Institute of Tropical Medicine, Nagasaki University
Activities and corresponding faculty members in each research field

as of 1, November 2024

Departments and Facilities		Research Activities / Corresponding NEKKEN faculty member
Microbiology and Parasitology	Department of Virology	Our department focuses on field epidemiology, molecular phylogeny, and the molecular mechanisms of tropical and emerging viral diseases, including arthropod-borne virus diseases (such as Dengue, Zika, Japanese Encephalitis, West Nile, Yellow Fever, Rift Valley Fever, and Severe Fever Thrombotic Syndrome), hemorrhagic fever virus diseases (Ebola and Marburg virus), and COVID-19.
	Contact person	Associate Professor. Yuki Takamatsu
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	Department of Emerging Infectious Diseases	・Research on emerging viral diseases including Ebola virus disease, Marburg disease, Lassa fever, SFTS and COVID-19. ・Epidemiological and ecological studies on viral diseases in Africa.
	Contact person	Professor. Jiro Yasuda
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	Department of Bacteriology	Our research focuses on the pathogenesis of enteric bacterial pathogens, including Vibrio parahaemolyticus, Vibrio cholerae, and Salmonella enterica spp. 1) V. parahaemolyticus pathogenesis, 2) the genetic characteristics and dynamics of epidemic strains of Vibrio spp. 3) Salmonella pathogenesis
	Contact person	Professor. Toshio Kodama
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	Department of Protozoology	To identify weak points of malaria parasites, we are investigating fundamental questions such as the invasion mechanism of erythrocytes and cytoadherence of the parasite-infected erythrocytes using cutting-edge genetic manipulation techniques. We are also conducting field-based malaria researches such as elucidating drug-resistance mechanisms, molecular epidemiology and population genetic analysis of drug resistance genes and host immune targets. We welcome collaborative projects to develop anti-malarial drugs, malaria vaccines, and diagnostic tools. Experiments on the transmission of *Plasmodium falciparum* to mosquitoes is also initiated.
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	Department of Parasitology	1) Epidemiological study on schistosomiasis in Kenya 2) Research and Development of new diagnostic and monitoring tools for schistosomiasis and leishmaniasis 3) Development and evaluation of new vaccines for leishmaniasis 4) Study on the host immune response and defense mechanism against parasites 5) Research on trematode development in freshwater snails 6) Searching for lead compounds for new drugs against schistosomiasis
	Contact person	Professor. Shinjiro Hamano
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Host and Vector Biology	Department of Immunogenetics	The theme of the department is the analysis of host immune responses to tropical infectious diseases. Research projects are being conducted in humans and animal models on host immune mechanisms involved in the severity and protection against infection by important tropical infectious agents such as protozoa (malaria, trypanosomes, schistosomiasis) and viruses (dengue fever). Collaborative research resources include the following 1. Chagas disease field in Latin America, with a focus on Bolivia 2. Chagas model mouse and isolated parasites library from Guatemala and Bolivia 3. Dengue fever, malaria, and schistosomiasis fields in the Philippines 4. Industry-academia-government collaborative network for the development and dissemination of pharmaceutical diagnostics and vaccines
	Contact person Phone E-mail	Professor. Kenji Hirayama +81-95-819-7893 hiraken@nagasaki-u.ac.jp
	Department of Host-Defence Biochemistry	We are conducting basic biological research on metabolic regulation, biochemistry and molecular biology of biological membranes, and drug discovery based on such studies, with a focus on the importance of natural compounds as candidates for anti-infectious diseases and anticancer drugs. In particular, we are focusing on the natural compounds. In addition, we try to integrate different disciplines, such as teaching and research on international medical issues (developing countries in Latin America, Southeast Asia, and Africa, as well as developed countries in Europe and America). We are actively collaborating with research groups from basic biology to drug discovery in our university, including the Institute of Tropical Medicine, especially with the departments of Virology, Emerging Infectious Diseases, Protozoology, Parasitology, and Molecular Infection Dynamics, to conduct research on parasites and virus infection.
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Public Health and Environment	Department of Eco-epidemiology	Our department is involved in various branches of public health research. With cutting-edge IT and biotechnology, we intend: to create more accurate assessment methods in global health, improve responses to public health needs on a local level, and open new directions in health sciences to future generations. Our activities include the following: 1） Epidemiological Research based on Health and Demographic Surveillance System (HDSS). 2） Epidemiological studies for healthy growth of children in Africa. 3） Research on the development and use of a cloud-based maternal and child health handbook registration system 4） Research to clarify the molecular bases of parasitic diseases. 5） Research on monkey malaria vectors applying the 3D-printing technology-based original mosquito trap. 6） Study fungal mycetoma in Sudan
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Public Health and Environment	Department of International Health and Medical Anthropology	Our department is based on the key concepts of adaptation and evolution, aiming to understand health and the spread of infectious diseases. Specifically, we focus on theory of sexually transmitted infections (STIs) spread using mathematical models, while also conducting sexual behavior surveys using web surveys and online data collection to elucidate the mechanisms by which STIs persist in human societies.From the perspective of game theory, we investigate the social dilemmas underlying the use of antimicrobials and the emergence/spread of antimicrobial resistance. Our project also includes studying the adaptation to hypoxia among Tibetan highlanders in Nepal and examining the carriage of periodontal pathogens and the association between psychoactive substances (alcohol, tobacco, drugs, etc.) and preterm birth or low birth weight in pregnant women in the Republic of Rwanda. By revealing the characteristics of pathogens collected from patients and residents, we provide information that serves as a foundation for research and efforts to control infectious diseases. Contact person: Associate Professor. Hiromu Ito Phone: +81-95-819-7869 E-mail: ito.hiromu@nagasaki-u.ac.jp URL: http://www.tm.nagasaki-u.ac.jp/newrect/
	Department of International Health Development and Policy	Two professors affiliated with School of Tropical Medicine and Global Health (TMGH) have been concurrently appointed, to conduct policy research on their respective areas of expertise described below. They contribute to continuously identifying the discrepancies between the health policies and field realities in low and middle income countries (LMICs), by collaborating not only with TMGH but also with London School of Hygiene and Tropical Medicine (LSHTM), the National Center for Global Health and Medicine (NCGM), and Japan International Cooperation Agency (JICA). 1) Health workforce, Health information system, Food security & nutrition, Neglected tropical diseases, Emergency assistance, Maternal and child health, Environmental health (Hirotsugu Aiga) 2) Child health, Community health,NCDs, Emergency assistance (Yasuhiko Kamiya) Contact person: Professor. Hirotsugu Aiga, Professor. Yasuhiko Kamiya Phone: +81-95-819-8582(Aiga), +81-95-819-7891 (Kamiya) E-mail: hirotsugu.aiga@nagasaki-u.ac.jp (Aiga) ykami@nagasaki-u.ac.jp (Kamiya)
	Department of Vector Ecology and Environment	Transmission of many infectious diseases in the tropics involves various animals as vectors and intermediate hosts. Mosquitoes are particularly feared as vectors of Plasmodium parasites and dengue virus. Freshwater snails are important intermediate hosts of schistosomiasis. We focus on mosquito vectors and snails to study their genetics, ecology, pathogenesis and human relationships in the tropics of Africa and Southeast Asia. We are currently working on 1) ecology and control of malaria vectors in Africa, 2) ecological and population genetic studies and control of dengue virus vectors in Asia and Africa, 3) analyses of impact of environmental factors such as climate change on vectors and disease transmission and development of prediction models, 4) ecological study of intermediate host snails, etc. Contact person: Professor. Noboru Minakawa Phone: +81-95-819-7809 E-mail: sakemoto@nagasaki-u.ac.jp

Clinical Medicine and Research	Department of Clinical Medicine	The Department of Clinical Medicine has developed and is managing the following oversea clinical research fields, which serve as our platform for future collaborations: 1. Fever study in the Philippines Conducted at the National Infectious Diseases Hospital (San Lazaro Hospital), this study has been prospectively recruiting patients suspected of community-acquired bacteremia, including COVID-19 patients since 2020; 2. Fever study in Northern Vietnam Conducted at the National Referral Hospital, Bac Mai Hospital in Hanoi, this study has collected clinical information and specimens from over 1,500 febrile patients admitted to the Infectious Disease Ward; 3. Birth cohort in Central Vietnam This study involved the follow-up of clinical information and blood samples from over 1,000 children up to 6 years of age. 4. Hospital-based HIV Cohort in Northern Thailand This cohort study has collected clinical information and specimens from 756 HIV-infected individuals before anti-retroviral drugs became widely available, 969 HIV-infected individuals on anti-retroviral therapy, and over 100 HIV-seronegative but exposed individuals. Contact person: Professor. Koya Ariyoshi, Chris Smith; Associate Professor Yoshinao Kubo Phone: +81-95-819-7842 E-mail: kari@nagasaki-u.ac.jp; christopher.smith@lshtm.ac.uk; yoshinao@nagasaki-u.ac.jp
	Department of Respiratory Infections	Globally, including in the tropics, respiratory infections have the highest burden of disease among infectious diseases. We conduct epidemiological studies of respiratory infections, mainly in the domestic field, with a focus on adult pneumonia. Our goal is to contribute to the development of more appropriate prevention strategies of respiratory infections by understanding its epidemiology. Current studies include 1) surveillance of hospitalized adult pneumonia, 2) carriage of pneumococcus in the older people, 3) vaccine effectiveness of COVID-19 vaccines and influenza vaccines Contact person: Program Specific Professor. Konosuke Morimoto Phone: +81-95-819-7842 E-mail: komorimo@nagasaki-u.ac.jp
	Department of Pediatric Infectious Diseases	Our department conducts clinical and epidemiological studies in the following fields. 1) Population-based cohort studies, pediatric acute respiratory infection (research studies in Vietnam and Japan) 2) Congenital infection research: investigation of the prevalence, characteristics, risk factors, and potential prevention and treatment strategy for congenital infection (Congenital Rubella Infection, Hepatitis B Virus, Zika, CMV infection, etc.) 3) Outbreak investigation studies, Population based disease burden and risk factor analysis studies utilizing hospital database and community survey database (Diphtheria, RSV, influenza, SARS CoV2, respiratory viruses, dengue, NCD, etc.) 4) Vaccine impact and clinical trial studies (Pneumococcal conjugate vaccine reduced dosing study, RSV vaccine impact modelling study, dengue vaccine, anti-dengue drug clinical and prophylactic treatment studies) Contact person: Professor. Laymyint Yoshida Phone: +81-95-819-7764 E-mail: lmyoshi@nagasaki-u.ac.jp

	Department of Tropical Viral Vaccine Development	Our department is involved in (1) developing new recombinant live dengue vaccines, (2) testing dengue vaccine concepts in vivo, (3) developing assays to characterize candidate dengue vaccines, (4) studying the immune responses these candidate vaccines induce (5) validating designed epitope-based peptide vaccine against DENV and (6) sero-epidemiological and molecular epidemiological studies on arboviruses in some Asian countries. We developed an in vitro assay system that can quantitatively evaluate the antibody dependent enhancement of dengue virus (DENV) infection in a high-throughput manner. We collaborate with the Kyushu-based KM Biologics (a pharmaceutical company) in the development of a tetravalent live vaccine for dengue. We will promote the development of an mRNA vaccine as part of the "100-day vaccine concept," of the AMED project.
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Shionogi Global Infectious Diseases Division	—	The focus of our research is to investigate mechanisms underlying the regulation of immune responses and immunological memory during malaria. We use mouse model of malaria and are particularly interested in regulatory mechanisms of cytokine, IL-27, on immunological memory to malaria. We also investigate the maintenance of immunological memory to malaria in the field of the Philippines. We select field that has eliminated malaria in the past and that has ongoing malaria infection and investigate the maintenance of memory B and T cells in the residents.
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	Molecular Infection Dynamics	The Department of Molecular Infection Dynamics, in cooperation with Department of Exploratory Research for Drug Discovery aim to identify drug target molecules and to establish screening systems in order to find lead compounds with potential use for treatment, prophylaxis and transmission blocking against malaria. Our Department conduct research on microaerophilic metabolism conserved in several pathogens such as parasites (protozoa and helminth) and bacteria, in order to understand the molecular mechanism of parasitism phenomena. We utilize multidisciplinary approaches, consisted by biochemistry, molecular biology, biophysics, structural biology and chemical biology, to conduct our basic and applied research. Our target infectious diseases include protozoan parasites such as Plasmodium spp., Theileria spp., Trypanosoma cruzi, T. brucei and Leishmania spp.; helminthes such as Ascaris suum, Anisakis spp., Haemonchus contortus and Fasciola spp., and bacterial pathogens such as Mycobacterium spp, Campylobacter spp., and Helicobacter pylori. We also conduct research on cancer metabolism. Intestinal parasites have evolved sophisticated machinery to adapt and survive in hypoxic and nutrient deprived environment (microenvironment). We have found several alternative metabolic pathways which are performed by certain type of cancer cells living under tumor microenvironment.
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	Immune Regulation	Our scope is malaria vaccine development utilizing cellular immunity. Malaria life cycle in human body is divided into two stages; erythrocytic- and liver- stage. Even with appearance of drug resistant strains, many antimalarial drugs are available for the erythrocytic stage. On the other hand, for the liver-stage, only few drugs with undesirable side effect are available, thus vaccine and drug development are still an urgent issue for this stage. Cellular immunity including cytotoxic T lymphocytes (CTL) is considered essential for protection against liver-stage malaria. But many vaccine developments aim to induce neutralizing antibody, the main effector of humoral immunity, and cellular immunity has not been well considered. Therefore, we started our cellular immunity based liver-stage malaria vaccine development. We will examine and optimize; a. vaccine antigen which lead the protection utilizing cellular immunity, b. the antigen delivery system c. the adjuvant and route of administration to enhance immune response. We started our study with mouse malaria model, and we aim to apply our research finding to human malaria, especially Plasmodium falciparum. We hope our study will contribute to develop better malaria vaccine. In addition, immunological analysis for other infectious diseases (e.g. Dengue fever, COVID-19) are also in progress.
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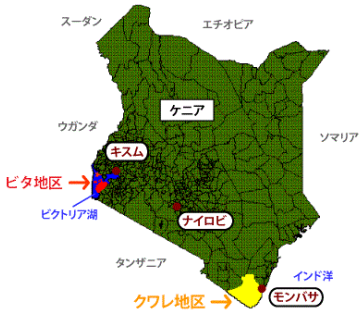
Center for Infectious Disease Research in Asia and Africa	Kenya Research Station	N agasaki University Institute of Tropical Medicine and Kenya Medical Research Institute (NUITM-KEMRI) Project was launched by signing the Memorandum of Understanding between the President of NUITM and the Director of KEMRI in 2005. The project's objective was to enhance research and develop capacity building in tropical medicine at the field level. In January 2006, Kenya Research Station was established to manage the project. Biosafety Level 2 and 3 laboratories and an insectary for mosquitos were installed in the station. Research field sites were also found in Mbita near Lake Victoria and Kwale on the coast of Kenya. Health and Demographic Surveillance System (HDSS) has registered about 120,000 people in the field and vital events like birth, death, and migration in two research areas. On-going studies are virus research, TB clinical study, Rabies genome surveillance, Malaria, Mosquito, schistosomiasis, maternal-child health, and geriatrics. In FY2021, we made renovations to our laboratories. The Next Generation Sequencer (NGS), P3 lab, and Molecular Biology lab were updated to the latest equipment. We look forward to your collaborative research with us.  Contact person: Leader and Professor. Shingo Inoue Phone: +81-95-819-7860 E-mail: pampanga@nagasaki-u.ac.jp URL: http://www.tm.nagasaki-u.ac.jp/kyoten_nairobi/
	Vietnam Research Station	The Vietnam Research Station was started as the "Program for the Formation of Research Centers for Emerging and Reemerging Infectious Diseases" by the Ministry of Education, Culture, Sports, Science and Technology. In 2006, we set up "NIHE-NU Friendship Lab (NNFL)" at the National Institute of Hygiene and Epidemiology in Hanoi, and a large-scale cohort in Nha Trang city, Vietnam as the flagship of our research base. From 2020, under the commission of the Japan Agency for Medical Research and Development (AMED), Japan Program for Infectious Diseases Research and Infrastructure (overseas base research area) "Study on Emerging and Re-emerging Infectious Diseases in Vietnam" has been started. This project will be conducted various studies on arbovirus infections, respiratory infections, infectious diarrhea diseases, wildlife-borne infections and drug-resistant bacteria at Nagasaki University and Vietnam National Institute of Hygiene and Epidemiology as main-base, and the National Center for Global Health and Medicine and Bac Mai Hospital as sub-base. This project aims to conduct following studies on the above-mentioned infectious diseases. Firstly, molecular epidemiological research on elucidation of real-time epidemic situation and transmission route of pathogens, and prediction of infectious disease epidemics by identification of other relevant risk factors will be carried out. Followed by study on mutation of pathogens, determination of pathogenicity and multiplication mechanism and diversity of immune response. Lastly search for unknown pathogens derived from wild animals and analysis of pathogenicity. Contact person: Leader and Professor. Futoshi Hasebe Phone: +81-95-819-7876 E-mail: rainbow@nagasaki-u.ac.jp URL: http://www.tm.nagasaki-u.ac.jp/vietnam/index.html

Central Laboratory	❖Central Laboratory (Electron Microscope Unit) supports ultrastructural characterization of microbial pathogens (viruses, bacteria, and protozoa) and the pathogen-infected cells. This unit is equipped with a transmission electron microscope, an ultra-microtomes, a vacuum coater, and a hydrophilic treatment device. This units offers sample preparation including ultrathin sectioning and staining, and high-quality imaging by conventional and immuno-electron microscopy. ❖Central Laboratory (Molecular & Cellular Biology Unit) provides laser scanning confocal/fluorescence microscopes, a super-resolution microscope, flow cytometers, multiplex assay systems, and multimode plate readers, all of which are installed in BSL2 room. ❖Research topics: 1) *Entamoeba* lipid metabolism; biochemistry, molecular and cell biology, and physiology, 2) Study for the molecular mechanism underlying *Entamoeba* encystation, 3) Elucidation of metabolic pathways in *Entamoeba histolytica* and identification of the targets for the development of anti-amoebiasis drugs.
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Tropical Medicine Museum	As Japan's only science museum specialising in tropical infectious diseases, we disseminate information to public by collecting and displaying information on the mechanisms of tropical infectious diseases and NTDs, measures for their control, and the historical background. In addition, from this year on, we have taken on the new challenge of preserving and sharing the materials, records and memories of COVID-19. 1. To preserve and share materials, records and memories related to the control of endemic diseases. 2. Preservation and transmission of materials, records and memories related to COVID-19. 3. Exhibitions and social communication related to tropical infectious diseases and COVID-19. 4. Cooperation in the use of information on infectious diseases in school education, social education, etc.
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NEKKEN Bio-Resource Center (NBRC)	NEKKEN Bio-Resource Center collects, maintains and preserves culture strains of pathogenic protozoa such as Plasmodium, Trypanosoma, Entamoeba, Leishmania, Giardia, Naegleria, Trichomonas species. Various cryopreserved strains and microscopic specimens of these protozoa are provided to research and educational organizations with supporting of MEXT National BioResource Project (NBRP). Furthermore, a new project aimed at optimizing freezing conditions for improving recovery rates from cryopreservation of protozoa.
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NTD Innovation Center	NTDi Center aims to support the formation of research and development projects and the exchange of information among research groups through industry-government-academia-industry collaboration toward eliminating neglected tropical diseases (NTDs). It is also the core of the Japan Alliance on Global NTDs (JAGntd), a national alliance for tackling NTDs to promote and manage services of NTDs-related academic conferences. Since 2022, we have also served as the secretariat of the NTD subcommittee under the Nikkei Asia-Africa Medical Innovation Consortium (AMIC).
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