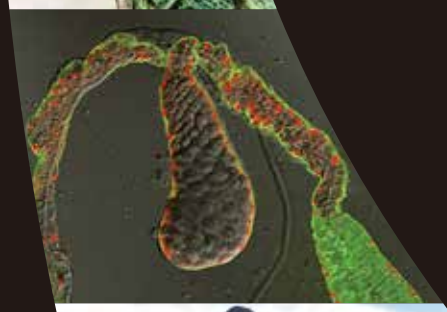
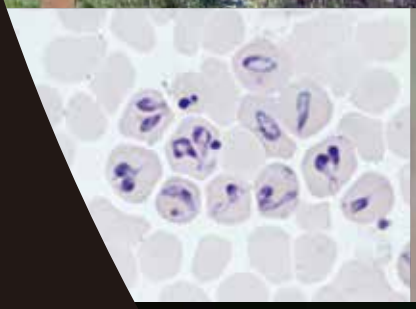
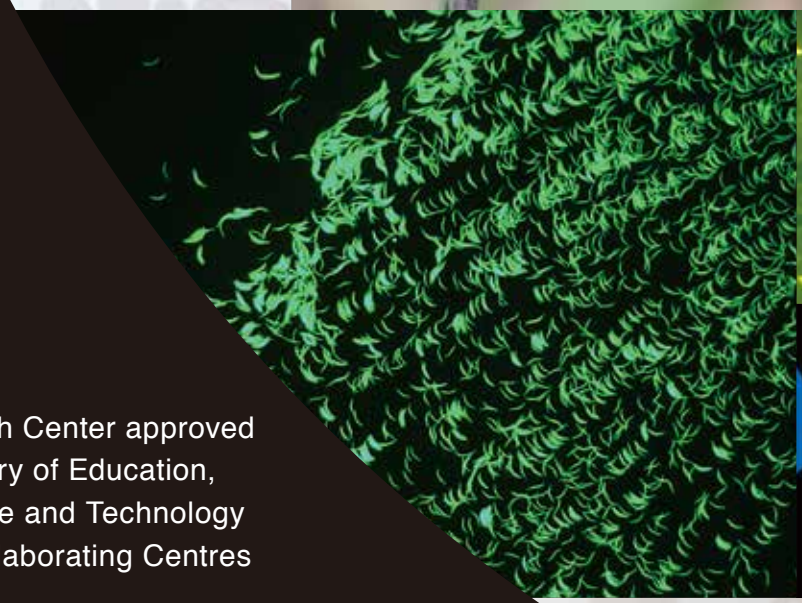
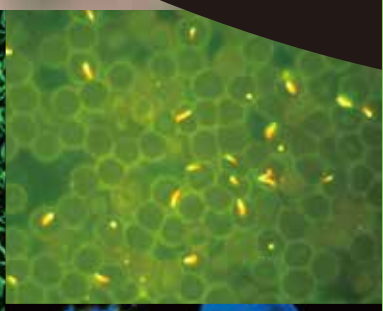
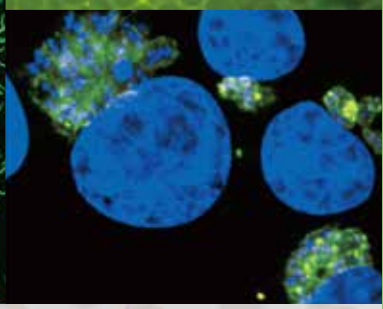






A Joint Usage/Research Center approved by the Japanese Ministry of Education, Culture, Sports, Science and Technology and one of the OIE Collaborating Centres

# National Research Center for Protozoan Diseases

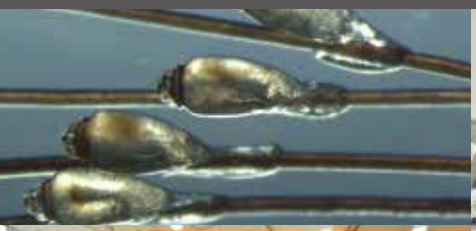
2017

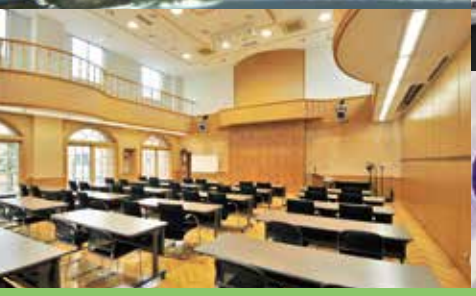
Obihiro University of
Agriculture and Veterinary Medicine

OIE collaborating centre
for surveillance and control
of animal protozoan diseases

# Mission

Our mission, as the only MEXT Joint Usage Research Center of Protozoan Diseases in Japan, is to promote cutting-edge research on the control of protozoan diseases in humans and livestock. This research is conducted to contribute to the health and welfare of human beings as well as to the global issue of food safety and security. This will be accomplished through cooperation with domestic and foreign universities, relevant ministries and international institutes.





# Message from the Director General

## Xuenan Xuan

Our center was first established in 1990 as a joint-usage facility of Obihiro University of Agriculture and Veterinary Medicine, under the name “Research Center for Protozoan Molecular Immunology”. Its research and educational activities have been highly valued by the Ministry of Education of Japan and in 2000, the center was re-organized as the “National Research Center for Protozoan Diseases”, a national joint-usage facility. As the only research institute focused on protozoan diseases in the country, our center has been leading research on the surveillance and control of protozoan diseases nationally and has educated numerous specialists during the last 26 years.

Protozoan diseases cause huge economic losses in animal production worldwide, and urgent needs such as the development of effective diagnostic, preventive, and therapeutic measures have yet to be fulfilled. To resolve these challenges, our center has contributed to the analysis of whole genomes and transcriptomes for many protozoan parasites and their transmitting vectors while simultaneously promoting practical research in protozoan diseases based on genomic sciences. Some of this research has already been applied as standard methods in the clinical field.

Since 2007, two laboratories from our center have been certified as World Organisation for Animal Health(OIE) reference laboratories, and the whole center was approved as an OIE collaborating center for the surveillance and control of protozoan diseases the following year. Currently, the OIE reference laboratories have been certified as ISO/IEC17025:2005-standardized facilities. The center provides standard diagnostic and preventive methods to control protozoan diseases around the world.

Our center has been organizing a Japan International Cooperation Agency (JICA) 10-month training course in protozoan and zoonotic diseases for the last 21 years, and more than 176 participants from Asian, African, and Central and South American countries have successfully completed the course. These former JICA participants and former PhD students (more than 300 alumni) from the center have created a robust international network that strengthens the global cooperative research focused on protozoan diseases.

The mission of our center, as an international joint research institute, is to lead and promote research on protozoan diseases not only in Japan but also worldwide, as well as to train the next generation of highly motivated and talented scientists in the field. Thank you very much for your attention and cooperation.

# Members of the center

**Director General** Xuenan Xuan **Vice Director General** Hiroshi Suzuki

## Department of Infection and Immunity

**Research Unit for Vector Biology**
Assoc. Prof. Shinya Fukumoto

**Research Unit for Host Defense**
Prof. Xuenan Xuan / Assoc. Prof. Yoshifumi Nishikawa

**Research Unit for Functional Genomics**
Prof. Hiroshi Suzuki / Assistant Prof. Rika Shirafuji

## Department of Disease Control

**Research Unit for Molecular Diagnostics**
Prof. Ikuo Igarashi / Prof. Naoaki Yokoyama

**Research Unit for Advanced Preventive Medicine**
Prof. Shin-ichiro Kawazu

**Research Unit for Infection and Pathology**
Prof. Makoto Igarashi

## Department of Global Cooperation

**Research Unit for Global Infection Control**
Assoc. Prof. Kentaro Kato

**Research Unit for Global Surveillance**
Prof. Ikuo Igarashi (Concurrent)
Project Assistant Prof.Keisuke Suganuma (Concurrent)

**Research Unit for International Animal Health**
Dr. Oriel M. M. Thekisoe
Dr. Patrick Vudriko
Dr. Ragab Makhlouf Mahmoud Fereig
Dr. Seung-Hun Lee

**Bio-Self-Regulating Science Laboratory (Hakuju Institute for Health Science Co.,Ltd)**
Prof. Hiroshi Suzuki (Concurrent)
Visiting Assoc. Prof. Shinji Harakawa
Visiting Researcher Takuya Hori

**Visiting Professor**
Director. Shigeyuki Kano
Research Institute National Center for Global Health and Medicine
Prof. Kiyoshi Kita
Nagasaki University School of Tropical Medicine and Global Health
Project Prof. Chihiro Sugimoto
Hokkaido University Research Center for Zoonosis Control
Prof. Naotoshi Tsuji
Kitasato University School of Medicine
Fellow Kozo Fujisaki
National Agriculture and Food Research Organization
Prof. Toshihiro Horii
Research Institute for Microbial Diseases, Osaka University

**Project Researchers** Kousuke Umeda, Aiko Kume, Takahiro Shirozu

**Technical Specialist** Tsuyoshi Habaguchi

**Technical Assistant** Ai Shindo,Kaori Takahashi

**Assistant Clerk** Miki Fukunishi

## Member of the collaborative researchers in 2017

(in order of the Japanese syllabary, with titles omitted)

| | |
|---|---|
| Hidetaka Akita | Professor, Chiba Uniersity |
| Masahito Asada | Assistant Professor, Nagasaki University |
| Hiromi Ikadai | Associate Professor, Kitasato University |
| Yuzuru Ikehara | Senior Chief Researcher, National Institute of Advanced Industrial Science and Technology |
| Aki Ishiyama | Project Assistant Professor, Kitasato University |
| Naoya Kojima | Professor, Tokai University |
| Mototada Shichiri | Senior Researcher, National Institute of Advanced Industrial Science and Technology |
| Madoka Seki | Assistant Professor, Iwate University |
| Tetsuya Tanaka | Associate Professor, Kagoshima University |
| Masaru Tanokura | Project Professor, The University of Tokyo |
| Youichi Nakao | Professor, Waseda University |
| Ryo Nakao | Associate Professor, Hokkaido University |
| Coh-ichi Nihei | Senior Researcher, Microbial Chemistry Research Foundation |
| Atsushi Furukawa | Assistant Professor, Hokkaido University |
| Tatsunori Masatani | Associate Professor, Kagoshima University |
| Tomohide Matsuo | Associate Professor, Kagoshima University |
| Shinya Mitsuhashi | Postdoctoral Research Associate, University of Texas Health Science Center at Tyler |
| Toshihiro Murata | Senior Assistant Professor, Tohoku Medical and Pharmaceutical University |
| Junya Yamagishi | Associate Professor, Hokkaido University |
| Chia-Kwung Fan | Professor, Taipei Medical University |
| Dinh Thi Bich Lan | Associate Professor, Institute of Biotechnology, Hue University |
| Haiyan Gong | Associate Professor, Shanghai Veterinary Research Institute,Chinese Academy of Agricultural Sciences |
| Phung Thang Long | Vice rector（Associate Professor）, Hue University of Agriculture and Forestry |

# History

## I The Laboratory for Protozoan Immunology (1983 - 1990)

**April 1984** The Laboratory for Protozoan Immunology was established as an annex of the Department of Veterinary Physiology (Prof. Em. Naoyoshi SUZUKI)

## II The Research Center for Protozoan Molecular Immunology (1990 - 2000)

**June 1990** The Research Center for Protozoan Molecular Immunology granted permission by MEXT, and established as a Joint Research-Educational Facility at Obihiro University until March 31, 2000. Research Unit of Molecular Immunology was established.

**April 1992** Research Unit of Pathophysiology, established.

**June 1993** New research building constructed with 462 ㎡ area.

**April 1995** Research Unit of Disease Control and Genetics, established.

**April 1997** Research Unit of Molecular Arthropodology, established.

**November 1997** New research building constructed with 970 ㎡ area.

## III National Research Center for Protozoan Diseases (2000 to the present)

**April 2000** Establishment of the "National Research Center for Protozoan Diseases: NRCPD" as a national research facility covering a 10 year period (2000-2010). Research Unit for Molecular Diagnosis and Research Unit for Advanced Preventive Medicine, established.

**March 2002** Extension of research building completed with 1,730 ㎡ area.

**October 2002** NRCPD recognized and selected to implement the "21st Century Center of Excellence (COE) Program", by MEXT

**April 2003** Department of Large Animal Infections, established.

**April 2005** Department of Global Surveillance of Protozoan Diseases, established with the three Research Units.

**March 2006** Extension of research building completed with 1,520 ㎡ area

**June 2007** Certified as an OIE Reference Laboratory (bovine babesiosis and equine piroplasmosis: Prof. Igarashi, surra: Prof. Inoue).

**May 2008** Certified as an OIE Collaborating Centre (the first facility in the world in the field of protozoan diseases).

**June 2009** Certified as the Joint Usage Research Center by MEXT.

**November 2012** Bio-Self Regulating Science Laboratory (Hakuju donated fund laboratory), established.

**March 2013** Research Unit for Global Infection Control, established (Tenure-Track Promotion Program, JST).

**April 2016** Re-certified as the Joint Usage Research Center by MEXT.

**March 2017** Certified as ISO/IEC17025:2005 (Bovine babesiosis, Equine piroplasmosis, and Surra).

# International Contribution/Development of Human Resources

The National Research Center for Protozoan Diseases, in collaboration with the Japan International Cooperation Agency (JICA), has provided training programs on zoonotic protozoan diseases to backbone and senior administrative technical researchers from developing countries, especially Asian and African nations, since 1995. Over 176 graduates working as advanced technical researchers perform zoonoses measures in their respective countries and act as important counterparts for the international joint research project. We also provide graduates the opportunity to join our research center for 6 months to 1 year to re-train their professional skills and develop collaborative research projects with us. We accept four or more re-trainees every fiscal year.

Providing technical assistance for the diagnosis of protozoan diseases in Vietnam

Opening ceremony for a JICA advanced training course

Workshop for JICA trainee

Providing technical assistance for the diagnosis of malaria in the Philippines

# International Joint Research Center

Many protozoan diseases persistently infect livestock, causing anemia and miscarriages and worsening their chronic health condition. However, accurate means of diagnosis, prophylactic vaccines and safe specific medicines are not available for protozoan diseases. The detrimental effects of protozoan diseases on livestock must therefore be resolved on a global scale as quickly as possible. The National Research Center for Protozoan Diseases, as the international joint research center for protozoan diseases of animals in the world, has clarified the distribution and damage caused by these diseases by conducting a large-scale epidemiological survey using diagnostic technology developed in-house. Moreover, we train young specialists throughout the world through these kinds of activities at the international joint research center. The center also continues to develop and make contributions to research on protozoan diseases, as well as maintaining an early recognition system and thereby contributing to the prevention of these diseases in livestock and thus to the development of the international livestock industry.

Cooperation countries: The United States of America, Mongolia, China, Taiwan, South Korea, Philippines, Thailand, Vietnam, Indonesia, Sri Lanka, Egypt, Kenya, Uganda, Benin, Burkina Faso, South Africa and Turkey

Investigation for tsetse fly in Zambia

Epidemiological survey for livestock protozoan diseases in Vietnam

Epidemiological survey for livestock protozoan diseases in Mongolia

Investigation of ticks that transmit protozoa in China

# OIE Reference Laboratory and Collaborating Centre

The World Organization for Animal Health (OIE), an international organization with 181 member countries, aims to ensure the security and safety of livestock and livestock products. They certify the world's cutting-edge research institutes and specialists as collaborating centres or reference laboratories. These institutes then utilize the results of the latest research for the development of new diagnostic methods for infectious diseases in animals and are responsible for the international standardization of vaccines. In recent years, OIE has also emphasized the contribution of collaborating centres to developing countries so that diagnostic technology for infectious diseases and livestock sanitation standards can be improved in these countries. In June 2007, two laboratories in the National Research Center for Protozoan Diseases were designated as OIE Reference laboratories (bovine babesiosis, equine piroplasmosis and surra). In May 2008, the National Research Center for Protozoan Diseases was designated as the first OIE Collaborating Centre in Asia. The National Research Center for Protozoan Diseases is highly expected to contribute for the control of zoonotic protozoan diseases in the world. Moreover, "protozoan DNA testing of bovine babesiosis, equine piroplasmosis and surra by PCR methods in accordance with OIE Manual" provided by OIE Reference laboratories has been certified as ISO/IEC17025:2005 in March 2017.

Non-tsetse transmitted animal trypanosomoses (NTTAT) specialist conference at the OIE headquarters

Joint hosting of the OIE Regional Workshop

Certificate of Accreditation of ISO/IEC 17025:2005


Plate declaring the National Research Center for Protozoan Diseases an OIE Collaborating Centre

# Department of Infection and Immunity

## Research Unit for Vector Biology

Associate Professor
**Shinya Fukumoto**

Certain infectious diseases such as malaria, sleeping sickness, Japanese encephalitis, and filariasis are transmitted by arthropods. The transmission of these infectious diseases requires "vectors". In other words, if the vector stage is cut off, infections of animals and humans can be avoided. Based on this concept, we raise the following questions: How do etiological agents behave within vectors? How do a vector and an etiological agent interact with each other? What are etiological agents to vectors in the first place? We are researching the items above in an effort to achieve the suppression of protozoan diseases by controlling the vector stage. We systematically integrate a wide range of information, from data generated by basic laboratory experiments to field research in endemic areas, as well as thoroughly analyzing unique life phenomena caused by the relationship between such etiological agents and vectors.

Research Unit for Vector Biology

## Research Unit for Host Defense

Professor
**Xuenan Xuan**

The main focus of this lab is to elucidate the host defense mechanisms against protozoan diseases, and to develop medical agents and recombinant vaccines that could efficiently stimulate the host protective immunity.

**Main Reserch Projects**

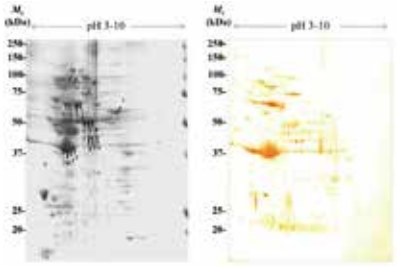
1) Elucidation of the mechanism of hemolytic anemia caused by babesiosis.

2) Analysis of the host protective immunity against babesiosis.

3) Identification of genome-wide metabolic pathways and vaccine candidate molecules of Babesia parasites.

4) Development of molecule-targeting treatments and recombinant vaccines against babesiosis.

5) International epidemiological surveys of tick-borne protozoan diseases.



Proteomic analysis of autoimmunity agaist platelets caused by *Babesia* parasite infection.

Research Unit for Host Defense

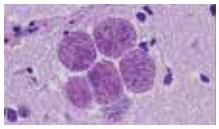
## Research Unit for Host Defense

Associate Professor
**Yoshifumi Nishikawa**

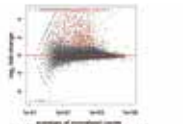
We are researching functional disorders of the central nervous system (CNS) and behavioral changes in host animals, as well as the mechanism of miscarriage or vertical transmission of protozoan infections. In addition, we are attempting to identify and analyze parasite-derived factors that control inflammatory response and immuno-suppression. Based on the results of this research, we are developing a new type of next-generation vaccine that can effectively transport a vaccine antigen to lymphoid tissues by utilizing multifunctional materials and can effectively stimulate immune cells. For practical application of our vaccine, we investigate the effects of the model vaccine based on infection models of mice and natural hosts.

**[Main Research Projects]**

(1) Study on behavioral changes of host animals and CNS disorder following Toxoplasma and Neospora infection.
(2) Study on immune evasion mechanisms of Toxoplasma and Neospora
(3) Pathological study of malaria, toxoplasmosis, neosporosis and cryptosporidiosis
(4) Vaccine development based on multifunctional materials
(5) Screening of anti-parasite drug from natural products
(6) Study on intestinal flora associated with bovine diarrhe



Cyst of Toxoplasma in brain tissue



Comparative transcriptome using the brain tissue of a mouse infected with Toxoplasma

Aborted fetus from cow infected with Neospora

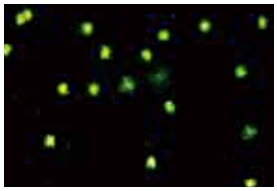
Lab HP: https://sites.google.com/site/nishihdlab/

Research Unit for Host Defense

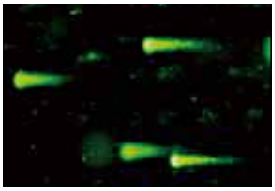
## Research Unit for Functional Genomics

Professor
**Hiroshi Suzuki**

We use developmental biotechnology to analyze the gene function of hosts and protozoa. The development of new techniques for developmental biotechnology and reproductive biotechnology is also one of our missions. In this research field, we are investigating the possibility of preventing and treating protozoan infectious diseases by modifying the hosts' physiological condition. For example, recent research using alpha-tocopherol transfer-protein knockout mice has found that a vitamin E deficiency in the host inhibits the growth of malarial protozoa and *Trypanosoma*. Moreover, we utilize developmental and reproductive biology techniques to improve the breeding of assistance dogs, including guide dogs, for the purpose of contributing to society.



(A)



(B)

The nuclei of malarial protozoa infecting the red blood cells of a wild-type mouse (A).
Disturbances in the DNA of protozoa infecting the red blood cells of an α-TTP deficient mouse (B).

Research Unit for Functional Genomics

## Research Unit for Functional Genomics

Assistant Professor
**Rika Shirafuji**

Ticks are obligatory hematophagous arthropods and are known to be important vectors for various pathogens in vertebrates, such as Babesia and Theileria parasites. Our laboratory focuses on the molecular mechanisms underlying nutrient metabolism in unfed or fed ticks and tick oogenesis. Our aim is to contribute to the development of new methods for controlling ticks and tick-borne pathogens.

○ **Nutrient metabolism in unfed ticks**

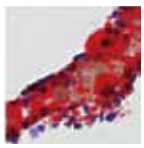
Most hard tick species have a life span of several months or years. Their life is essentially composed of relatively short parasitic periods and long non-feeding periods, without intake of blood. This remarkable viability is important for understanding the biology and epidemiology of ticks and tick-borne pathogens.

○ **Nutrient metabolism in fed ticks**

Energy and nutrient reserves provided by digestion of a blood meal in female ticks allow the synthesis of vitellogenin (Vg), the yolk protein precursor. Synthesis and uptake of Vg are essential processes in the oogenesis of ticks.

○ **Vector biology**

Using ticks infected with parasites, we are studying the relationship between transmission of parasites and nutrient metabolism of ticks.



Research Unit for Functional Genomics

# Department of Global Cooperation

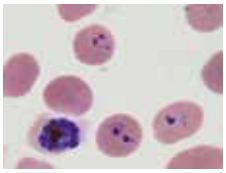
## Research Unit for Global Infection Control

Associate Professor
**Kentaro Kato**

We have been using molecular biology and virology techniques to study Malaria, which is one of the world's three major infectious diseases, and toxoplasmosis and cryptosporidiosis, which are global zoonoses. We have also been developing new antiprotozoal drugs and vaccines for practical use.

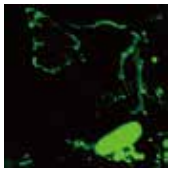
**Main Research Topics**

○Elucidation of the molecular mechanisms of the invasion, growth, latent infection and severe infection of parasites in host cells.
○Detection of protozoan receptors and practical studies on carbohydrate drugs as antiprotozoal drugs.
○Analyses of destruction mechanism of protozoas by host immuno cells and development of antiprotozoal drugs with peptides and nanoparticles.
○Molecular epidemiological analyses and development of molecular diagnosis system using parasites and their symbiotic viruses.
○Elucidation of protozoan epigenetic mechanism.



*Plasmodium falciparum*

*Cryptosporidium oocyst*



Gliding motility of *Toxoplasma*

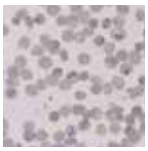
Research Unit for Global Infection Control

## Department of Disease Control

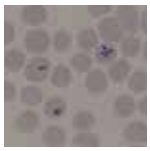
### Research Unit for Molecular Diagnostics

OIE Expert of Reference Laboratories / Professor
**Ikuo Igarashi**

Piroplasmosis is a tick-borne protozoan disease caused by *Babesia* and Theileria. This disease leads to great economic loss in animal industries worldwide. Our aims are to develop accurate and rapid diagnostic methods for Babesia and *Theileria* infections and by applying them, provide effective treatment and prevention of parasitic infections. In addition, we aim to conduct epidemiological surveys and prevent the introduction of exotic piroplasmosis (babesiosis and theileriosis) into Japan from endemic countries. We established a high-throughput screening system using in vitro cultivation of Babesia and *Theileria*, and found some potential drug candidates. We are also determining the molecular mechanisms of invasion and multiplication of *Babesia* parasites in red blood cells and the development of highly specific and sensitive serological and molecular diagnostic assays. Furthermore, our research unit was designated as the world's first Reference Laboratory of the World Organization for Animal Health (OIE) for equine piroplasmosis and bovine babesiosis. We are currently performing international epidemiological surveys to determine the endemic status of piroplasmosis using diagnostic methods developed in our laboratory. We contribute to building the capacity of young researchers from abroad, especially from developing countries, as graduate students and trainees.

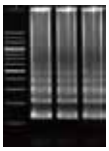


*Babesia caballi*



*Theileria equi*

Immunochromatographic method



LAMP method



### Research Unit for Molecular Diagnostics

Professor
**Naoaki Yokoyama**

Bovine piroplasmosis (bovine theileriosis and babesiosis) caused by species of genera *Babesia* and *Theileria*, is characterized by fever and anemia. The disease usually results in severe economic losses in cattle industry worldwide. However, preventive and control measures against bovine piroplasmosis have often been ineffective. With an ultimate aim of minimizing the incidence of bovine piroplasmosis, we conduct research to 1) determine the current status of bovine piroplasmosis in Japan and other endemic countries; 2) identify tick vectors transmitting bovine *Theileria*, and thereby establish systematic tick-control measures; 3) determine immunological responses against *Theileria* infection in cattle and develop vaccine; 4) clarify the mechanisms by which Babesia invades erythrocytes with the objective of vaccine development; 5) establish effective techniques and tools to analyze the genetic polymorphism in vaccine candidate antigens; and 6) develop made-to-order type subunit vaccines effective in different endemic regions. To expedite our aim of eliminating bovine piroplasmosis, we maintain a strong international collaborative network and accept postgraduate students and young postdoctoral researchers for the development of human resources in countries where bovine piroplasmosis is endemic.

*Theileria* parasites

*Babesia* parasites

Tick in Mongolia

Development of a liposome-based vaccine and conducting field trials

Epidemiological surveys (buffaloes in Thailand, cattle in Mongolia and Vietnam)



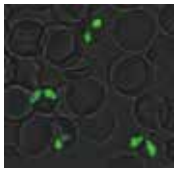
### Research Unit for Advanced Preventive Medicine

Professor
**Shin-ichiro Kawazu**

**Malaria**
We focus on oxidative stress responses, redox (oxidation/reduction) signals, and calcium signals in malaria protozoan cells. Living organisms adjust various physiological functions by altering the oxidation-reduction balance and calcium oscillation. We focus on "watching cells" and "imaging experiments" to understand the said systems and the roles of molecules that function in the systems, using malaria protozoa as a model organism.

***Babesia***
We are developing technology to manipulate genes using ***Babesia***. So far, we have developed a foreign gene expression system (green fluorescent protein-expressing protozoa) and a gene knockout system, and we are currently trying to use live imaging to clarify the mechanism of the said protozoa's growth and infiltration n the red cells and the vector tick.

**Japanese bilharziasis**
**Japanese bilharziasis** is a zoonotic disease that prevails in rural areas of Asian countries, and is closely related to rural health and sanitation and livestock sanitation. We conduct serum-epidemiological surveys using the newly developed ELISA protocol in regions of the Philippines where Japanese bilharziasis prevails, and conduct comprehensive epidemiological surveys including the survey on population genetics of the parasite and the search for reservoir hosts in endemic areas.





### Research Unit for Infection and Pathology

Professor
**Makoto Igarashi**

Toxoplasmosis is a zoonotic disease latently infecting 20% to 30% of the world's population. *Toxoplasma* causes serious problems in immune-suppressed people such as HIV patients and the elderly as well as in congenitally infected infants. This laboratory is working on unraveling the mechanism of *Toxoplasma's* parasitism in hosts.

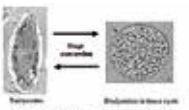
**Main Research Project**

○Understanding *Toxoplasma's* parasitism in host cells:

We aim to identify target molecules for new medicines by isolating molecules involved in *Toxoplasma's* parasitism in host cells.

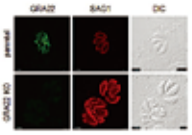
○Understanding the transition process from acute to chronic *Toxoplasma* infection:

During the transition from an acute to a chronic infection *Toxoplasma* changes its life cycle from a propagation type to a cyst-forming type. By uncovering the mechanism of this change we aim to utilize it for vaccine development strategies.

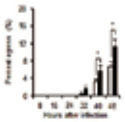


Stage conversion of *Toxoplasma*

Identification of the bradyzoite-specific DPA molecule and its expression in a cerebral cyst




Creation of a GRA22 gene knockout strain



Is GRA22 involved in egress from host cells?



## Concurrent

### Research Center for Global Agromedicine

Project Assistant Professor
**Keisuke Suganuma**

Trypanosomoses are endemic in many countries and affect both humans and animals. However, no effective control measures are available for this disease. We therefore aim to develop and establish effective control strategies for trypanosomoses.

**Studies on developmental-stage conversion mechanisms. (Fig. 1)**
Developmental-stage conversion (or cell differentiation) is essential for trypanosomes to parasitize mammalian hosts and vectors. Therefore, we aim to reveal the stage conversion mechanisms using gene manipulation technology, with the aim of developing new control strategies for trypanosomoses.

**Global surveillance and establishment of new laboratory strains of trypanosomes. (Fig. 2)**
We aim to establish effective control strategies for trypanosomoses in endemic countries based on field surveillance data. In addition, we intend to isolate and establish field strains of trypanosomes for further study.

**Development of novel trypanocidal drugs.**
We aim to find novel trypanocidal compounds by using in vitro drug screening systems and mouse models.

Fig. 1: GFP expressed transgenic *Trypanosoma congolense* (Suganuma et al., 2012 & 2013)

Fig. 2: *Trypanosoma equiperdum* isolated from Mongolia (IVM-t1 strain) (Suganuma et al., 2016) *(Trypanosoma equiperdum)*

# Base of Activities

As an international joint research center for the control of protozoan diseases, the National Research Center for Protozoan Diseases develops technology for the diagnosis, prevention and treatment of livestock protozoan diseases in domestic and foreign countries. We utilize an experimental system that simulates the life cycle of each protozoon in nature (experimental system of authentic infection). In addition we use OIE Collaborating Centre-related research to promote developmental research into technology relating to protozoan disease prevention that will become the international standard. Using the framework of the JST/JICA SATREPS Program "Epidemiological studies on animal protozoan diseases in Mongolia and development of effective diagnostics measures", which was adopted in May 2013, this center established a research hub for foreign fields in the Institute of Veterinary Medicine in Mongolia. This is used to implement the experimental system of authentic infection for livestock protozoan diseases, and to perform research on site in areas where protozoan diseases prevail.

Joint research laboratory established in the Institute of Veterinary Medicine in Mongolia

Conclusion of the agreement for joint research with the School of Veterinary Medicine, Rajamangala University of Technology, Thailand

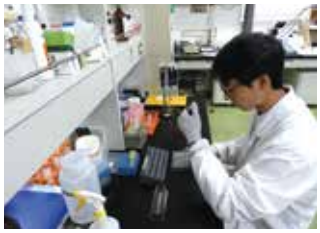
Joint laboratory established in Shanghai Veterinary Research Institute, China

MOU Conclusion with University of the Philippines

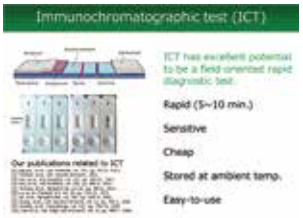
# Social Contribution Activity

We offer diagnostic services for infectious diseases, especially protozoan diseases, in domestic animals in cooperation with the Veterinary Medical Center at Obihiro University of Agriculture and Veterinary Medicine to help the community with our research achievements. We also provide extremely advanced and specialized diagnostic services for protozoan diseases that have been developed by the National Research Center for Protozoan Diseases. Moreover, as a core research institute for protozoan diseases, we would like to contribute to the development of protozoan disease research not only in Japan but worldwide. We therefore provide bioresources such as protozoan parasites, ticks, cDNA libraries, and monoclonal antibodies. Information about the bioresources offered is openly available on our home page. Furthermore, by establishing and providing systems of bioassay for pathogenic protozoan parasites, we contribute actively to development of anti-protozoal agents.

Introduction of our research to the general public



Special diagnostic service for infectious diseases




Immunochromatography for the diagnosis of protozoan diseases

Bioresources (protozoan parasites)

# Situation for Acquirement of External Funds (number)

| Source of Budget | Budget Item | FY 2015 | FY2016 | FY2017 |
|---|---|---|---|---|
| Japan Society for the Promotion of Science, Ministry of Education, Culture, Sports, Science, and Technology | Special Coordination Fund for Developing Human Resources in Science and Technology | 1 | 1 | – |
| | Grant-in-Aid for Scientific Research on Innovative Areas | 2 | 2 | 0 |
| | Grant-in-Aid for Scientific Research (A) | 1 | 2 | 2 |
| | Grant-in-Aid for Scientific Research (B) | 8 | 7 | 6 |
| | Grant-in-Aid for Scientific Research (C) | 1 | 1 | 1 |
| | Grant-in-Aid for Exploratory Research | 2 | 3 | 1 |
| | Challenging Research (Exploratory) | – | – | 1 |
| | Grant-in-Aid for Young Scientists (B) | 3 | 2 | 2 |
| | Grant-in-Aid for JSPS Fellows | 8 | 4 | 3 |
| | AA Science Platform Program | 0 | 0 | 1 |
| | Joint Research Projects/Seminars | 3 | 2 | 3 |

| Source of Budget | Budget Item | FY 2015 | FY2016 | FY2017 |
|---|---|---|---|---|
| Ministry of Health, Labour and Welfare | Health and Labour Sciences Research Grants | 0 | 1 | 1 |
| Ministry of Agriculture, Forestry and Fisheries | Science and technology research promotion for agriculture, forestry, fisheries and food industry etc. | 3 | 2 | 1 |
| Japan Science and Technology Agency | PREST etc. | 0 | 1 | 0 |
| Japan International Cooperation Agency (JICA) | Master's Degree and Internship Program of African Business Education Initiative for Youth | – | 1 | 1 |
| Japan Agency for Medical Research and Development | SATREPS | 1 | 1 | 1 |
| | International Collaborative Research Program (NTDs) | 1 | 1 | 1 |
| | International Collaborative Research Program | – | 1 | 2 |
| Private Research grant etc. (500,000 yen or more) | Joint research | 5 | 4 | 4 |
| | Grants | 4 | 0 | 3 |
| | GHIT Fund | 1 | 1 | 0 |
| | Total | 44 | 37 | 34 |

# A relief sculpture on the façade of the National Research Center for Protozoan Diseases

**Theme** "National Research Center for Protozoan Diseases: Playing an Active Role Around the World"

**Designed and produced by** Masami Aihara (sculptor)

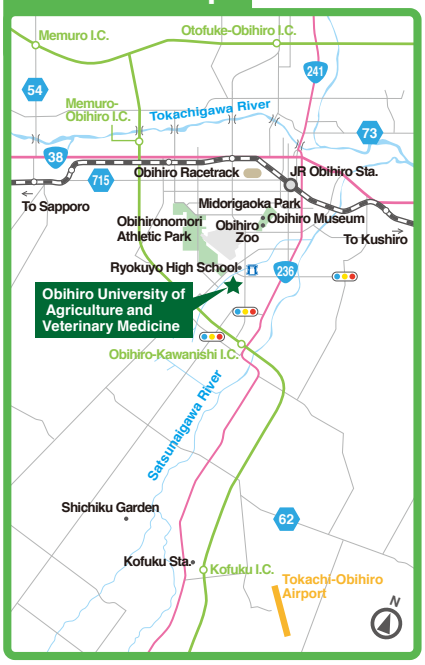
**Title** What's inside

There are things seen and unseen in living creatures and in our natural surroundings, all linked harmoniously.

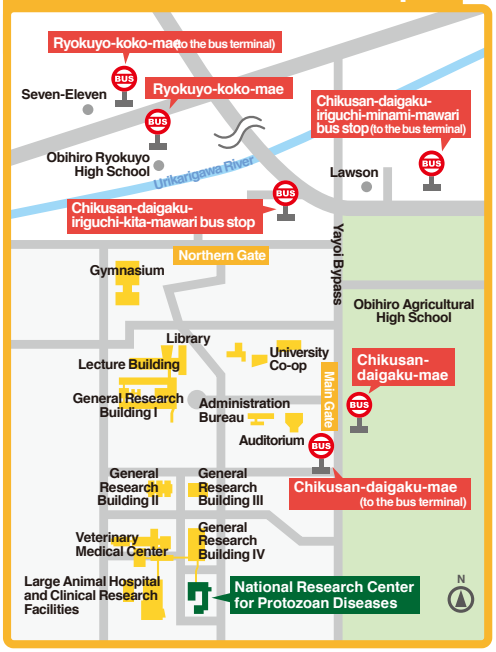
**Motif** The shape is taken from the idea of vegetation and animals (including arthropods), with the dark parts expressing immune cells (macrophages) within bodies. The uneven surface signifies protozoa (Toxoplasma, Babesia, Trypanosoma) and organelles.

# Access to us

## Access Map




## Information for bus stops





### From Obihiro Station to the university

- **Tokachi Bus**

① **Ozora-danchi Route (#70)**

Boarding at **platform #9 in the Bus Terminal near Obihiro Station**

▼

A 15-min. walk from **Ryokuyo-koko-mae bus stop** to the main gate of the university

•Time required: About 30 min. •Fare: 410yen •Departures: 2 per hour

② **Northern route (Route #28)**

Boarding at **platform #11 in the Bus Terminal near Obihiro Station**

▼

A 10-min. walk from **Chikusan-daigaku-iriguchi bus stop** to the main gate of the university

•Time required: About 30 min. •Fare: 410 yen •Departures: 4 per day

③ **Chikudai Route (#79)**

Boarding at **platform #9 in the Bus Terminal near Obihiro Station**

▼

A 10-min. walk from **Chikusan-daigaku-mae bus stop** to the main gate of the university

•Time required: About 30 minutes •Fare: 410 yen •Departures: 2 per day

- **Taxi**

•Time required: About 20 minutes •Fare: about 2,000 yen (about 7 km)

### From Tokachi-Obihiro Airport to the university

- **Tokachi Bus**

To Obihiro Station from Tokachi-Obihiro Airport

•Time required: About 40 minutes •Fare: About 1,000 yen

From Obihiro Station see schedule shown above.

- **Taxi**

•Time required: About 25 minutes •Taxi fare: about 5,500 yen (about 21km)


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

Inada-cho Nishi 2-sen 13-banchi, Obihiro,
Hokkaido 080-8555, Japan
TEL: 0155-49-5642 FAX: 0155-49-5643
http://www.obihiro.ac.jp/protozoa/



Issued on August 1st, 2017