage young researchers in studies on malaria, and hope to encourage them to develop enthusiasm for useful scientific research. We believe that scientific research should be fun, and try to foster a freethinking and engaging research environment for students working with us.

We are interested in all aspects of malariology, and are currently actively engaged in research projects involving immunology, genetics, genomics, evolutionary theory, ecology, epidemiology, and molecular cell biology.

Collaborative projects with malaria researchers based in Japan and internationally are of enormous importance to us, and make up the bulk of the work we are currently engaged in. At present we are actively working with researchers from the USA, the Republic of Congo, Vietnam, Sri Lanka, Brazil, the UK and Saudi Arabia.



Malaria parasites in their definitive host - the mosquito

Head and Professor	Kouichi Morita
Associate Professor	Richard Culleton
Assistant Professor	Masachika Senba
Research Associate	Akitoyo Ichinose
Assistant	Kanae Tanaka
Assistant	Nozomi Hayashida

## Animal Research Center for Tropical Infections

The center makes it the principal aim to ensure the safety of animal experiments which are dealt with the pathogenic microorganisms and to build up the continuous production of experimental animals, microorganisms and parasites. The building consists of seven breeding rooms for experimental animals, three laboratories, one breeding room for snails and insects, and a P3-level biohazard laboratory.

The temperature of all the rooms is kept at just about 25C all the year round. The air pressure is kept always negative to avoid outflow from inside. Since the building has the most thorough ventilation through HEPA filters, any microbes cannot leak out to outside of the building. The used cages are reused after autoclave-sterilization, and used water is drained off after chlorination. The laboratory animals bred in the center are mice, rats, gerbils, rabbits, snails and mosquitoes. The number of users in 2010 was around 6,500.

The breeding and experiments are done according to Nagasaki University Animal Experiment Regulations.

Head and Professor	Shinjiro Hamano
Research Associate	Tetsuo Yanagi
Assistant	Junko Kawashima



a laboratory in ARCTI

## Number of Staff (as of May, 2011)

Divisions	Professor	Associate Professor	Lecturer	Assistant Professor	Research Associate	Sub total	Others	Total
Enrollment	12 (4)	4 (2)	2	16 (17)	3	37 (23)	10 (6)	47 (29)

※ ( ) number of fixed-term staff

## Accounting

### Revenue (in 2010)

Divisions	Amount (in thousands)
Tuition and Admission Fees	2,238
Others	251
Total	2,489

### Expenditure (in 2010)

Divisions	Amount (in thousands)
Personnel expenses	532,702
the cost of equipment	471,524
Total	1,004,226

## Grant-in-Aid for Scientific Research from the Ministry of Education, Culture, Sports, Science and Technology (in 2011)

Type of Research	Scientific Research (A)	Scientific Research (B)	Scientific Research (B)	Scientific Research (C)	Challenging Exploratory Research	Young Scientists (B)	Research Activity Start-up	Total
Number of Grants	2	5	2	8	7	6	1	31
Amount (in thousands)	30,420	29,900	10,010	12,740	12,870	10,010	1,508	107,458

Facilities & Administrative costs included

## Grant-in-Aid for Scientific Research from the Ministry of Health, Labour and Welfare (in 2011)

Type of Research	Research on health security control	Global Health Issue	Emerging and Reemerging Infectious Diseases	AIDS Control	Clinical Cancer	Total
Number of Grants	1	4	4	3	1	13
Amount (in thousands)	3,700	13,511	8,800	7,500	1,000	34,511

## Subsidy (in 2010)

Type of Research	Grant-in-Aid for Forming Research Locations etc (Global COE)	National Bio-resource Project (NBRP)	Special Coordination Funds for Promoting Science and Technology of the Ministry of Education, Culture, Sports, Science and Technology	Leading-edge Research Promotion Fund	The JSPS Postdoctoral Fellowship for North American and European Researchers (short-Term)
Amount (in thousands)	245,330	3,700	59,895	651,710	1,458

Facilities & Administrative costs included

## External Funding (in 2010)

Divisions	Joint Research with Private Sectors	Commissioned Research	Commissioned Project	Endowments
Number of Sources	2	13	4	22
Amount (in thousands)	61,350	264,187	22,830	14,710

Facilities & Administrative costs included

## Agreement of Educational, Scientific and Scholarly Exchange

### ○Overseas

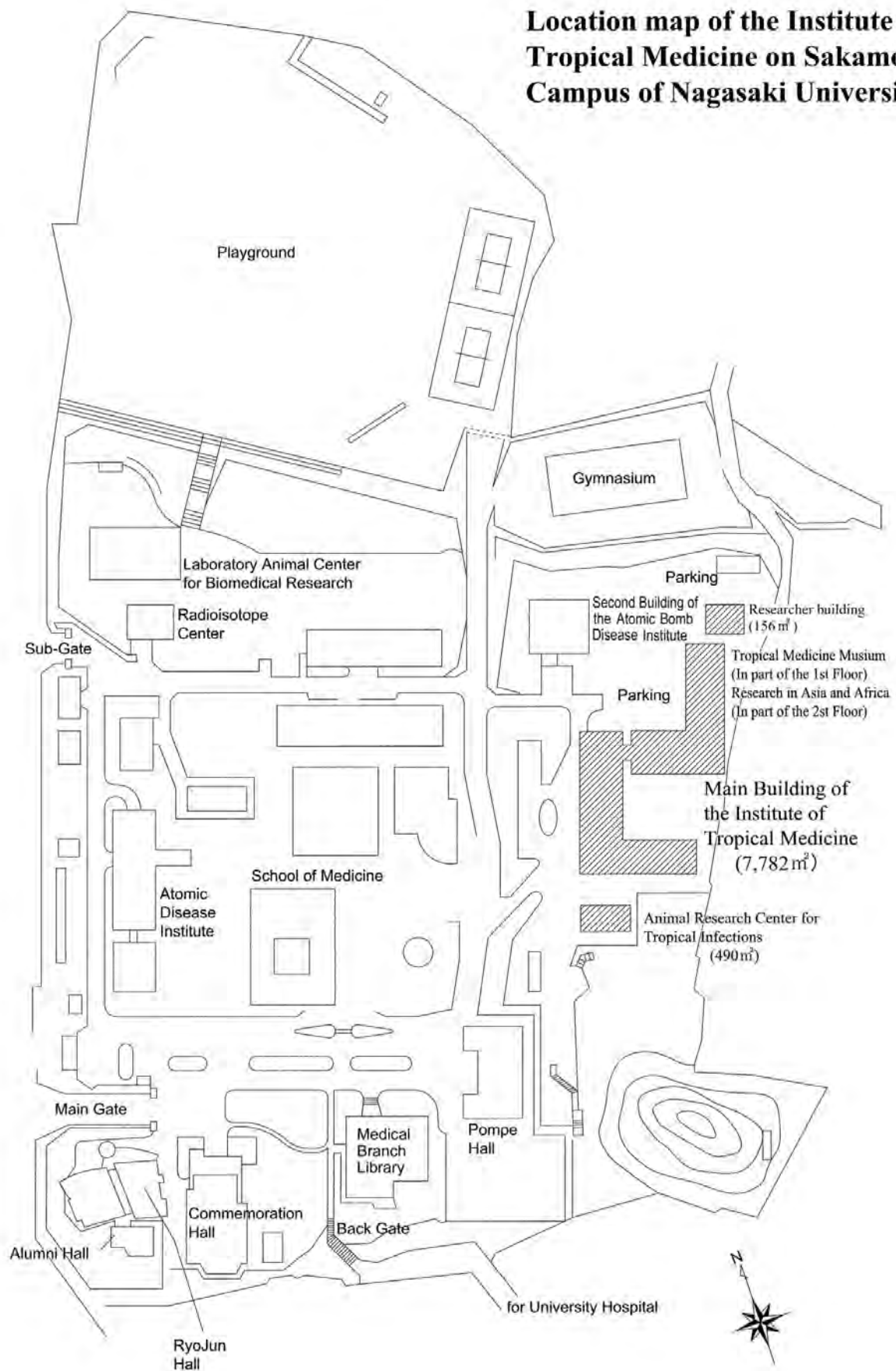
Name of organization of partner countries	Concluded date
Chiang Mai University (Thailand)	February, 1988
Mahidol University (Thailand)	November, 1999
University of the Philippines Diliman (Philippines)	April, 2001
National Institute of Hygiene and Epidemiology (Vietnam)	June, 2001
Airlangga University (Indonesia)	January, 2004
St. Luke's Medical Center (Philippines)	February, 2004
San Lazaro Hospital Medical Center (Philippines)	August, 2004
Kenya Medical Research Institute (Kenya)	November, 2004
Thammasat University (Thailand)	March, 2006
Defence Research and Development Establishment (India)	January, 2010
National Institute for Communicable Diseases of the National Health Laboratory Service (South Africa)	July, 2010
China Medical University (China)	September, 2010
Peking Union Medical College (China)	September, 2010
Jiangsu Institute of Parasitic Diseases (China)	September, 2010

### ○Domestic

Name of organization of partner	Concluded date
The Research Institute of Tuberculosis Japan Anti-Tuberculosis Association	March, 2009



# **Location map of the Institute of Tropical Medicine on Sakamoto Campus of Nagasaki University**



## Telephone Number

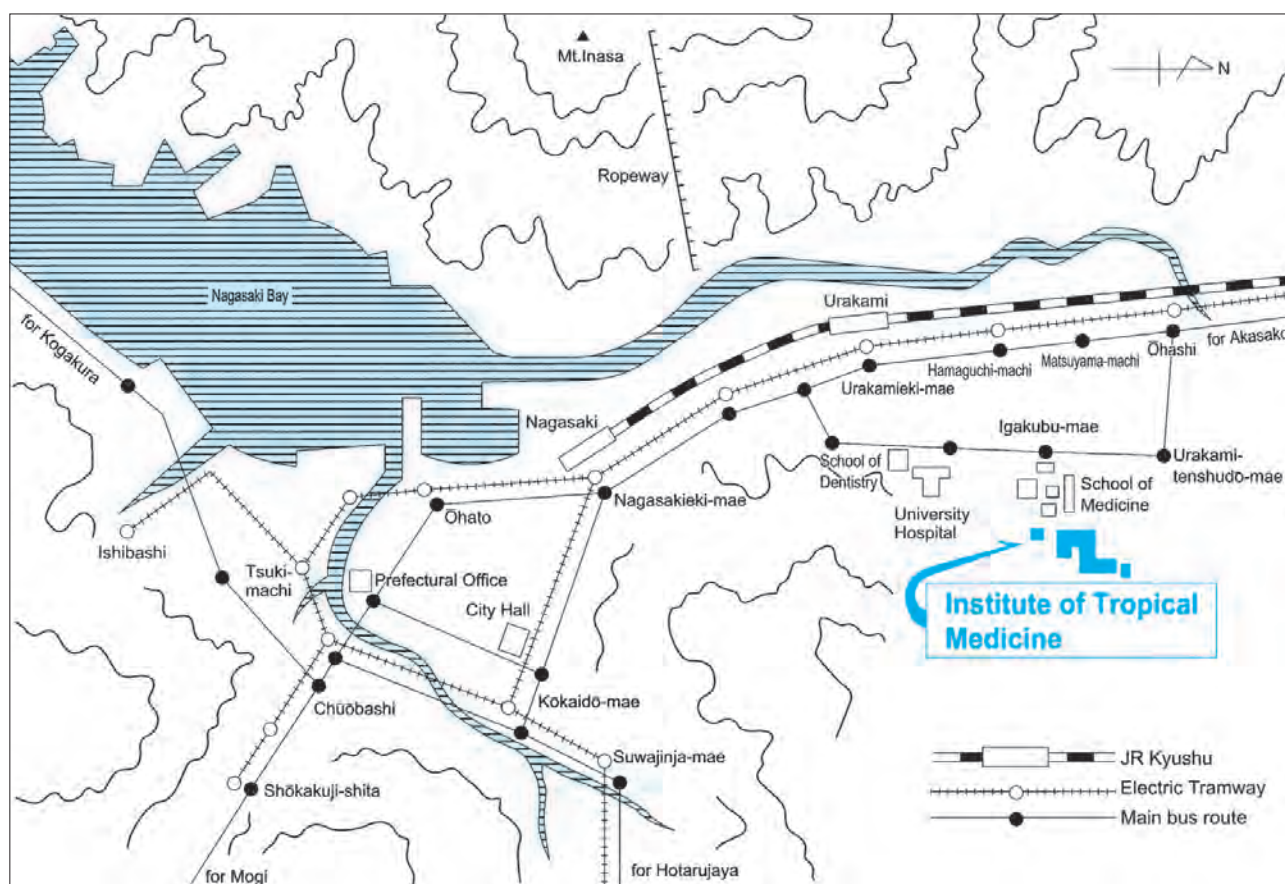
Institute of Tropical Medicine, Nagasaki University

0 9 5 ( 8 1 9 ) 7 8 0 0

	Extension	Direct dialing
Dean .....	7 8 0 1	8 1 9 - 7 8 0 1
Head of Administrative Office .....	7 8 0 2	8 1 9 - 7 8 0 2
Expert Staff .....	7 8 1 3	8 1 9 - 7 8 1 3
Chief of General Affairs Unit .....	4 7 0 2	8 1 9 - 7 8 0 3
General Affairs Unit.....	7 8 0 3	
Chief of Accounting and Facilities Management Unit .....	4 7 0 6	8 1 9 - 7 8 0 7
Accounting and Facilities Management Unit.....	7 8 0 7	
Accounting and Facilities Management Unit.....	7 8 1 6	
Chief of Overseas Research Station Unit.....	4 7 0 9	8 1 9 - 7 8 0 6
Overseas Research Station Unit .....	7 8 0 6	
Facsimile.....	7 8 0 5	8 1 9 - 7 8 0 5
Main Meeting Room .....	4 7 1 1	
Meeting Room .....	7 8 7 0	
Department of Virology		
Professor .....	7 8 2 7	8 1 9 - 7 8 2 7
Associate Professor .....	7 8 2 8	8 1 9 - 7 8 2 8
Information .....	7 8 2 9	8 1 9 - 7 8 2 9
Facsimile .....	7 8 3 0	8 1 9 - 7 8 3 0
Department of Emerging Infectious Diseases		
Professor .....	7 8 4 8	8 1 9 - 7 8 4 8
Staff room.....	7 8 4 9	8 1 9 - 7 8 4 9
Laboratory.....	7 8 5 0	8 1 9 - 7 8 5 0
Information .....	7 8 5 1	8 1 9 - 7 8 5 1
Department of Bacteriology		
Professor .....	7 8 3 1	8 1 9 - 7 8 3 1
Lab.2 .....	7 8 3 2	8 1 9 - 7 8 3 2
Lab.1,Lab.3 .....	7 8 3 3	8 1 9 - 7 8 3 3
Facsimile .....	7 8 7 7	8 1 9 - 7 8 7 7
Department of Protozoology		
Professor .....	7 8 3 5	8 1 9 - 7 8 3 5
Lab.2 .....	7 8 3 6	8 1 9 - 7 8 3 6
Lab.1 .....	7 8 3 7	8 1 9 - 7 8 3 7
Information .....	7 8 3 8	8 1 9 - 7 8 3 8
Laboratory.....	7 8 1 5	8 1 9 - 7 8 1 5
Department of Parasitology		
Professor .....	7 8 2 2	8 1 9 - 7 8 2 2
Staff room.....	7 8 2 3	8 1 9 - 7 8 2 3
Facsimile .....	7 8 2 4	8 1 9 - 7 8 2 4
Information .....	7 8 2 5	8 1 9 - 7 8 2 5
Department of Immunogenetics		
Professor .....	7 8 1 8	8 1 9 - 7 8 1 8
Assistant Professor .....	7 8 1 9	8 1 9 - 7 8 1 9
Information .....	7 8 2 0	8 1 9 - 7 8 2 0
Facsimile .....	7 8 2 1	8 1 9 - 7 8 2 1

	Extension	Direct dialing
ExtensionsDepartment of Pathology		
Assistant Professor .....	7 8 1 4	8 1 9 – 7 8 1 4
Department of Preventive Medicine and AIDS Research		
Laboratory .....	7 8 4 4	8 1 9 – 7 8 4 4
Information1 .....	7 8 4 5	8 1 9 – 7 8 4 5
Information2 .....	7 8 4 6	8 1 9 – 7 8 4 6
Department of Eco-epidemiology		
Professor .....	7 8 6 4	8 1 9 – 7 8 6 4
Staff room .....	7 8 6 6	8 1 9 – 7 8 6 6
Staff room .....	7 8 6 7	8 1 9 – 7 8 6 7
Lab.1 .....	7 8 5 4	8 1 9 – 7 8 5 4
Lab.2 .....	7 8 6 8	8 1 9 – 7 8 6 8
Information .....	7 8 6 5	8 1 9 – 7 8 6 5
Department of International Health		
Professor .....	7 8 6 9	8 1 9 – 7 8 6 9
Lab.1 .....	7 8 0 8	8 1 9 – 7 8 0 8
Information .....	7 8 6 9	8 1 9 – 7 8 6 9
Department of Vector Ecology and Environment		
Professor .....	7 8 1 0	8 1 9 – 7 8 1 0
Staff room .....	7 8 1 1	8 1 9 – 7 8 1 1
Information .....	7 8 0 9	8 1 9 – 7 8 0 9
Facsimile .....	7 8 1 2	8 1 9 – 7 8 1 2
Department of Clinical Medicine		
Professor .....	7 8 4 0	8 1 9 – 7 8 4 0
Associate Professor .....	7 8 7 3	8 1 9 – 7 8 7 3
Information .....	7 8 4 1	8 1 9 – 7 8 4 1
Information .....	7 8 4 2	8 1 9 – 7 8 4 2
Facsimile .....	7 8 4 3	8 1 9 – 7 8 4 3
Center for Infectious Disease Research in Asia and Africa		
Kenya Research Station Professor .....	7 8 6 0	8 1 9 – 7 8 6 0
Vietnam Research Station Professor .....	7 8 7 6	8 1 9 – 7 8 7 6
Animal Research Center for Tropical Infections		
Office .....	7 8 5 6	8 1 9 – 7 8 5 6
Tropical Medicine Museum		
Professor .....	7 8 1 7	8 1 9 – 7 8 1 7
Information .....	7 8 6 8	8 1 9 – 7 8 6 8
Central Laboratory		
Electron Microscope Room .....	7 8 5 9	8 1 9 – 7 8 5 9
Information .....	7 8 5 7	8 1 9 – 7 8 5 7

## Location map of the Institute of Tropical Medicine, Nagasaki University in Nagasaki City



### How to get the Institute

○ From JR Nagasaki Station

▶ Electric Tramway "Nagasaki Station" → (bound for Akasako) → "Hamaguchi-machi" → about 10-minute walk

Nagasaki Bus "Nagasaki Station" → (No.8 bound for Shimoohashi via School of Medicine) → "School of Medicine"

○ From JR Urakami Station

▶ Electric Tramway "Urakami Station" → (bound for Akasako) → "Hamaguchi-machi" → about 10-minute walk

○ From Nagasaki Airport

▶ Kenei Bus "Nagasaki Airport No.4 Bus Stop" → (bound for Nagasaki City via Showa-machi and Urakami) → "Urakami Station" → refer to "From JR Urakami Station" above

### Location

1-12-4 Sakamoto Nagasaki 852-8523

URL <http://www.tm.nagasaki-u.ac.jp>

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