

Through Scientific Discovery and its Application Solving the World Health Problem



Institute of Tropical Medicine Nagasaki University
July 2017



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

Nagasaki University Institute of Tropical Medicine (ITM) was established in 1942 as a unique government-assisted institution for research on tropical medicine, both in the basic and applied fields. The Ministry of Education, Culture, Sports, Science and Technology (MEXT) designated ITM as a “Collaborative Institute” and a “Center of Excellence” in 1982 and 1995 respectively. In 1993, the World Health Organization designated ITM a WHO Collaborating Centre for Reference and Research on Tropical Viral Diseases. Most recently, in 2009, ITM was authorized as a “Tropical Medicine Research Center of Joint Usage” supported by MEXT. This recognition underlines the importance of ITM as an open institute whose resources are freely available to the whole research community. The current organization of the institute involves four major research fields (15 departments, one domestic visiting department, one overseas visiting department), two centres, and one clinical unit.

Developing countries in the tropics, the most ecologically and culturally diverse regions of the world, are affected by a diverse group of tropical diseases, new emerging infectious diseases and life-style diseases. In view of the remarkable advances made in the field of international exchange in recent years, the industrialized countries of the temperate zones are also affected by these problems and it is imperative that they are addressed from a global perspective. Based on this paradigm, ITM aims to overcome tropical and emerging infectious diseases, and the various related health problems in the tropics and the rest of the world, in cooperation with related institutions, and 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

This pamphlet offers a brief but hopefully intelligible explanation of our organization and its activities in research, education and other related social activities. As you will see, our research activities address traditional tropical diseases such as malaria, schistosomiasis, dengue fever, zika virus disease, yellow fever and acute respiratory infections, and emerging infections such as HIV/AIDS, SARS and Ebola disease. We conduct basic, epidemiological and clinical research for disease prevention and control. We also investigate environmental factors including vectors, and natural and social environments. ITM educates students in PhD and Masters courses as part of the Graduate School of Biomedical Science and Graduate School of Tropical Medicine and Global Health of Nagasaki University. In addition, ITM provides a three-month training course on tropical medicine. You will also find information about our research bases in Kenya and Vietnam. Finally, the financial status of the institute is summarized.

Your suggestions, support and ideas for the further development of ITM are greatly appreciated.

May, 2017
Kenji Hirayama
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 designated 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, three additional departments i.e., clinical medicine, pediatric infectious diseases and clinical pharmaceutical science, were admitted for installation.

In June, 2013, the Animal Research Center for Tropical Infections was closed.

In April, 2014, Tropical Medicine Museum was relocated.



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

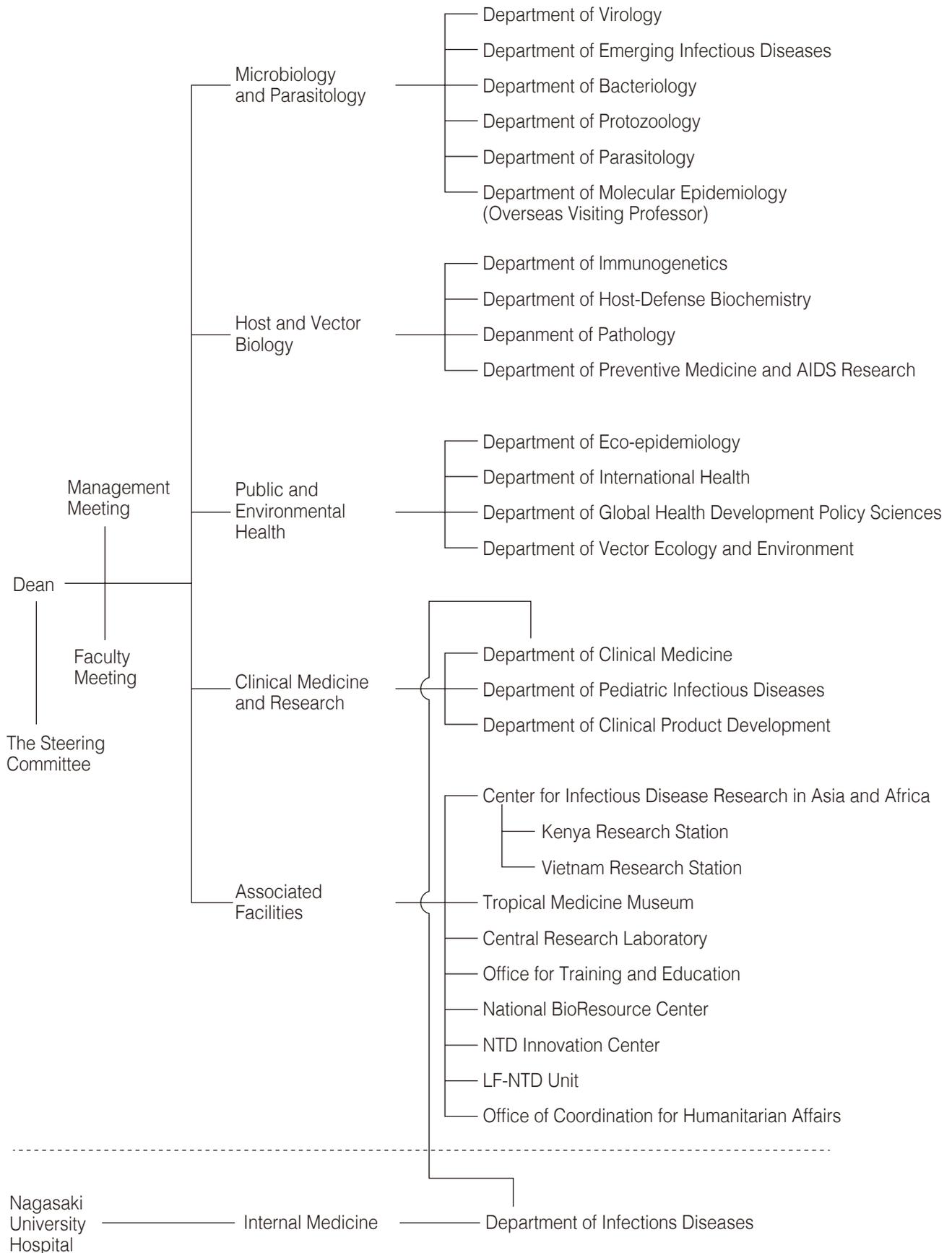
(Research Institute of Endemics)

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	Jun. 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 - May. 31, 2013
Kouichi Morita	Apr. 1, 2013 - May. 31, 2017
Kenji Hirayama	Apr. 1, 2017 - Up to the present

Organizational Chart



The Steering Committee for the Institute of Tropical Medicine

Committee Member outside the university

National Institute of Infectious Diseases	Director-General	Ichiro Kurane
Department of Tropical Medicine and Malaria Research Institute National Center for Global Health and Medicine National Center for Global Health and Medicine Disease Control and Prevention Center Hokkaido University Research Center for Zoonosis Control	Director	Shigeyuki Kano
Obihiro University of Agriculture and Veterinary Medicine	Director Specially Appointed Professor	Norio Ohmagari Chihiro Sugimoto
National Institute for Environmental Studies Tohoku University Graduate School of Medicine St. Luke's International University Graduates School of Public Health	Executive Vice President, Director President Professor Dean	Noboru Inoue Chiho Watanabe Hitoshi Oshitani Hiroyoshi Endo

Committee Member outside the institute

Nagasaki University	Trustee	Syunichi Yamashita
Graduate School of Biomedical Sciences	Dean	Isao Shimokawa
School of Tropical Medicine and Global Health	Dean	Kiyoshi Kita
Atomic Bomb Disease Institute	Dean	Yasushi Miyazaki

Committee Member inside the institute

Institute of Tropical Medicine	Dean	◎Kenji Hirayama
Institute of Tropical Medicine	Vice-Dean	Shinjiro Hamano
Institute of Tropical Medicine	Vice-Dean	Osamu Kaneko

◎:Chairman

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 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 11 members, out of whom more than half should be outside 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.

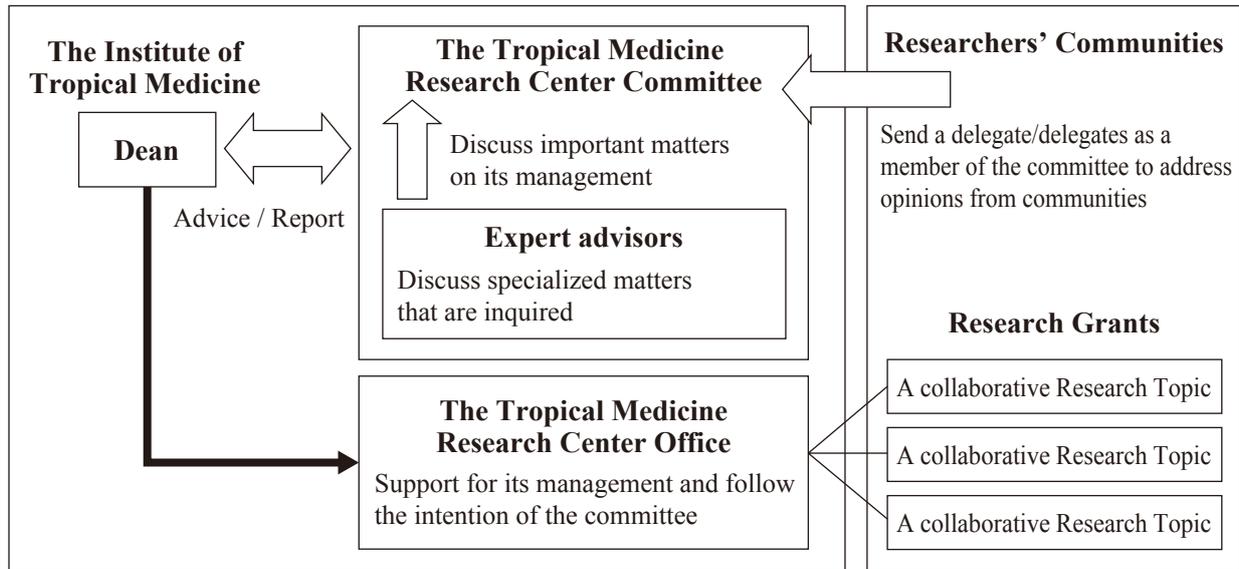
4. Applications for Collaborative Researches

There were 39 applications for collaborative researches, out of which 27 were adopted.

There were 2 applications for collaborative researches with overseas bases, out of which 2 were adopted.

There were 2 applications for research meeting, out of which 2 were adopted.

Concept Diagram



The Steering Committee for the Collaborative Research Center on Tropical Medicine

Committee Member outside the university

Oita University Faculty of Medicine	Professor	◎Akira Nishizono
National Research Center for Protozoan Diseases, Obihiro University of Agriculture and Veterinary Medicine	Professor	Shinichiro Kawazu
Niigata University Graduate School of Medical and Dental Sciences	Professor	Sohkichi Matsumoto
Institute for Frontier Life and Medical Sciences, Kyoto University	Associate professor	Takayuki Miyazawa
National Institute of Infectious Diseases	Director	Manabu Ato
The University of Tokyo Graduate School of Medicine	Professor	Satoshi Sasaki
National Center for Child Health and Development	Director	Rintaro Mori
National Institute of Infectious Diseases	Visiting researcher	Yoshio Tsuda

Committee Member outside the institute

Graduate School of Biomedical Sciences	Professor	Katsuyuki Yui
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Committee Member inside the institute

Institute of Tropical Medicine	Professor	Taro Yamamoto
Institute of Tropical Medicine	Professor	Koya Ariyoshi
Institute of Tropical Medicine	Professor	Yoshio Ichinose

◎: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 and Tropical Medicine Museum. Other facilities of the institute include NTD Innovation Center, Nekken Bio-Resource Center, Office of Coordination for Humanitarian Affairs, a joint research laboratory, a tropical medicine education office and LF-NTD Unit.
- 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 14 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. The third term of the Vietnam project has started in 2015 and Kenya project has started in 2016. 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. At the same time, basic research area related to Infection has been activated by obtaining Kakenhi grants From MEXT.
- 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

1. PhD Course

Graduate School of Biomedical Sciences, Nagasaki

University now offers six master and doctoral courses, after unification in 2002 of three biomedical schools, Medical, Dental and Pharmacology. All the departments in the Institute of Tropical Medicine (ITM) are actively involved in teaching the Course on Infection Research. In April 2013, the “Program for Nurturing Global Leaders in Tropical and Emerging Communicable Diseases (PhD course)” was incorporated in this Course. Limited to 15 students per year, the new program is one of the several programs adopted by the Program for Leading Program supported by the Ministry of Education, Culture, Sports, Science and Technology. It focuses on controlling tropical and emerging infectious communicable diseases and on leadership. One of its unique features is that students will be given practical trainings in a cross-field curriculum, which includes hands-on training at overseas Nagasaki University Research Stations in Kenya and Vietnam and other international organizations. For the program, twenty-one staff of ITM composed of professors, associate professors and assistant professors devote themselves in giving lectures and supervising students' research activities.

2. Master Courses

In April 2015, School of Tropical Medicine and Global Health was newly established. The School consists of three master courses;

Tropical Medicine Course (Master of Tropical Medicine) provides the medical doctors with clinical knowledge and academic research skill to respond to health issues in the area of tropical medicine. (one year)

International Health Development Course (Master of Public Health) equips the students with essential knowledge and skills required to pursue careers in international health. (two years)

Health Innovation Course (Master of Science in Global Health and Medicine) gives opportunities of basic research skills to prepare for pursuing higher academic careers in global health research. (two years)

The latter two courses are open to those who have no medical/ health background.

One of the strengths is that the students of all three courses will learn together in the basic modules on global health so that they will have opportunities to understand the issues in wider perspectives than their own disciplines.

Other characteristics include the whole learning is conducted in English and the academic partnership of teaching and research with London School of Hygiene & Tropical Medicine, a leading global institute of tropical medicine

The information on PhD and master courses including application form will be available through our webpage. <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, implementing disease control programs and conducting medical research in tropical and developing countries. The course began in 1978 and since 2017, it opens to the researchers who pursue technology for global health. Fifteen participants are accepted to attend the course in each year. As of the 39th course in 2016, 501 participants in total (including 181 medical doctors, and 320 co-medical such as nurses, community health nurses, midwives, pharmacists) from all over Japan have completed the course.

The course is run by the steering committee, which consists of members from both inside and outside the Institute of Tropical Medicine (ITM).

During thirteen weeks (April to June), the full-time staff members of the ITM and a substantial number of visiting professors and lecturers provide 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 successfully completed the course are awarded the Diploma in Tropical Medicine.



Admission ceremony in 2017

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. In 2015, we had 5 open lectures at Nagasaki Museum of History and

Culture etc. To accumulate know-how of risk communication on tropical infectious diseases in our institute, we are planning to have open lectures where we have frank communication with citizens on the present state and future prospects of research on tropical medicine.

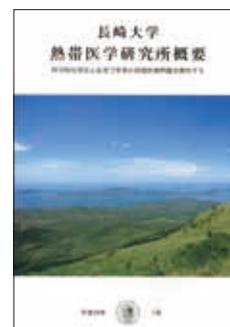
Publications

Our official publications are as follows;

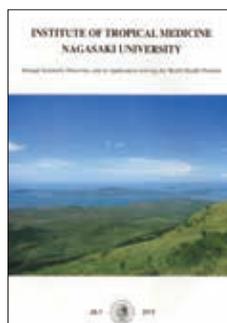
1. Bulletin of Nagasaki University Institute of Tropical Medicine (in Japanese, yearly since 1964, PDF files are available at our web page.)
2. Japanese Brochure (in Japanese yearly since 1977, PDF files are available at our web page.)
3. English Brochure: INSTITUTE OF TROPICAL MEDICINE NAGASAKI UNIVERSITY (this copy. 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.)



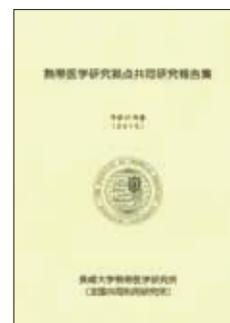
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Department of Virology

This Department has been conducting basic and applied research on arthropod-borne viruses (arboviruses) such as Japanese encephalitis virus (JEV), dengue virus (DENV), Zika virus, Chikungunya virus (CHIKV) and severe fever with thrombocytopenia virus (SFTSV), as well as emerging infectious viruses, such as SARS virus and Nipah virus.

Molecular epidemiology of arboviruses

We isolate DENV, JEV and CHIKV in Asia and African regions and conduct molecular epidemiological analysis to clarify international and inter-continental movement of these viruses. We also analyze unique genome sequences that are relevant to pathogenicity.

Research on viral pathogenesis and vaccine development using reverse genetics

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

Research on the pathogenicity of arboviruses and in vivo evaluation of therapeutic compounds

We elucidate the mechanism of pathogenicity and infectivity of arboviruses, such as JEV and SFTSV using a mouse model. We also evaluate the therapeutic effects of antiviral drugs and antiserum in vivo. A new dengue vaccine is under development by financial support of GHIT.

Development of rapid diagnostic assay for infectious diseases

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, Severe Fever and Thrombocytopenia Syndrome virus (SFTS) and H5N1 avian influenza virus are being conducted in Viet Nam, Japan and other countries in the South East Asia.

Activities as a WHO Collaborating Center

The department is designated as a WHO Collaborating Center for Reference and Research on Tropical Viral Diseases since 1993 and has been re-designated until the present as a center for Tropical and Emerging Virus Diseases. The centre has been collaborating with WHO in training WHO fellows from many developing countries and has deployed experts as WHO short-term consultants. 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
Associate Professor	Moi Meng Ling
Associate Professor	Shingo Inoue
Associate Professor(Project)	Daisuke Hayasaka
Assistant Professor	Takeshi Nabeshima
Assistant Professor	Mya Myat Ngwe Tun
Visiting Professor	Masanobu Ago
Visiting Researcher	Toru Kubo
Visiting Researcher	Akira Yoshikawa
Visiting Researcher	Yuki Takamatsu
Visiting Researcher	Reo Uchida
Research Fellow	Muhareva Raekiansyah
Assistant	Kazumi Jodai
Assistant	Kimiko Taniguchi
Graduate Student	Aung Kyaw Kyaw
Graduate Student	Satoshi Shimada
Graduate Student	Phu Ly Minh Huong
Graduate Student	Bui Thu Thuy
Graduate Student	Mark Anthony D. Luz
Graduate Student	Nguyen Co Thach
Graduate Student	Tsuyoshi Ando



Molecular imaging of SFTSV-infected mouse

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.

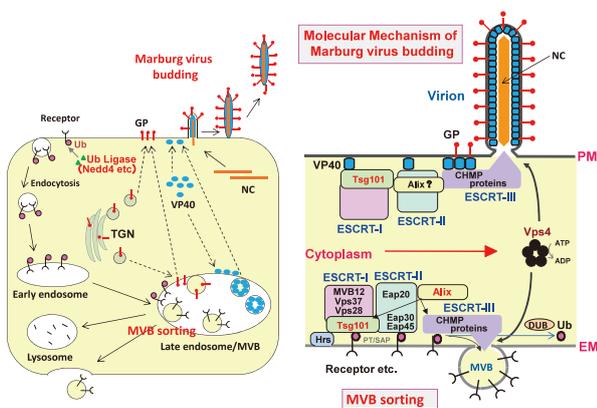
Development of detection methods for highly pathogenic viruses

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 Lassa fever in Nigeria

Lassa fever is a viral hemorrhagic fever and now endemic in West African countries. Annually 300,000-500,000 peoples are infected with Lassa virus and 5,000 patients have died in Lassa fever every year. We are carrying on the epidemiological studies, the development of novel diagnostic methods and the pathological studies on Lassa fever in collaboration with a Nigerian group.

Professor	Jiro Yasuda
Assistant Professor	Yohei Kurosaki
Assistant Professor	Shuzo Urata
Assistant Professor	Haruka Abe
Research Fellow	Rokusuke Yoshikawa
Research Fellow	Yuri Ushijima
Research Fellow	Sayaka Okada
Research Fellow	Mayuko Kimura
Research Fellow	Maki Sueyoshi
Assistant	Miku Takano
Assistant	Saki Miyazaki
Graduate Student	Olamide Oloniniyi Kolawole
Graduate Student	Vahid Rajabali Zadeh
Graduate Student	Patrick Mpingabo Ilunga
Graduate Student	Christelle Pemba Mawonga
Graduate Student	Ryosuke Yamashiro



Molecular Mechanism of Marburg virus budding



Collaboration research work in the South Africa BSL-4 facility

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 phos-phorylation 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 (RTPs), i. e., RTP α and RTP β , resulting in toxin internalization and vacuolation of the human gastric adeno-carcinoma cell lines AZ-521 and G 401 [5, 6, 7]. By analysis of the pathological responses of wild type and RTP β -deficient mice to

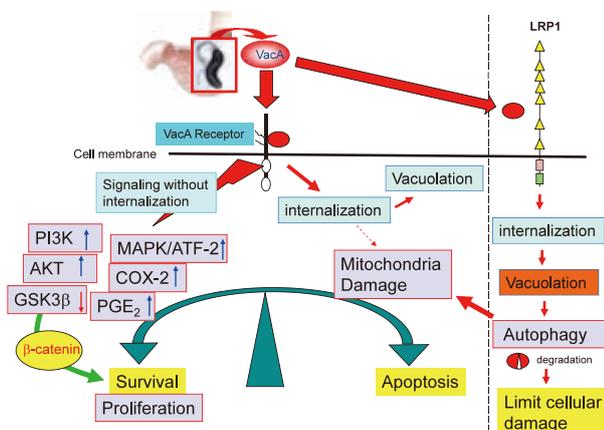
oral administration of VacA, we found that RTP β functions as a receptor for VacA and produces the disease associated with VacA toxicity including gastritis and gastric ulcer [3].

More recently, we purified from AZ-521 cells, a human gastric epithelial cell line, a surface membrane protein, p500, which binds VacA, and identified it as low-density lipoprotein receptor-related protein-1 (LRP1). LRP1 binding of VacA was shown to be specifically responsible for VacA-induced autophagy and apoptosis, but not activation of the Wnt/ β -catenin signaling pathway. Similar to RTP α and RTP β , LRP1 mediates VacA internalization in AZ-521 cells, but in contrast to RTP α and RTP β , LRP1 targeted downstream pathways leading to autophagy and apoptosis. VacA-induced autophagy via LRP1 binding precedes apoptosis suggesting that an excessive autophagic activity can also lead to cell death. This is the first study to provide evidence that LRP1 mediates autophagy [8]. Surprisingly, CagA, which is an oncogenic protein injected by its type IV secretion system into host cells, was degraded by autophagy induced by m1 VacA, but not m2 VacA, whereas CagA in CD44v9-expressing cancer stem-like cells escaped this autophagy system, resulting in accumulation of CagA in cells [9].

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] J. Biol. Chem. 287:3104-3115, 2012,
- [9] Cell Host Microbe. 12: 764-777. 2012.

Senior Assistant Professor Akihiro Wada
 Assistant professor Masayuki Nakano
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Virulence mechanism of *Helicobacter pylori* vacuolating cytotoxin, VacA



Laboratory

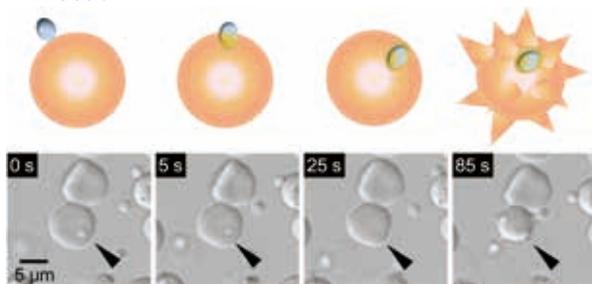
Department of Protozoology

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 red blood cell (RBC) invasion and the phenomenon of cytoadherence of parasite-infected RBCs using a variety of malaria parasites including human-infecting *Plasmodium falciparum*, rodent malaria parasite *Plasmodium yoelii*, and *Plasmodium knowlesi* a causative agent of zoonotic human malaria. To expand a platform for basic and clinical malaria researches, we also aim to establish novel malaria model systems for *Plasmodium vivax* and ungulate malaria parasites. In addition, we are also conducting research aimed at elucidating the intracellular survival strategy of *Trypanosoma cruzi* that cause Chagas disease and *Babesia* parasites that cause Babesiosis in cattle.

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 RBCs
- 3) Calcium signaling in malaria parasites
- 4) Molecular epidemiology of malaria parasites in endemic countries
- 5) Understanding the biology of *Plasmodium vivax* hypnozoites
- 6) Establishment of a reporter line of *Plasmodium vivax*
- 7) Molecular basis of human *Plasmodium knowlesi* infection



RBC invasion by *P. yoelii*. Merozoite-stage parasite (arrowhead) invades into RBC within 30 seconds (0 - 25 s) and deformed RBC to spike-like shape (85 s).

- 8) Establishment of a novel malaria model using ungulate *Plasmodium*

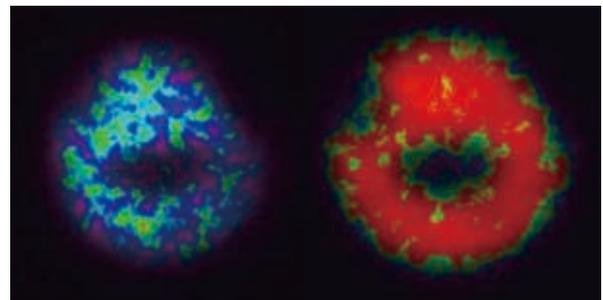
2. Trypanosoma

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

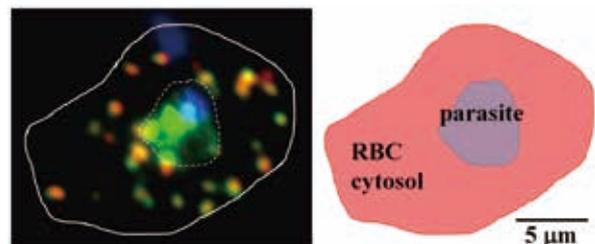
3. Babesia

- 1) Molecular basis of host cell invasion and modification
- 2) Development of genetic manipulation techniques for Piropiasm parasites

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Assistant Professor	Kazuhide Yahata
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Graduate Student	Ben-Yeddy Abel Chitama
Graduate Student	Takahiro Ishizaki
Graduate Student	Nattawat Chaipayong
Visiting Researcher	Hassan Hakimi
Visiting Researcher	Jesse Gitaka Njihia



P. falciparum expressing a calcium biosensor. Fluorescence resonance energy transfer (FRET) signal from the same parasite is shown in pseudocolor before (left) and after (right) adding an inhibitor of calcium-dependent ATPase.



Recombinant protein (green) expressed in *P. falciparum* co-localized with Maurer's cleft protein (red) seen in the RBC cytosol outside of the malaria parasite. Nucleus is visualized with blue color.

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 afflictions, 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, Filariasis and STHs

We have been researching parasitic diseases in Mbita Kenya, in cooperation with Kenya Medical Research Institute (KEMRI). In the laboratory, we maintain *Schistosoma mansoni* and intermediate snails and are trying to elucidate immune responses as well as to develop ideal diagnostic methods through the study on the unique molecules belonging to *Schistosoma* spp. In 2017, we have just started “DeWorm3” project in Japan which is supported by the Bill & Melinda Gates Foundation as a collaboration with the Natural History Museum, London.

We set up lymphatic filariasis and neglected tropical disease unit (LF-NTD Unit) together with Prof. Kazuyo Ichimori, so as to contribute to the activities toward Global Program to Eliminate LF and NTD by WHO. In the laboratory, *Brugia malayi*, *B. pahangi* and *Aedes aegypti* are maintained.

2. Amoebiasis, Leishmaniasis, Trypanosomiasis etc.

Cohort studies on leishmaniasis are carried out in cooperation with the International Centre for Diarrheal Disease Research, Bangladesh (ICDDR, B.) and Oita University. Field sites include Dhaka and rural areas of Bangladesh. In the laboratory, we study host defense mechanisms against *Leishmania major*, *L. donovani*, *Trypanosoma cruzi*, and in the process, have elucidated the function of the IL-12 cytokine family such as IL-27/WSX-1 during infection. We initiated developing the live attenuated vaccine to leishmaniasis by editing a gene using CRISPR-Cas9 system with the support from Global Health Innovative Technology Fund (GHIT) in 2015. In addition, we developed animal models of intestinal amoebiasis together with Prof.

Haupt at University of Virginia, we elucidated the pathogenicity of *Entamoeba moshkovskii*, and now are devoting ourselves to the study on molecular basis of pathogenicity of and host defense mechanisms to *E. histolytica*.

3. Cohort study using HDSS on infectious diseases in Mbita and Kwale area in Kenya

We are repeating cross-sectional study on infectious diseases including schistosomiasis, other helminthic and protozoan infections, Malaria, tuberculosis and so on, in Mbita area using HDSS (Health and Demographic Surveillance System) as the collaboration with London School, Niigata Univ. and Dept. Vector Ecology and Environment, Immunogenetics and Eco-epidemiology. In 2017, we have just started a new project to clarify “the dynamics of *Schistosoma mansoni* transmission and its environment along with Lake Victoria” with the support from MEXT Grant-in-Aid for Scientific Research (A).

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Visiting Professor	Abhay Satoskar
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Graduate Student	Kenichi Nobusue
Graduate Student	Taeko Moriyasu
Graduate Student	Sharmina Deloer
Graduate Student	Evans Asena Chadeka
Graduate Student	Musa Abu Mohamed
Graduate Student	Khanjada Shahnewaj Bin Mannan
Graduate Student	Mitsuko Hasegawa
Graduate Student	Mukendi Kambala Jean Pierre
Graduate Student	Mio Tanaka
Graduate Student	Talaam Kiplangat Keith
Graduate Student	Gavicho Lindo Celestino
Medical Student	Ishii Jo
Medical Student	Yamasaki Risa
Technologist	Megumi Hamasaki
Assistant	Hiroshi Oda
Assistant	Fumie Hara
Assistant	Yasuko Kawabata
Assistant	Chiaki Hisata
Assistant	Hena Asma



Our research activity in a primary school in Kenya

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 analysis of malaria endemicity
- 2) Vaccine development
 - * Py Transamidase (TAM) vaccine with nanoparticle delivery system

2. Schistosomiasis

- 1) Vaccine and Drug target molecules identification by genomics and proteomics
 - * SEA motif bearing gene family

3. Chagas disease

- 1) Genetic susceptibility to different clinical types of chronic Chagas disease, namely, indeterminate, cardiac, and digestive forms
 - * HLA-B14 haplotype as resistant against chronic complications
- 2) Host and Parasite factors influencing on the reactivity to the chemotherapy in the paediatric patients with chronic Chagas Disease. On going
- 3) Compound library screening by using in vitro culture of T.cruzi
 - * Astellas open innovation network including U.Tokyo, Tokyo Institute of Technology, AIST (National Institute of Advanced Industrial Science and Technology), and DNDi

4. Dengue fever

- 1) Pathogenesis of the DHF (Dengue Hemorrhagic Fever)
 - * HLA, Mast Cell derived factors, related to

- severity
- 2) Early stage predictors for severe Dengue fever
 - * Free DNA, Chymase, VEGF ATIII

Collaborations:

The research here is performed based on the well-arranged collaborative projects with the following facilities.

1. **Malaria:** Karolinska Institute (Sweden), Kenya Medical Research Institute (KEMRI), London School of Hygiene and Tropical Medicine, University of Liverpool
2. **Schistosomiasis:** Jiangxi Provincial Institute of Parasitic Diseases (China), Jiangsu Provincial Institute of Parasitic Disease (China), RITM (Philippines).
3. **Chagas Disease:** Center of Tropical Medicine, Sirani Clinic, and Hospital Japonese (Bolivia), IICS University of Asuncion (Paraguay).
4. **Dengue Fever:** Ho Chi Minh Pasteur in Vietnam, Pasteur Paris, McMaster University

Professor	Kenji Hirayama
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Senior Assistant Professor	Mihoko Kikuchi
Assistant Professor	Cherif Mahamoud Sama
Assistant Professor	Shusaku Mizukami (Clinical Product Development)
Assistant Professor	Dumre Shyam Prakash
Research Fellow	Chisato Narahara
Assistant	Michiko Fukuda
Assistant	Yoko Hosoi
Graduate Student	Vasquez Velasquez Clara Alejandra
Graduate Student	Dao Huy Manh
Graduate Student	Farhana Mosaddeque
Graduate Student	Mathenge Peterson Gitonga
Graduate Student	Maiko Akashi
Graduate Student	Kota Mochizuki
Graduate Student	Miho Inokuchi
Graduate Student	Teklemichael Awet Alem
Graduate Student	Pembi Emmanuel
Graduate Student	Nguyen Thi Ngoc Phuong
Graduate Student	Yuki Tayama
Visiting Researcher	Yukimi Katagami



Members



Experiment scenery



Fieldwork in Bolivia

Department of Pathology

○Division 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- κ B is also involved cancer development and progression. Therefore, our research focuses on the molecular players during the development from chronic inflammation to cancer.



○Division of Malaria

We are a small, highly driven malariology group focusing on many different aspects of malaria. Established in 2011, we believe in a multi-disciplinary 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 succeed only 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. Research should be fun, and we 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.

One particular ongoing project involves analysis of asymptomatic malaria carriage in Nigeria.

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, Australia, Tanzania, Kenya, Nigeria, Brazil, the UK and Saudi Arabia.

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Assistant Professor	Masachika Senba
Assistant	Sarina Hokama
Graduate student	Ernest Medard
Graduate student	Ifeoma Ugwuanyi

Department of Eco-epidemiology

Our department is involved in various branches of public health research. Through cutting edge IT and biotechnology, we aim to create more accurate assessment methods in global health, improve responses to public health needs on a local scale, and open new directions in health science to pass on to future generations. Our activities include the following:

1) Development of microsphere-based simultaneous multiple assays and surveillance systems for multiple infectious diseases in Africa. Neglected tropical diseases (NTDs) are spreading across Sub-Saharan Africa, but the actual situation of NTDs is still unclear. Simple and cost effective methods for monitoring NTDs are desirable, especially where distributions of multiple NTDs are overlapping. Toward this goal, we are developing a simultaneous multiple antibody assay system, utilizing microsphere-based multiplex technology.

2) Health and Demographic Surveillance System (HDSS) in Lao PDR. In many developing countries, civil registration and vital statistics systems are still deficient. Health and Demographic Surveillance System (HDSS) is a resident registration system for epidemiological research in a given locale. HDSS follows residents and their dynamics over a long-term period. In Lao PDR, we are operating two HDSSs to design research and improve health conditions in rural communities.

3) Epidemiological studies for child health in Kenya. Kwale district is categorized as one of the poorest areas in Kenya. The infant mortality rate in the region remains high. Poor nutritional status in Kwale children contributes to a high prevalence of stunted growth. To improve this situation, we are conducting a child cohort study, attempting to reveal factors that could prevent stunted growth.

4) Research on dengue prevention through a residential environmental clean-up program in Sri Lanka. Dengue fever is one of the major health problems in Sri Lanka, and measures of prevention are urgently needed. We are evaluating the effects of environmental intervention: e.g., clean-up activities such as collection of containers left outdoors that act as breeding sites for dengue mosquitoes

5) Finding malaria vaccine candidate antigens using microsphere-based simultaneous multiple assays. We are working to find novel candidate antigens for malaria vaccine using a cohort in a malaria endemic area with a microsphere-based multiplex assay system.

6) Researches clarifying the molecular bases of parasitic diseases. Besides field works, basic researches especially on schistosomiasis, amoebiasis and leishmaniasis are being conducted in our lab. We are aiming bringing back the results to field works.

7) A scientific approach to community-led total sanitation strategies in Africa. The aim of this study is to develop Community-Led Total Sanitation (CLTS) models in Africa. We particularly focus on improving community health through the promotion of toilet use.

8) Support for JICA project in Sri Lanka and Serbia. With increasing economic development and longer life expectancy, the number of lifestyle-related diseases or non-communicable diseases (NCDs) is expected to increase. However, a mechanism to grasp the actual situation of NCDs does not currently exist in Sri Lanka. The department has cooperated with the JICA NCD management project to establish a system for estimating the number of patients with NCDs. In Serbia, enhancement of breast cancer screening program is operated by JICA. From epidemiological point of view, the department is supporting the JICA project in Serbia.

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Visiting Researcher	Tomoko Komagata
Research Fellow	Yombo Dan Justin Kalenda
Research Fellow	Rie Ozaki
Research Fellow	Tomonori Hoshi
Research Fellow	Daniel Toshio Harrell
Visiting Researcher	Kazuya Ogawa
Visiting Researcher (JSPS)	Job Wasonga
Visiting Researcher	Chisa Shinsugi
Assistant	Emi Nakayama
Assistant	Kuniko Shimoda
Assistant	Shiho Chikatoshi
Assistant	Mitsumasa Miura
Graduate Student	Junichi Tanaka
Graduate Student	Mami Uchida

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 viewpoint and 4) research on the epidemiology from the historical viewpoint. The umbrella concept or key word linking above four 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. For examples, we would like to pursue the ways of analysis by various approaches such as molecular-evolutional technique, molecular epidemiology, detection of trace DNA, genomics based on bioinformatics, mathematical model, and computer science. In addition to these researches of infectious diseases, we decided to add the historical approach based on documentary records in order to understand widely the relationship between creatures and societies.

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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Visiting Professor	Kui-Chen Zheng
Visiting Professor	Ishii Masami
Visiting Professor	Akihiro Seita
Visiting Researcher	Hiromu Ito
Visiting Researcher	Taijin Kaku
Visiting Researcher	Liang Qin
Visiting Researcher	Guoxi Cai
Visiting Researcher	Syuko Takahashi
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Graduate Student	Kaori Yamamoto
Graduate Student	Hiroyuki Arima
Graduate Student	Raoping Tu
Graduate Student	EZZAN SAEED MOHAMMED KUNNA
Graduate Student	SWETA KOIRALA
Graduate Student	AKINTIJE SHIMBA CALLIOPE



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 tools.

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 geographical distributions in South East Asia and Africa, and examining the relationships with environmental factors.

2. Malaria vectors

We are examining ecological and physiological differences among the members within the *Anopheles gambiae* complex group and the *Anopheles funestus* group in Kenya and Malawi. We are also investigating their geographic distributions, and monitoring their abundance in East Africa. This extensive field survey was designed to understand the effects of climate and develop a climate base malaria prediction model.

3. Vector control measures

The coverage of insecticide treated bed nets (ITNs) has considerably increased in Africa. We are investigating whether local residents properly use and maintain ITNs, and how long ITNs 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 East Africa.

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Graduate Student	Huynh Thi Thuy Trang
Graduate Student	Nozomi Imanishi
Graduate Student	Sai Zaw Min Oo
Graduate Student	Yang Chao
Graduate Student	Nayu Sukehiro
Graduate Student	Yasue Morimoto



Department of Clinical Medicine

This is the only clinical department in NEKKEN, which does clinical practices in Nagasaki University Hospital. We conduct a wide range of multi-disciplinary studies bridging our strength of clinical epidemiology to laboratory-based microbiology and immunology studies both in- and outside Japan. Our main research interests are respiratory infectious diseases, tropical infectious diseases, tuberculosis (TB) and HIV/AIDS. Specific research topics are as described below:

1. Respiratory Infections Diseases

We apply our in-house multiplex-PCR assays to identify 19 different viral and bacterial respiratory pathogens and a novel nano-fluidic real time PCR-based assay to determine 50 pneumococcus serotypes for a multi-center adult pneumonia survey all over Japan and childhood acute respiratory infection study in central Vietnam. We published several papers demonstrating vaccine efficacy against pneumococcal pneumonia and influenza. Since 2009, we have run a birth cohort studies of about 2,000 pairs of mothers and new-born babies, which facilitates studies of host-gene factors associating the severity of pediatric infectious diseases. We also investigate the pathogenesis of treatment-refractory pneumonia at molecular levels focusing on macrophage function, of clearing apoptotic cells from the inflammation site.

2. Tuberculosis

For better-diagnosis of latent MTB infection and tuberculosis, we are analyzing cellular immune responses to various TB antigens using an intra-cellular cytokine staining assay to evaluate a range of cytokines profile in various stages of TB infection and their contact cases both in Japan and abroad. Our goal is to clarify TB-specific cellular immune responses characteristic to a different clinical stage of TB infection. We also investigated pathogens causing bacterial pneumonia and its impact on the survival prognosis of TB patients admitted to the National Infectious Diseases Hospital (San Lazaro Hospital) in the Philippines.

3. Fever management in the tropics

In collaboration with National Institute of Infectious Diseases, Tokyo, we are conducting undiagnosed febrile illness study in the Department of Infectious Diseases, Bac Mai Hospital, Hanoi, Vietnam and the National Infectious Disease Hospital (San Lazaro Hospital), the Philippines, by applying diagnostic tests for leptospirosis and various rickettial diseases. We also coordinate a bed-side clinical training course on tropical infectious.

4. HIV/AIDS Studies

In collaboration with National Institute of Health, Thailand, Bac Mai Hospital, Vietnam, Philippine General Hospital, and Nagoya Medical Center, we have investigated the pattern of opportunistic infections among HIV/AIDS patients and disclosed different clinical pictures in different geographical settings.

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Assistant Professor	Hikaru Sato
Assistant professor	Yoshiro Yamashita
Senior Lecturer	Takeshi Tanaka
Assistant professor	Masahiro Takaki
Assistant professor	Emi Kitasyoji
Assistant professor	Hiroto Yamanashi
Assistant professor	Kensuke Takahashi
Visiting Professor	Michio Yasunami
Visiting Professor	Christopher Parry
Visiting lecturer	Akitsugu Furumoto
Visiting Researcher	Masahiko Mori
Visiting Researcher	Bhim Gopal Dhubadel
Visiting Researcher	Mai Izumida
Assistant Researcher	Taisuke Nakamura
Assistant	Rina Shiramizu
Assistant	Kyoko Uchibori
Assistant	Yumi Araki
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Graduate student	Tohru Ogasawara
Graduate student	Reiko Miyahara
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Graduate student	Satoshi Kakiuchi
Graduate student	Ngo Chi Cuong
Graduate student	Hiroshi Fujii
Graduate student	Shungo Kato
Graduate student	Hiroyuki Ito
Graduate student	Kentaro Hayashi
Graduate student	Eiichiro Sando
Graduate student	Tomoko Hiraoka
Graduate student	Ikkou Yasuda



Bed-side clinical training course in San Lazaro Hospital

Department of Pediatric Infectious Diseases

The Department of Pediatric Infectious Diseases conducts research on a wide range of infectious diseases with special attention on severe pediatric infectious diseases including pneumonia, diarrhea, dengue and malaria. Our research interests include integration of clinical, environmental and social issues at global, national and local levels.

Cohort studies on Pediatric Infectious Diseases in Vietnam

We receive funding from the Japan Initiative for Global Research Network on Infectious Diseases (JGRID), Japan Agency for Medical Research and Development (AMED) to conduct a large population based cohort study on Pediatric Infectious Diseases in Nha Trang, central Vietnam since 2006. We are focusing on severe common pediatric infectious diseases (SPID) such as acute respiratory infection (ARI), diarrhea and dengue which are the major causes of under 5 mortality.

Pediatric ARI surveillance: A population based hospitalized Pediatric ARI surveillance at Khanh Hoa General Hospital, Nha-Trang, Vietnam was established to determine incidence, etiology and risk factors for pediatric ARI/pneumonia since 2007. We also investigate the emergence of new viruses and its molecular and clinical importance. In addition, we also investigate the impact or potential of various vaccine introduction on pneumonia and dengue in a population level.

Birth cohort study: We are also conducting a birth cohort study on 2000 new born babies in Nha Trang, Vietnam since 2009. This study was conducted to study congenital infection and host genetic factors on physical-neurological development of the child and development of SPID. We are also studying congenital rubella infection and its complication in Vietnam.

Pneumococcal conjugate vaccine (PCV) reduced dosing trial: We received a multimillion dollar grant from Bill and Melinda Gates Foundation to conduct a PCV reduce dosing trial in Vietnam. We believe that the study outcome will change global PCV vaccination strategy to improve the availability of PCV and other vaccines in developing countries.

Health impacts of global environmental change

Our research interests extend over a range of issues in environmental epidemiology. The current research topics, which we work in collaboration with both the international and Japanese colleagues, focus on the health impacts of atmospheric environmental changes including global climate change and

transboundary and local air pollution. Ongoing projects include:

1. Effects of flooding and weather on diarrhoea, acute respiratory infections and other infectious diseases.
2. Ocean-atmosphere interaction phenomena including the Indian Ocean Dipole and its association with malaria and cholera in the Eastern and Southern Africa.
3. Health effects of local and transboundary air pollution in Japan and in the East and Southeast Asia.
4. Mortality risk of temperature extremes in tropical climate where we estimate excess mortality associated with exposure to temperature extremes and the extended period of heat in tropical countries.
5. Respiratory health effects of the different chemical composition of airborne particulate matter and the sources.
6. Heat effect on mortality in Japan
7. Associations between weather factors and suicide in multiple countries in Asia, Europe, and America
8. Development of malaria early warning system in Southern Africa

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Assistant Professor	Kim Yoonhee
Assistant Professor	Michiko Toizumi
Assistant Professor	Noriko Kitamura
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Assistant Professor	Chihiro Iwasaki
Assistant Professor	Le Minh Nhat
Assistant	Nozomi Oka
Assistant	Setsuko Hirakura
Assistant	Kaori Yoshida
Assistant	Kayoko Kamihiro
Graduate student	Keisuke Yoshihara
Graduate student	Eriko Ikeda
Graduate student	Naohiko Matsusita
Graduate student	Saki Tanaka
Graduate student	Atsushi Fujioka



Nha Trang PCV study vaccination field work.



Environmental change and global health research in Bangladesh

Department of Clinical Product Development

This is a newly established department in response to the Global Strategy on public health, innovation and intellectual property (resolution WHA61.21). The resolution calls for the enhancement of health-needs driven research and development to address diseases that disproportionately affect developing countries. The establishment of this department was supported by the Department of Academic and Research Promotion, Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan. MEXT continues to support the department until its full development.

The department focuses on:

1. Building capacity of individuals for innovation in health product
2. Strengthening capability of the local research institutions in providing an enabling environment, including infrastructure for product R&D
3. Strengthening research institutes network for knowledge sharing and exchange, and for R&D technology transfer activities. The emphasis will be on developing products for public health needs to address the issues of inequity in health.
4. Filling the gap of health knowledge

The operation of this department depends on the collaboration of existing offices and departments in NEKKEN and in Nagasaki University, e.g. Office for Training and Education, Immunogenetics, Toxicology, Clinical Pharmacy, Parasitology, Clinical Medicine, Clinical Pediatrics, Center for infectious disease research in Asia and Africa and the research institutions and universities in developing countries. The aim of its operation is to ensure that research priorities of research institutions are in line with their public-health needs, in particular the need for innovative research to address the health problems of their populations and to contribute to improved public health in other countries.

The activities:

1. Training
 - 1) Two- week course on Product Research and Development for public health needs;
 - 2) Three-day course on Bioethics
 - 3) Three-day course on Conducting Responsible Research
 - 4) PhD training as part of actual product development ie. Shiunko for Cutaneous Leishmaniasis, Herbal Medicine for Cholangiocarcinoma and Malaria
 - 5) PhD training as part of associated product development processes e.g. ethical issues in product development, clinical data management, good laboratory practice and etc.
 - 6) Online learning courses for undergraduate students and young medical doctors to conduct evidence-based medicine, evidence synthesis, secondary data analysis, and health care survey
2. Research
 - 1) Development of Shiunko for Cutaneous Leishmaniasis;
 - 2) Identification and further development of Herbal Medicine and novel small compounds for

- Cholangiocarcinoma and Malaria.
- 3) Physiological Based Pharmacokinetics (PBPK) Modelling in Malaria and Cholangiocarcinoma
- 4) Development of Novel Treatment for Dengue patients
- 5) Performance of researches on evidence-based medicine, evidence synthesis, secondary data analysis, and health care survey to improve health care
- 6) Development of Teaching Methodology to Enhance Medical Student conducting research
- 7) Identification and addressing Methodological and Ethical Issues in Biomedical Science
- 8) Identification of Ethical Issues in Research Publications

3. Network

- 1) Coordination of Product Research and Development (PRD) Network
- 2) Coordination of research ethics global network: Strategic Initiative for Developing Capacity in Ethical Review (SIDCER)
- 3) Supervisor of Online Research Club: Mentoring global young clinicians and medical students to conduct several types of research

Collaborations:

1. Drug Research Center, Thammasat University, Bangkok, Thailand
2. Forum for Ethical Review Committees in the Asian and Western Pacific Region (FERCAP), Bangkok, Thailand
3. Armauer Hansen Research Institute, Ministry of Health, Addis Ababa, Ethiopia
4. Institution of Human Research Protection, Ministry of Health, Thailand
5. Liverpool School of Tropical Medicine, Liverpool, England
6. National Research council of Thailand, Thailand
7. Institute of Herbal Medicine, University of Philippines, Manila, Philippines
8. University of Medicine and Pharmacy at Ho Chi Minh City, Ho Chi Minh, Vietnam
9. Ton Duc Thang University, Ho Chi Minh, Vietnam
10. Pasteur Institute of Ho Chi Minh City, Vietnam
11. Kumamoto University Graduate School of Medical Sciences, Kumamoto, Japan
12. Institute of Natural Medicine, University of Toyama, Toyama, Japan

Member

Professor	Juntra Laothavorn
Associate Professor	Nguyen Tien Huy
Assistant Professor	Shusaku Mizukami
Visiting Professor	Kesara Na-Bangchang
Visiting Researcher	Tullayakorn Plengsuriyakarn
Assistant	Sayuri Delaney
Graduate Student	Nut Koonrunsesomboon
Graduate Student	Teerachat Sae-heng



Center for Infectious Disease Research in Asia and Africa

○Kenya Research Station

Outline

Nagasaki University Kenya Research Station is an overseas research site that was established through the “Program to Establish Infectious Disease Research Network” (Sept. 2005- Mar. 2010) and “Tropical Medicine, Emerging Infectious Disease and Clinical Epidemiological Research Program” (Apr. 2010-Mar. 2016) funded by the Ministry of Education (MEXT) in Japan. Since April 2016, the site received renewed funding from MEXT titled, “Program for Research and Capacity Development Toward Infectious Diseases Control” to establish an education and research collaboration platform for Kenya and Japan.

The goals of this project are to strengthen the Kenya Research station, to train young researchers on emerging and re-emerging infectious diseases, and to collaborate with local researchers on long-term projects.

Progress

1. Establishment of The Research Station

We have made progress on establishing the Kenya Research Station in Nairobi (including the Biosafety Level 3 laboratory) and field research sites in Mbita, Kwale and Busia. Renovation of the building and conference rooms, maintenance of information systems, and procurement of vehicles are currently ongoing.

2. Researchers and administrative staff from Japan

Two researchers including the Chief Representative and three administrative staff members were dispatched from Japan to Kenya. Four Professors and Two Associate Professors and two Assistant Professors have supported our project through short-term visits.

3. Contribution to the Community members

In Mbita and Kwale areas, Health and Demographic Surveillance System (HDSS) has collected data on population, birth and death rates, and incidences of diseases over time. Mosquito Surveillance System (MSS) collects and analyzes data on malaria mosquitos in Mbita. In 2012, we began a new project through the JICA Partnership Program focusing on school health in Mbita which has been ongoing since 2009.

4. Tropical Medicine Research

Research on parasitology, malaria eradication, and mosquito transmission research are ongoing in

Western Kenya, Research on bacterial and viral diarrheal disease and mosquito-borne hemorrhagic fever are continuing in the laboratories at the P3 lab in Nairobi Office and at the Kenya Medical Research Institute, Production Department.

In Kwale, epidemiological research of maternal child health are being conducted. “The JICA-AMED Satreps Project for Development of Rapid Diagnostics and the Establishment of an Alert System for Outbreaks of Yellow Fever and Rift Valley Fever in Kenya” started in March 2012 has completed in January 2017. The mSOS system (mobile SMS-based disease outbreak alert system) was established at the Ministry of Health. A lab. for seroepidemiology project focusing on NTD (neglected tropical diseases) was set up with funding by the Japan Science and Technology Agency (JST) (1st phase: 2009-2011, 2nd phase:2011-2016). The 3rd phase started in Nov. 2015.

5. Educational Programs

Five medical doctors from Kenya graduated from “the Master of Tropical Medicine at the Institute of Tropical Medicine in Nagasaki”. Five Kenyan students are currently enrolled in graduate school of the “Program for Nurturing Global Leaders in Tropical and Emerging Communicable Diseases” at the Institute of Tropical Medicine. Every year, we give opportunities for three master students from “The Nagasaki University School of Tropical Medicine and Global Health” to study in Kenya. We also have accepted medical school students from Osaka University, Osaka City University and Shiga University of Medical Science and so on for field trainings.

Project Members

Chief Representative, Professor	Yoshio Ichinose (Kenya)
Professor	Noboru Minakawa Shinjiro Hamano Masahiro Hashizume Satoshi Kaneko
Associate Professor	Shingo Inoue Yoshito Fujii Daisuke Hayasaka
Assistant Professor	Kyoko Futami Mohammad Shah Rie Takeuchi(Kenya)
Administrator	Haruki Kazama (Kenya)
Administrative/HR Manager	Yukie Saito (Kenya)
Chief Accountant	Shizuko Yagi (Kenya)
Administrator	Kaori Mori
Graduate Student	Shunpei Kambe
Graduate Student	Gabriel Dida



Our Members



NUITM Kenya Research Station
(Nairobi Office)



Mbita Research Site



Kwale Research Site

Center for Infectious Disease Research in Asia and Africa

○ Vietnam Research Station

Outline

The Institute of Tropical Medicine (ITM), Nagasaki University and the National Institute of Hygiene and Epidemiology, Vietnam (NIHE), have been jointly conducting a collaborative project since 2005 on emerging and reemerging infectious diseases under a grant from the Ministry of Education, Science, Culture and Technology (MEXT) of Japan. A Vietnam research station established on the NIHE campus has been the site of number of research activities. The project for clarifying environmental and social factors affecting outbreaks of zoonosis, vector-borne infectious diseases, diarrhoea, and childhood pneumonia has been conducted within a collaborative project framework. Having achieved the goals set or research in the project's first phase (from 2005 to 2009), the next objectives had been underlined, clarifying the factors and mechanisms causing infectious diseases (from 2010 to 2014).

Since 2015, the project has been taken over to the third phase under a grant from the newly established Japan Agency for Medical Research and Development (AMED). Four main subjects i.e., Dengue fever, Infectious diarrhoea, Influenza, and Drug resistant bacteria were selected for taking the aim of development an intervention-based method to inhibit the spread of infectious diseases. In Vietnam Research Station, we have conducted over 20 independent activities including collaborative research with other Japanese institute. To conduct projects on a higher level, cooperation has been established with three Vietnamese governmental research institutions and with JICA-supported national hospitals. The outcome of such activities is expected to contribute greatly to promoting public health and improving medical care.

Research activities (The activities which have been implemented in the J-GRID program were described)

The objectives of the entire project are (1) to clarify the ecology of pathogens in nature and in human society, (2) to clarify the pathogenic mechanism of human diseases. The principal research agenda are as follows:

1. Dengue fever research:

- 1) Comprehensive analysis of dengue viruses for identification of pathological factors and application in new drug development.
- 2) A study of mosquito vectors, pathogenic mechanism of dengue fever, and anti-infection measures
- 3) Vector capacity of mosquitoes to transmit arbovirus
- 4) Searching for the potential seeds for prevention

2. Dengue fever research (consortium):

- 1) Inter-regional analysis of dengue viruses.
- 2) Global movement of variation of dengue vector mosquito: Building a database for countermeasure.

3. Infectious diarrhoea research

- 1) A study on the effects rotavirus vaccine will make on the reduction of diarrhoeal disease burden and the dynamics of circulating strains
- 2) Hospital based and a community based studies of a broad range of etiological agents of diarrhoea in Vietnam
- 3) A molecular epidemiological study of *Vibrio cholerae* in ecosystem in Vietnam

4. Infectious diarrheal research (consortium)

- 1) Inter-regional studies of a broad range of etiological agents of diarrhea in Southeast Asia

5. Pediatric acute respiratory infection research:

- 1) A birth cohort based study for acute respiratory infection
- 2) A birth cohort based study for influenza
- 3) A birth cohort based study for drug resistant Pneumococcus

Vietnam Research Station (VRS) staff

Professor	Futoshi Hasebe
Assistant Professor	Takashi Tsunoda
Assistant Professor	Taichiro Takemura
Administrative Staff	Kei Saito
Research Assistant	Phan Hoai Linh Ly
Research Assistant	Doan Thi Hang
Research Assistant	Le Thi Kim Anh
Research Assistant	Nguyen Thi Hang
Research Assistant	Pham Hong Quynh Anh
Research Assistant	Nguyen Thu Trang
Research Assistant	Pham Ha Chau
Research Assistant	Vi Thi Quynh Trang
Secretary	Bui Thu Tra
Assistant	Mayumi Nakano



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. In addition, the present museum was moved to Nagasaki University Museum of Medicine. The display was renewed.

The institution performs the following 2 functions.

The institute primarily functions as a museum and resource center for tropical disease. 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. From April, 2015 through May, Nagasaki University held "the Nagasaki University exhibition which fought against an infectious disease" in Nagasaki Museum History and Culture. We provided much exhibits about the tropical disease, and citizen's people saw it.

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 2012, 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 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	Junko Okumura
Technologist	Kazuo Araki
Assistant	Kiyomi Suda
Assistant	Sayaka Taniyama
Assistant	Satomi Tominaga



The database server



Tropical Medicine Museum



Tropical Medicine Museum

Central Laboratory

The aim of Central Laboratory is to operate and efficiently manage common equipments and to support general laboratory activities in the institute. In addition, this laboratory also supports research activities conducted in the institute by extramural investigators.

○Molecular & Cellular Biology Unit

Molecular & Cellular Biology Unit is responsible to maintain and operate following equipments located in Central Laboratory; 16- and 48-capillary sequencers, GS junior genome sequencer and mass spectrometry-based genotyping system for genome analysis; flowcytometer for cell function analysis; fluorescence-luminescence imager for visualization analysis; and Luminex bead-array system and fluorescence-luminescence multilabel counter for multipurpose analysis. In addition, this unit is also responsible to maintain equipments/facilities to support general laboratory activities; such as pure water supply, ultracentrifuge, lyophilizer, Speed-Vac, French press, Bioruptor, sample storage in liquid nitrogen, autoclave, dark room and cold room.



Researchers using 16-capillary sequencer

○Light Microscope Unit

Light Microscope Unit provides optical instruments to perform basic, translational, and clinical research on the imaging features of infectious disease. We operate Nikon Infectious Disease Imaging Core laboratory established in April 2015. The laboratory has equipped laser scanning confocal/fluorescence microscope (NIKON), Imaging flowcytometer (MERCK), laser scanning confocal/superresolution microscope (ZEISS), and a Virtual Slide Scanner (Nanozoomer 2.0-RS, Hamamatsu Photonics).



Practical exercise in the PhD program using Super Resolution Microscope

○Electron Microscope Unit

Electron Microscope Unit supports ultrastructural characterization of microbial pathogens and the structural change of the pathogen-infected cells. This unit offers high quality imaging services by state-of-art techniques such as conventional and immuno-electron microscopy and 3D tomography, and also provide training on sample preparation and equipment usage. This unit is responsible for transmission and scanning electron microscopes (JEOL), high-pressure freezer (LEICA), ultra-microtomes (LEICA and REICHERT), vacuum coater, hydrophilic treatment device, and osmium plasma coater in addition to general laboratory facilities for a wide range application of electron microscopy.



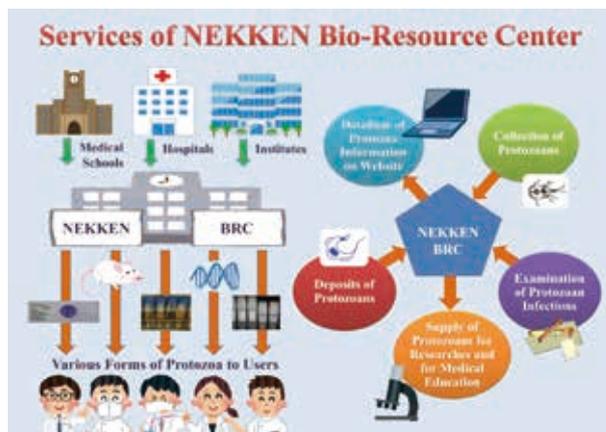
Transmission electron microscope

Head and Professor	Shinjiro Hamano
Senior Assistant Professor	Mihoko Kikuchi
Assistant Professor	Miako Sakaguchi
Assistant	Masae Masumoto

NEKKEN Bio-Resource Center (NBRC)

The Government of Japan has been making efforts under its second and third Science and Technology Basic Plans to create a world-class intellectual platform. In FY2002 the Ministry of Education, Culture, Sports, Science and Technology (MEXT) implemented the National Bio-Resource Project (NBRP) to construct the framework for systematic collection, preservation, and distribution of bio-resources with a focus on those that required strategic development by the National Government. To promote life sciences it is important that researchers share the various bio-resources necessary for pursuing research and development. The resources produced in years with painstaking labor will make foundation for future researches. The NBRP deals with the bio-resources, which will not be able to be restored again if once they are lost. Through the revision every five years, the NBRP has been operated under the control of Japan Agency for Medical Research and Development (AMED) since FY2015, and the 4th phase of the NBRP started in FY2017.

Since 2002 Institute of Tropical Medicine (NEKKEN), Nagasaki University has been taking of Division of Protozoa in Pathogenic Microorganisms of a Core Facility Upgrading Program under Medical Mycology Research Center, Chiba University. NEKKEN Bio-Resource Center (NBRC) contributes the services to researchers, (1) information of owners and strains of pathogenic protozoans in Japan on database Website, (2) supply of protozoans from NBRC, (3) acceptance of protozoan deposit to NBRC and the preservation, (4) supply of protozoan specimens for laboratory practice of medical-educational schools, (5) examination for protozoan infections from any medical facilities.

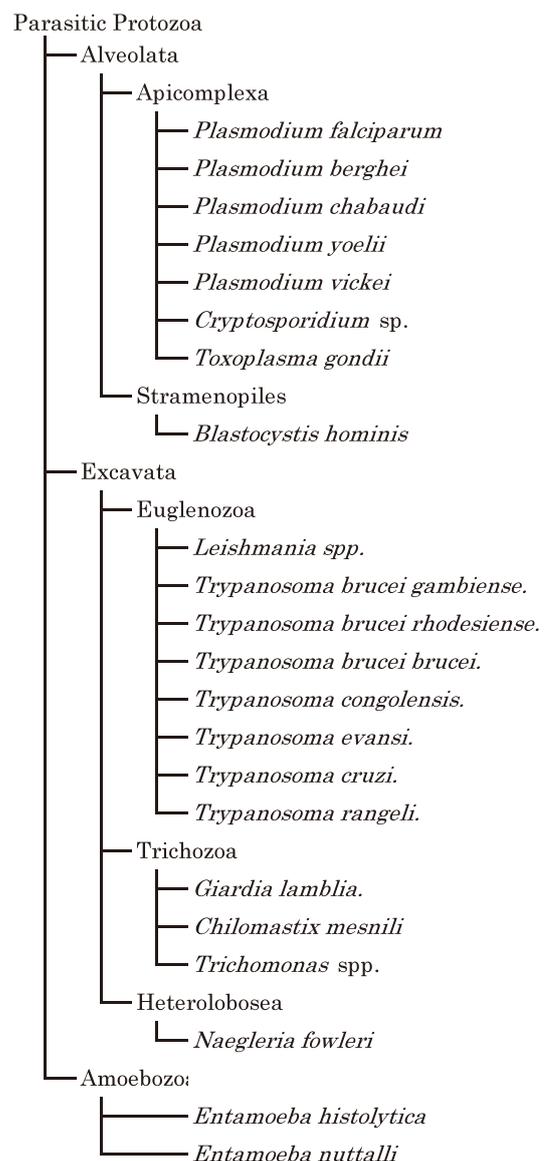


(6) instructions for protozoan detection and for the culture. Pathogenic protozoan resources, which can be supplied by NBRC, are listed in the figure.

We would like to ask the access to our Project Website. Your cooperation and support for the project would be highly appreciated.

<http://www.tm.nagasaki-u.ac.jp/nbrc/>
E-mail:protozoa@tm.nagasaki-u.ac.jp

Project Representative	Osamu Kaneko
Service Manager	Makoto Kazama
Advice Collaborator	Shinjiro Hamano
Advice Collaborator	Richard Culleton
Advice Collaborator	Kiyoshi Kita



NTD Innovaton Center

Why?

The widening gap between the poor and the wealthy has led to increasing crime rates, disturbances of public peace, corruption, and a rise in extremism.

Disintegration of health and sanitation in the poorer regions is of great concern for global health. The reach of endemic diseases including parasitic diseases has been expanding, not only within regions, but also into wider area as shown by the recent outbreak of Ebola hemorrhagic fever in West Africa. These health issues need to be dealt with on a global rather than local level.

To be more specific, a global support framework is needed to implement measures to mitigate against the spread and occurrence of chronic infectious diseases including parasitic diseases that affect the poor, in developing and tropical regions; regions that account for 80% of the world's population. One continual challenge is in motivating pharmaceutical companies to develop drugs for these less profitable markets. That is the reason why we call those diseases as neglected tropical diseases (NTDs). Japan has been a leader among the G7 countries in supporting major NTDs programs such as the "Hashimoto Parasite Control Initiative" and the "Pacific Programme for the Elimination of Lymphatic Filariasis" in this area for over 20 years, but more needs to be done. People expect Institute of Tropical Medicine (NEKKEN) should take a leading role in this area in Japan. Therefore, in fiscal year 2016, we established a center to promote drug development and research in Neglected Tropical Diseases (NTDs) to promote research activities and collaboration between industry, academia and government.

How?

At WHO and G-7 Summit, industrialized countries, as members of the global community, should be the vanguard in establishing NTDs measures.

What is most needed to control NTDs is a close cooperation between developing countries impacted by these diseases and advanced countries with research and development capabilities. Drawing on this collaborative approach, we are pursuing innovative research for diagnosis, treatment, and prevention methods.

To this end, it is essential to provide researchers with comprehensive data and know-how to allow them to discover the "seeds" that will lead from basic research to preclinical and early clinical trials.

We have set the following goals, 1) providing training courses with continuously updated knowledge every year, 2) staying abreast of research trends and grant availability, and providing researchers with necessary information, 3) active promotion using

websites and e-mail magazines to widely disseminate information on related research inside and outside the NEKKEN. By improving the research environment in this manner and by strengthening collaboration with private enterprise, we intend to promote a stable and sustainable research and development system.

What we are doing?

1. Training program management

Three educational programs (research ethics, drug development, medical economics)

- >International Course on Research Ethics in May (3 days)
- >Diploma Course on Research & Development of Products to meet Public Health Needs in August (7 days)
- >Introductory course of health economy (planned)

2. Information Gathering

- >NTDi Center Symposiums organized with GHIT and AMED
- >Establishment of R & D portfolio system
- >Present on going projects.
 - 1) Anti Chagas compounds (Astellas)
 - 2) Measles based recombinant Dengue Vaccine (GHIT)
 - 3) RAMP diagnostic Kit for Ebola (Toshiba)
 - 4) Simultaneous surveillance system for NTDs by multiplex beads assay (AMED)
 - 5) POC system for yellow fever and Rift Valley diagnostics (AMED:SATREPS)
 - 6) House shield bed net (Sumitomo)
 - 7) Diagnostic Kit for active infection of Schistosomiasis (AMED)
 - 8) Shiunko for cutaneous Leishmaniasis (Ohkusa)
 - 9) Anti Malaria Kampo medicine (Toyama)
 - 10) Anti Malaria development based on an open innovation platform (MEXT)
 - 11) Pneumococcal conjugate vaccine (Gates)

3. Nurturing promising research seeds

One of our mission is to support promising projects in our research stations of Kenya and Vietnam.

In 2016, we supported a schistosomiasis epidemiology research in Kenya and a collaborative research with Toyama University on Kampo medicine.

4. Members

- | | |
|--|--------------------------------------|
| Leader and Professor | Satoshi Kaneko |
| Committee at NEKKEN | Juntra Laothavorn
Nguyen Huy Tien |
| Committee at N.U. | Yusuke Fujiwara |
| (Center for Industry, University and Government cooperation) | |
| Expert adviser | Kazuyo Ichimori
(LF-NTD Unit) |
| Staff | Eiko Sanefuji |

LF-NTD Unit

Global efforts to control, eliminate or eradicate neglected tropical diseases (NTD) are fast progressing in recent years. Lymphatic filariasis (LF) is not an exception. Under Global Programme to Eliminate Lymphatic Filariasis (GPELF), endemic countries are progressively scaling up interventions with partnership at national and global levels towards the common goal to eliminate the disease as a public health problem by 2020.

The purposes of this unit are to establish and keep the data warehouse of the programme and to foster professionals not only with knowledge but also with global vision who can contribute to the global partnership to fight against LF and NTDs.

Activities:

- 1) Data collection and management
 1. Collection and management of data and information related to LF/NTDs from the world
 2. Participation in and contribution to the expert meetings related to LF/NTDs at national and global level



- 2) The bridge between Japan and the world in the area of tropical control
 1. Establishment and maintenance of global network
 2. Promotion Japan's participation in the global partnership



- 3) Advocacy and information dissemination in Japan
 1. Lectures, meetings, media on tropical disease control
 2. Information sharing and exhibition to the general public



- 4) Trainings on tropical disease control
 1. Lectures and trainings for students and professionals
 2. Publication of documents, development of training materials and curriculum



- 5) "PacELF Endgame Project"
 1. A joint project with James Cook University
 2. Data catalogue, Case studies, PacELF Way II book



Director
Assistant

Kazuyo Ichimori
Yukiko Baba

Professor

Shinjiro Hamano



Office of Coordination for Humanitarian Affairs

(Introduction)

In 2016, the Office of Coordination for Humanitarian Affairs was set up in our institute. Prof. Taro Yamamoto, who also heads the Department of International Health, was nominated as the first chief of this section. One year has passed since its inception during which time we have dispatched missions to natural disaster affected areas and yellow fever epidemic areas.

(Aims)

The aims of this office are to provide support to both natural and manmade disaster areas. In order to undertake these missions, this office shall develop more human resources, do research, and become the center of an international humanitarian network.

(Organization)

1. Office of Coordination for Humanitarian Affairs was set up in NEKKEN
2. Appoint one section chief (professor)

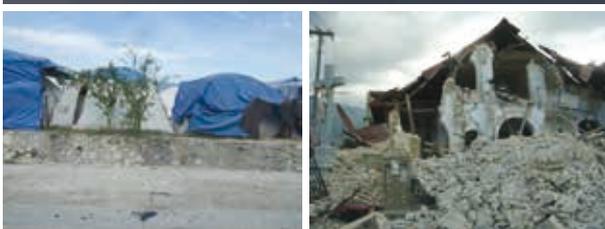
(Past, Present and Future)

NEKKEN has dispatched missions to disaster afflicted areas such as Haiti in 2010, Tohoku region in 2011 just after the East Japan Great Earthquake, West Africa in 2014 and Nepal 2015. These activities

make NEKKEN one of the leading organizations in Japan in terms of disaster relief activities.

Further, the infectious diseases team for Japanese Disaster Relief was decided in a cabinet meeting in October, 2015 based upon the fact that Ebola broke out in West Africa in 2014 and there was an international call for cooperation to help deal with it. NEKKEN is expected to serve as one of the main stakeholders in this field and was asked to participate on that team.

Because of all these events, setting up the Office of Coordination for Humanitarian Affairs was proposed.



The University Hospital Infectious Disease Ward

It was 16 June 1967 when the clinical department of the Institute of Tropical Medicine (NEKKEN) established its department in the Nagasaki University Hospital. Currently the NEKKEN department of clinical medicine has been running a clinic and providing in-patients care in the Department of Infectious Diseases as “NEKKEN-NAIKA”. Our ward has 16 beds with 8 negative pressure rooms, of which two can accommodate patients with BSL4 pathogens. We are specialized in infectious diseases and also respiratory diseases; we treat patients with systemic infectious diseases, including tropical infectious diseases, HIV/AIDS, tuberculosis, pneumonia, and various neoplastic and inflammatory respiratory diseases. We also receive approximately 500 consultation cases a year in other wards and give advices on diagnosis and treatment. Outpatient clinic is open twice a week where we run a travel clinic for international travelers.

For training and education, we provide a number of lectures on infectious diseases and respiratory diseases to undergraduate students and bed-side training programs for resident physicians. We organize a clinical case conference of tropical infectious diseases as a part of Master of Tropical Medicine course, School of Tropical Medicine and Global Health. Staff doctors and resident doctors are regularly dispatched for a long-term to abroad, San Lazao Hospital, the Philippines and the infectious disease ward in Bac Mai Hospital, Vietnam to accumulate our knowledge and experience of clinical tropical medicine.

Professor	Koya Ariyoshi
Associate Professor	Konosuke Morimoto
Senior Lecturer	Takeshi Tanaka
Assistant Professor	Yoshiro Yamashita
Assistant Professor	Masahiro Takaki
Assistant Professor	Emi Kitasyoji
Assistant Professor	Kensuke Takahashi
Visiting Lecturer	Akitsugu Furumoto
Fellow Doctor	Mai Izumida
Fellow Doctor	Satoshi Kakiuchi
Fellow Doctor	Hiroyuki Ito
Fellow Doctor	Hiroshi Nakaoka
Fellow Doctor	Ikko Yasuda
Fellow Doctor	Kosuke Matsui
Fellow Doctor	Masahiro Sano
Fellow Doctor	Akira Nishiyama
Fellow Doctor	Kanako Shimamori
Assistant	Ayako Matsuo



Group photo of staff members

Number of Staff

(as of May 1, 2017)

Divisions	Professor	Associate Professor	Lecturer	Assistant Professor	Sub total	Others	Total
Enrollment	14 [1]	6 (2) [1]	3	17 (19)	40 (21) [2]	7 (8)	47 (29) [2]

※ () number of fixed-term staff, [] number of concurrent staff

Accounting

(Fiscal Year 2016)

Revenue

Divisions		Amount (in thousands of yen)
Administrative cost subsidy		772,269
Non-subsidy income at Nagasaki University		161,815
External Fund	Joint Research	25,921
	Commissioned Research	1,372,892
	Commissioned Project	42,695
	Endowment	12,618
Others		4,100
Total		2,392,310

Expenditure

Divisions		Amount (in thousands of yen)
Administrative cost subsidy		772,269
Non-subsidy income at Nagasaki University		161,815
External Fund	Joint Research	26,005
	Commissioned Research	949,551
	Commissioned Project	31,189
	Endowment	22,335
Others		4,100
Total		1,967,264

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

(FY 2016)

Type of Research	Scientific Research(A) (General)	Scientific Research(B) (Overseas Academic Research)	Scientific Research(B) (General)	Scientific Research(C) (General)	Challenging Exploratory Research	Young Scientists(B)	JSPS Research Fellow	Research Activity Start-up	Total
Number of Grants	4	11	2	13	3	7	3	1	44
Amount (in thousands)	40,430	50,310	11,700	20,410	5,330	12,480	3,730	1,430	145,820

Facilities & Administrative costs included

Subsidy

(FY 2016)

Type of Research	National Bio-resource Project (NBRP)
Amount (in thousands)	4,100

External Fund

(FY 2016)

Divisions	Joint Research with Private Sectors	Commissioned Research	Commissioned Project	Endowments	Total
Number of Sources	9	32	8	18	67
Amount (in thousands)	25,921	1,372,892	42,695	12,618	1,454,126

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
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 (Philippines)	August, 2004
Kenya Medical Research Institute (Kenya)	November, 2004
Thammasat University (Thailand)	March, 2006
National Institute for Communicable Diseases of the National Health Laboratory Service (South Africa)	July, 2010
China Medical University (China)	September, 2010
Jiangsu Institute of Parasitic Diseases (China)	September, 2010
National Institute of Malaria, Parasitology and Entomology (Vietnam)	November, 2013
University of the Philippines Manila (Philippines)	January, 2014
Patan Academy of Health Sciences (Republic of Nepal)	July, 2014

○Domestic

Name of organization of partner	Concluded date
The Research Institute of Tuberculosis Japan Anti-Tuberculosis Association	March, 2009
Nagasaki Prefectural Institute of Environment and Public Health	September, 2015

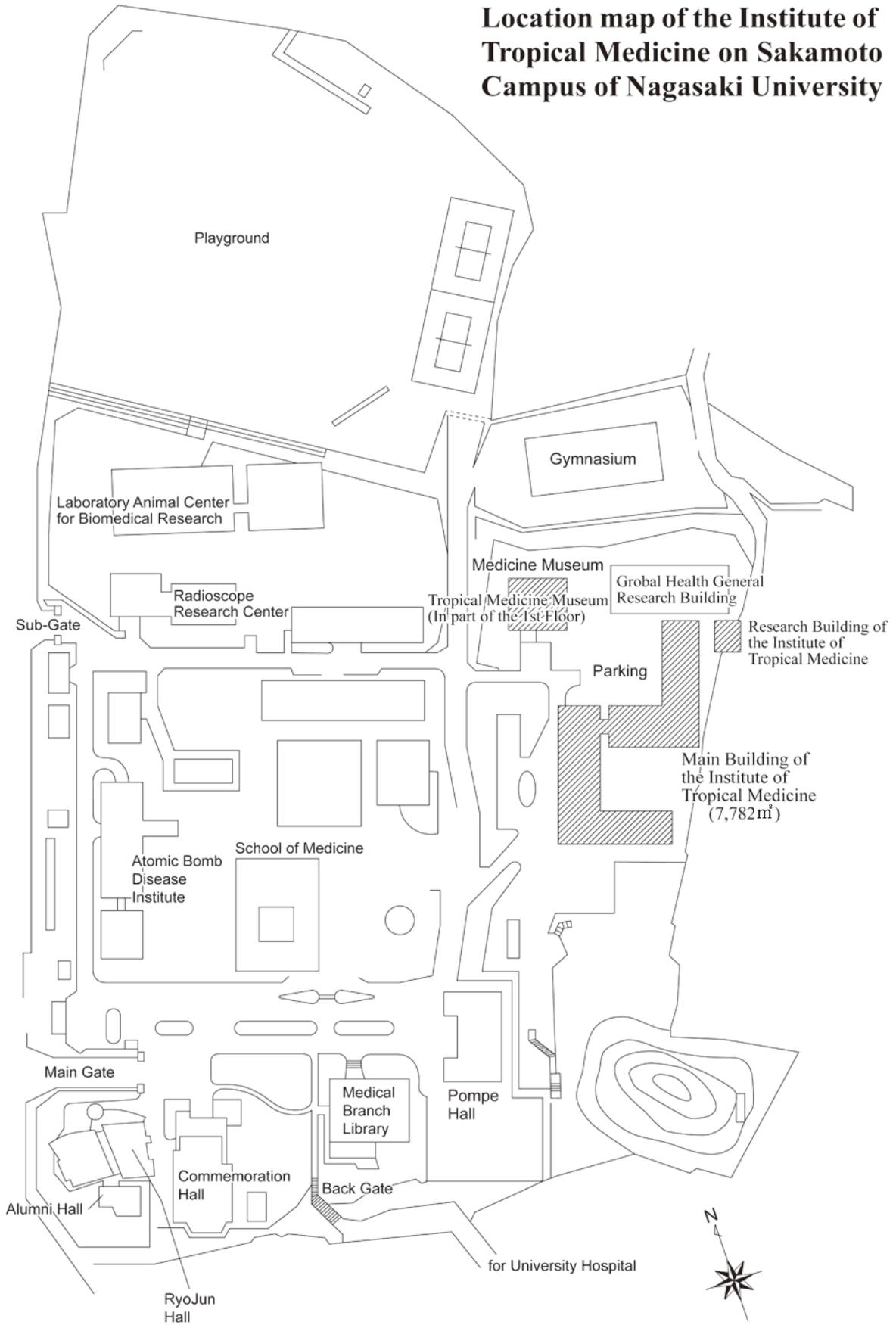
Telephone Number

Institute of Tropical Medicine, Nagasaki University 095 (819) 7800

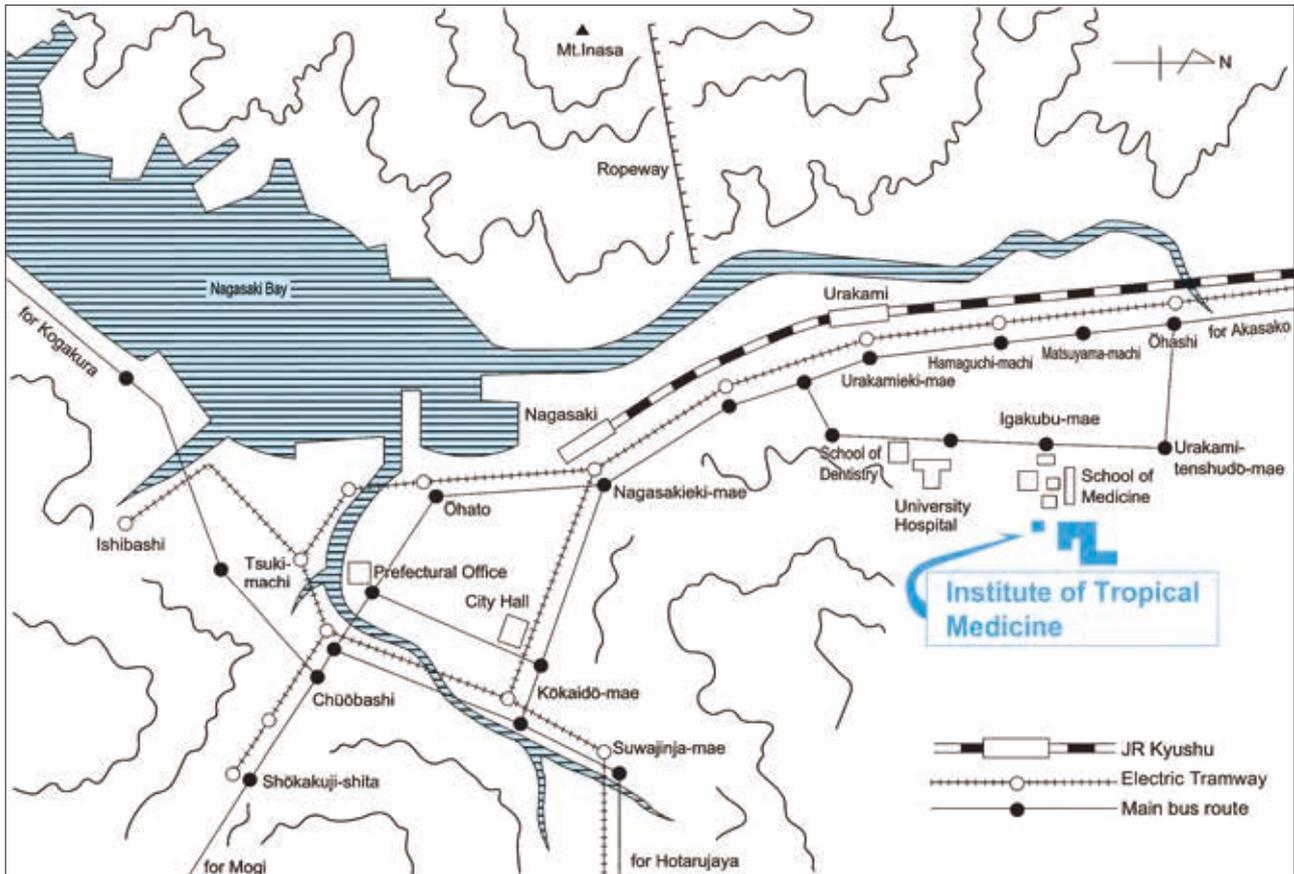
	Extension	Direct dialing
Dean	7801	819-7801
Head of Administrative Office	7802	819-7802
Section Leader	4714	819-7803
Chief of General Affairs Unit	4702	819-7803
General Affairs Unit	7803	
Chief of Accounting and Facilities Management Unit	4706	819-7807
Accounting and Facilities Management Unit	7807	
Accounting and Facilities Management Unit	7816	
Chief of Overseas Research Station Unit	4709	819-7806
Overseas Research Station Unit	7806	
Facsimile	7805	819-7805
Meeting Room	7870	
Department of Virology		
Professor	7827	819-7827
Associate Professor	8588	819-7828
Information	7829	819-7829
Facsimile	7830	819-7830
Department of Emerging Infectious Diseases		
Professor	7848	819-7848
Staff room	7849	819-7849
Information	7851	819-7851
Department of Bacteriology		
Senior Assistant Professor	7833	819-7833
Information	7831	819-7831
Department of Protozoology		
Professor	7835	819-7835
Lab.2	7836	819-7836
Lab.1	7837	819-7837
Information	7838	819-7838
Senior Assistant Professor	7815	819-7815
Department of Parasitology		
Professor	7822	819-7822
Staff room	7823	819-7823
Facsimile	7824	819-7824
Information	7825	819-7825
Department of Immunogenetics		
Professor	7818	819-7818
Senior Assistant Professor	7845	819-7845
Information	7820	819-7820
Facsimile	7821	819-7821
Department of Pathology		
Associate Professor	7903	819-7903
Assistant Professor	7814	819-7814

	Extension	Direct dialing
Department of Eco-epidemiology		
Professor	7 8 6 6	8 1 9-7 8 6 6
Associate Professor	7 8 6 7	8 1 9-7 8 6 7
Lab.1	7 8 5 4	8 1 9-7 8 5 4
Information	7 8 6 6	8 1 9-7 8 6 6
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
Lab.2	7 8 5 3	8 1 9-7 8 5 3
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
Department of pediatric Infectious Diseases		
Professor	7 7 6 3	8 1 9-7 7 6 3
Professor	7 2 8 4	8 1 9-7 2 8 4
Information	7 7 6 4	8 1 9-7 7 6 4
Department of Clinical Product Development		
Professor	7 2 8 5	8 1 9-7 2 8 5
Information	7 5 5 8	8 1 9-7 5 5 8
Center for Infectious Disease Research in Asia and Africa		
Kenya Research Station Professor	7 8 6 0	8 1 9-7 8 6 0
Kenya Research Station Assistant Professor	7 8 3 2	8 1 9-7 8 3 2
Vietnam Research Station Information	7 8 7 6	8 1 9-7 8 7 6
Tropical Medicine Museum		
Professor	7 8 6 8	8 1 9-7 8 6 8
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
NEKKEN Bio-Resource Center Information	7 8 5 6	8 1 9-7 8 5 6
NTD Innovation Center		
Information	4 7 0 7	8 1 9-8 5 8 5
LF-NTD Unit	8 5 8 9	8 1 9-8 5 8 9
Office of Coordination for Humanitarian Affairs		
Information	7 8 6 9	8 1 9-7 8 6 9

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



Location map of 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 (For Nagasaki Sta. (via Showa-machi / via Showa-machi · Sumiyoshi)) → Hamaguchi-machi → about 10-minute walk

Location

1-12-4 Sakamoto Nagasaki 852-8523

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