

**Fiscal 2023 “Joint Usage / Research Center”
Application Guidelines for Joint Research Program**

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

Application details

As the only research base for protozoan diseases and their vectors in a university of veterinary medicine, National Research Center for Protozoan Diseases, Obihiro University of Agriculture and Veterinary Medicine is promoting comprehensive research on the diagnosis, treatment and prevention of protozoan diseases in cooperation with domestic and foreign universities, research institutes and international organizations. It has been designated by the Ministry of Education, Culture, Sports, Science and Technology as an international joint research center for the control of protozoan diseases. To accept a wide range of domestic and foreign researchers who conduct research on protozoan diseases and further promote activities as a joint usage/research center, the Center invites applications for joint research in FY 2023 as follows.

Applications are invited for joint research in which applicants (principal investigator) set a research subject in accordance with the following research divisions and topics below. Principal investigator and co-researchers will implement research in cooperation with appropriate faculty members of the Center.

Research Content and Research Divisions

I. Department of Drug Discovery and Development

	Research content	Faculty members of the Center
Research Unit for Innovative Medicine	In order to develop control strategy against refractory protozoan diseases, we are researching parasite-host interaction and mechanism of pathogenesis on infections with <i>Toxoplasma</i> , <i>Neospora</i> , malaria parasite and <i>Cryptosporidium</i> regarding immune response, central nervous system, pregnancy and diarrhea.	Yoshifumi NISHIKAWA TEL: +81-155-49-5886 nisikawa@obihiro.ac.jp
	In our research unit, basic research for gene and genomic function in protozoan diseases by means of developmental biotechnology (transgenic technology) is ongoing. In addition, development of assisted reproductive techniques for animals and humans is targeted in our laboratory.	Hiroshi SUZUKI TEL: +81-155-49-5640 hisuzuki@obihiro.ac.jp

II. Department of Disease Control

	Research content	Faculty members of the Center
Research Unit for Molecular Diagnosis	<p>Bovine and equine piroplasmosis (theileriosis and babesiosis) caused by species of genera <i>Babesia</i> and <i>Theileria</i>, is characterized by fever and anemia. The disease usually results in severe economic losses in the industry worldwide. However, preventive and control measures against the piroplasmosis have often been ineffective. With an ultimate aim of minimizing the incidence of piroplasmosis, we conduct research to 1) determine the current status of piroplasmosis in Japan and other endemic countries; 2) identify tick vectors transmitting bovine <i>Theileria</i>, and thereby establish systematic tick-control measures; 3) determine immunological responses against <i>Theileria</i> infection in cattle and develop vaccine; 4) clarify the mechanisms by which <i>Babesia</i> invades erythrocytes with the objective of vaccine and drug developments; 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.</p>	<p>Naoaki YOKOYAMA TEL: +81-155-49-5649 yokoyama@obihiro.ac.jp</p>
	<p>Ticks are obligate blood-sucking arthropods and are known to be important vectors for various pathogens, such as <i>Babesia</i> and <i>Theileria</i> parasites. Understanding tick biology and physiology is essential to develop novel control methods against ticks. Our research themes are 1) molecular mechanisms of nutrient metabolism in unfed or fed ticks, 2) tick oogenesis, 3) molecular mechanisms of tick-parasite interactions, 4) symbionts of ticks, and 5) validation of the efficacy of vaccine or drug candidates against ticks.</p>	<p>Rika UMEMIYA-SHIRAFUJI TEL: +81-155-49-5800 umemiya@obihiro.ac.jp</p>

<p>Research Unit for Advanced Preventive Medicine</p>	<p>Malaria</p> <p>We focus on oxidative stress responses, redox (oxidation/reduction) signals, and calcium signals in malaria parasites. We focus on “watching cells” and “imaging experiments” to understand the said systems and the roles of molecules that function in the systems.</p> <p><i>Babesia</i></p> <p>We have developed a foreign gene (e.g. green fluorescent protein) expression system and a gene knockout system in <i>Babesia</i> parasites. We are currently trying to use those systems in live imaging to clarify the mechanism of the said protozoa’s infiltration and growth in the vector tick.</p> <p><i>Other protozoan parasites and their arthropod vectors</i></p> <p>We have applied population genetics for molecular phylogenetic and molecular epidemiological analyses of protozoan parasites and their arthropod vectors.</p>	<p>Shin-ichiro KAWAZU TEL: +81-155-49-5846 skawazu@obihiro.ac.jp</p>
	<p>Our current control measures to combat trypanosomoses are limited, i.e., early diagnosis followed by isolation of patients and affected animals, treatment with drugs which often cause severe adverse effects, and vector control. To improve such current situation, we are conducting development of simpler, affordable, and more accurate diagnostic methods, safe therapeutic agents, and vaccines, as well as to analyze the prevalence and risk factors of the disease.</p> <p>Another research project focuses on the survival strategies of trypanosomes as parasitic organisms. Trypanosomes can survive within their mammalian hosts and vectors (often insects), which have completely different internal environments. However, mechanisms of their life-cycle development and environmental adaptation are largely unknown. Our research is particularly focused on the identification and functional analysis of developmental stage-specific surface molecules.</p>	<p>Noboru INOUE TEL: +81-155-49-5652 ircpm@obihiro.ac.jp</p>

	<p>Animal trypanosomosis is endemic in many developing countries. However, no effective control measures are available for this disease. We therefore aim to develop and establish effective control strategies for trypanosomosis.</p> <p>1) Epidemiological surveillance of animal trypanosomosis and establishment of new laboratory strains of animal trypanosomes.</p> <p>2) Development of new trypanocidal drugs using <i>in vitro</i> drug screening assay and <i>in vivo</i> trypanosome infection model.</p> <p>3) Investigation of parasitic strategy, especially tissue parasitism of <i>T. equiperdum</i>.</p>	<p>Keisuke SUGANUMA (Concurrent) TEL: +81-155-49-5697 k.suganuma@obihiro.ac.jp</p>
<p>Research Unit for Infection and Pathology</p>	<p>Toxoplasma infection is found in about 30% of the world's population, causing severe symptoms due to infection to the fetus or immuno-deficient people. Also infections on livestock cause a great economic loss. We are aiming to control toxoplasmosis through fundamental research such as analysis of proliferation mechanism of this protozoan parasite in host cell.</p>	<p>Makoto IGARASHI TEL: +81-155-49-5802 makoto@obihiro.ac.jp</p>
	<p>We focus on disease vectors and are aiming to eradicate vector-borne diseases by vector control measures. We are conducting research on the development of novel technologies for protozoal genetic recombination techniques, mainly on the rodent malaria parasite model, studies on host-parasite interactions using the <i>Anopheles-plasmodium</i> and <i>Aedes-dirofilaria</i> models, and epidemiological survey of wildlife diseases.</p>	<p>Shinya FUKUMOTO TEL: +81-155-49-5887 fukumoto@obihiro.ac.jp</p>

III. Department of Global Cooperation

	Research content	Faculty members of the Center
Research Unit for Global Infection Control	<p>This laboratory conducts following projects on babesiosis: 1) analyzing the host defense immunity; 2) elucidating the mechanism of hemolytic anemia; 3) searching genome-wide vaccine candidate and drug target molecules; 4) analyzing the developmental stages of the parasites in ticks; 5) developing novel preventive and therapeutic measures.</p>	<p>Xuenan XUAN</p> <p>TEL: +81-155-49-5648 gen@obihiro.ac.jp</p>
	<p>We focus on the protozoan parasitic diseases which have serious impacts on livestock health and public health in the world. In order to develop effective intervention strategies against the diseases, we aim to understand the basic biology of the parasites.</p> <p>Babesiosis: Development of novel genetic manipulation techniques for the parasites and study on molecular mechanisms of erythrocyte invasion and modification by the parasites.</p> <p>Malaria: Epidemiological surveillance of ungulate malaria parasites and study on the pathogenicity and co-infection status of other parasites.</p>	<p>Masahito ASADA</p> <p>TEL: +81-155-49-5647 masada@obihiro.ac.jp</p>
Research Unit for International Surveillance	<p>In May 2008, National Research Center for Protozoan Diseases was approved as the World Organization for Animal Health (OIE) collaborating center for Surveillance and Control of Animal Protozoan Diseases, We are doing the following activities.</p> <p>1) research on the development and prevention method of novel diagnostic methods for protozoan diseases, 2) epidemiological survey on domestic and overseas protozoan diseases and arthropods, 3) other international collaborative research on diagnosis, prevention and control of protozoan diseases , technical advice, international evaluation.</p>	<p>Naoaki YOKOYAMA (Concurrent)</p> <p>TEL: +81-155-49-5649 yokoyama@obihiro.ac.jp</p> <p>Shinya FUKUMOTO (Concurrent)</p> <p>TEL: +81-155-49-5887 fukumoto@obihiro.ac.jp</p> <p>Keisuke SUGANUMA (Concurrent)</p> <p>TEL: +81-155-49-5697 k.suganuma@obihiro.ac.jp</p>

<p>Research Unit for International Cooperation</p>	<p>National Research Center for Protozoan Diseases has trained overseas experts from developing countries through JICA and our own training programmes. In cooperation with overseas institutions and experts, we focus on major protozoan diseases that are causing economic loss to the country and develop diagnostic, preventive and therapeutic methods for control of the diseases.</p>	<p>Noboru INOUE (Concurrent) TEL: +81-155-49-5652 ircpm@obihiro.ac.jp</p> <p>Makoto IGARASHI (Concurrent) TEL: +81-155-49-5802 makoto@obihiro.ac.jp</p>
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B. Priority joint research

Research content	Faculty members of the Center
<p>Protozoan diseases are causing enormous economic losses in the global livestock industry, but the biological complexity of the protozoan parasites and social conditions such as market size make it difficult to control them. In order to promote drug discovery research on protozoan diseases in livestock, we will establish a center for drug discovery research on protozoan diseases in livestock, conduct screening analysis of candidate compounds, search for drug targets, and evaluate them using vectors and animals, and build a research base for future social implementation projects.</p> <p>Specifically, screening analysis of candidate compounds against protozoan strains and vectors and identification of drug targets and mechanism of drug action will be conducted as Phase 1. Candidate compounds (hit compounds) screened from Phase 1 will be subjected to experimental infection models using mice (Phase 2) and natural hosts (Phase 3) to evaluate the efficacy of the compounds against protozoan parasites and vectors.</p>	<p>Yoshifumi NISHIKAWA</p> <p>TEL: +81-155-49-5886 nisikawa@obihiro.ac.jp</p>

C. OIE-related joint research

Research content	Faculty members of the Center
<p>The NRCPD has three OIE- reference laboratories for equine piroplasmiasis, bovine babesiosis, and surra. These laboratories offer various services to the international community, such as providing diagnostic services and reagents, training, education, and consulting services. In this joint research, we will support international research projects aimed at controlling protozoan diseases based on the principles of OIE.</p>	<p>Naoaki YOKOYAMA</p> <p>TEL: +81-155-49-5649 yokoyama@obihiro.ac.jp</p>

Application eligibility

Faculty members of domestic and foreign universities, researchers who belong to other research institutes and those engaging in research on protozoan diseases and in related fields who are deemed to have equivalent research capability. In particular, challenging research by young researchers and participation of diverse researchers are desirable, and therefore, the applicants who are young researchers, female researchers and foreign researchers will be encouraged to apply. Graduate school students may participate in research as co-researchers, but the principal investigator must be a faculty member who is the supervisor of such students. Please inquire separately concerning the participation of undergraduate students.

Research period

One to three years from the date of adoption (April 1, 2023, or later).

Note: Even if the research period is more than one year, the screening result and the amount of financial support will be determined for each year. An additional application form for the ongoing project must be submitted in every subsequent year.

“Ongoing project” means a multi-year research project in its second or subsequent years.

How to apply

Consult with relevant faculty members of the Center on the research topic, research plan, necessary expenses, scheduled period of visiting the Center and other details in advance and, after gaining the approval of the head of your affiliated organization (may be the head of your department), submit a copy of the joint research application form. It is also necessary to gain approval of co-researchers in advance.

Deadline

Friday, January 6, 2023

Screening Result

After discussions by the Center’s steering committee, the Director of the Center will determine the screening result and notify it to the applicant. The adopted amount of funding determined as a result of screening may be less than the amount applied for.

Expenses to be covered

Travel, supplies and other expenses necessary for research will be borne by the Center. The budget must be planned within the limit of 500,000 yen/year for a project, with a clear statement of the relationship between the use of expenses and research content. If a plan is to be financed only partially by this research project, the percentage of the funding to be provided by this research project must be stated on the application form.

Travel expenses will be calculated in accordance with Hokkaido National Higher Education and Research System’s Rules on Traveling Expenses, and in principle, will be paid in arrears. Travel expenses for the principal investigator and co-researchers from their place of work (or residence) to the Center will be covered. However, this does not apply if the place of a presentation on joint research results is not the Center.

Research achievement report

The principal investigator of joint research must submit the joint research report within 60 days after the end of research to the address for the submission of the application form. A debriefing session may be held for the presentation and sharing of research results and principal investigator may be asked to make presentations. Details will be notified separately.

Presentation of research results

When presenting research results, it must be clearly stated that research was conducted under this research project.

【English】

Cooperative Research Grant (2023-joint-#) of National Research Center for Protozoan Diseases. Obihiro University of Agriculture and Veterinary Medicine

Note: State the project number on the adoption notice in place of #)

Handling of intellectual property

Intellectual property rights as a result of the joint research program will be handled in accordance with Hokkaido National Higher Education and Research System's Rules on the Handling of Employee Inventions.

Address for Submission

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(National Research Center for Protozoan Diseases)