



# **【Online】 Knowledge Co-Creation Program (Group & Region Focus)**

## **GENERAL INFORMATION ON**

**Nurturing researchers of countermeasure for zoonosis  
including a parasitic disease  
課題別研修「人獣共通感染症対策(寄生虫病含む)研究者育成」  
JFY 2021**

**NO. 202003089J001**

**Preparation Part: From 08<sup>th</sup> November to 07<sup>th</sup> December, 2021**

**Main Part: From 17<sup>th</sup> January 2022 to 16<sup>th</sup> February 2022**

This information pertains to one of the JICA Knowledge Co-Creation Program (Group & Region Focus) of the Japan International Cooperation Agency (JICA), which shall be implemented as part of the Official Development Assistance of the Government of Japan based on bilateral agreement between both Governments.

'JICA Knowledge Co-Creation Program (KCCP)' as a New Start

In the Development Cooperation Charter which was released from the Japanese Cabinet on February 2015, it is clearly pointed out that *"In its development cooperation, Japan has maintained the spirit of jointly creating things that suit partner countries while respecting ownership, intentions and intrinsic characteristics of the country concerned based on a field-oriented approach through dialogue and collaboration. It has also maintained the approach of building reciprocal relationships with developing countries in which both sides learn from each other and grow and develop together."* We believe that this 'Knowledge Co-Creation Program' will serve as a center of mutual learning process.

\* In the context of the COVID-19 pandemic, please note that there is still a possibility the course period will be changed, shortened, or the course itself will be cancelled

# **I. Concept**

## **Background**

By the middle of the 21st century, the world's population is expected to reach nine billion, which is one and a half times the current level. In order to secure stable animal protein supplies in the future, newly emerging and developing countries in particular must find immediate breakthroughs to escape the current situation in which food production is often hindered by infectious diseases among domestic animals. Most of these diseases are zoonoses (such as cryptosporidiosis, toxoplasmosis, avian influenza, salmonellosis, brucellosis etc.) which not only cause economic losses in animal production, but also directly threaten human health. In addition, some animal-originated infectious diseases such as current COVID-19 pandemic situation are threatening the stable functioning of society over the world. In developing countries, training of experts who can implement infectious disease control through cooperation with the international community is an immediate priority.

The World Organization for Animal Health (OIE – an intergovernmental organization with 182 member countries aiming to ensure the safety and security of domestic animals and livestock products) recognizes leading-edge infectious disease research organizations as collaborating centers. The OIE uses research results provided by these organizations to develop new diagnostic approaches to infectious diseases and establish international standards for vaccination. In recent years, the OIE has also emphasized the contributions of collaborating centers in order to improve diagnostic approaches to infectious diseases and enhance levels of public health in developing countries. In this regard, National Research Center for Protozoan Diseases (NRCPD), Obihiro University of Agriculture and Veterinary Medicine became Asia's first OIE collaborating center in May 2008, and is expected to make a significant contribution to the field.

## **For what?**

This program is designed for experts who deal with control of globally important infectious diseases to acquire advanced technology and forefront knowledge, including global animal health, public health, zoonoses and epidemiology.

## **For whom?**

This program is offered to lecturers of universities/colleges, researchers of national/public institutes, and/or technicians of administrative agencies.

## **How?**

In consideration of spread and prolongation of the impact of COVID-19 outbreak, this program will be implemented online.

This program provides the participants with intensive research training in the different

Research Units of the National Research Center for Protozoan Diseases (NRCPD), and Department of Veterinary Medicine in Obihiro University of Agriculture and Veterinary Medicine. Participants are expected to be a member of the unit, and acquire advanced knowledge and skills about diagnostic, therapeutic, preventive measures and host immune responses on the theme which participant selected, through cooperative research with instructors.

## ***II. Description***

### **1. Title (J-No.)**

Nurturing researchers of countermeasure for zoonosis including a parasitic disease (202003089-J001 )

### **2. Course Period**

Preparation Part: From 8<sup>th</sup> November to 7<sup>th</sup> December, 2021

Main Part: From 17<sup>th</sup> January 2022 to 16<sup>th</sup> February 2022

### **3. Target Regions or Countries**

SRI LANKA , FIJI , ARGENTINA , PARAGUAY , PALESTINIAN AUTHORITY ,  
BOTSWANA, KENYA, NIGERIA, UGANDA, SOUTH SUDAN

### **4. Eligible / Target Organization**

This program is designed for Veterinary Research Institute, Animal Disease Diagnostic Organization, Public Hygiene Organization and Veterinary University

### **5. Course Capacity (Upper limit of Participants)**

12 participants

### **6. Language to be used in this program**

English

### **7. Course Objective**

Participants' countermeasure skills on zoonosis including parasitic diseases will be improved.

### **8. Overall Goal**

To improve quality of the disease preventive, diagnostic and therapeutic skills of experts who deal with control of globally important infectious diseases in developing countries / regions.

## 9. Expected Module Output and Contents:

This program consists of the following components. Details on each component are given below:

<b>(1) Preliminary Phase</b> <i>Participating organizations make required preparation for the Program.</i>	
Expected Module Output	Activities
Inception Report is formulated	To outline your country / region / organization as well as identify / analyze current condition / problems in terms of animal health in the participant's country / regions, and develop Inception Report. Please refer to section VI. ANNEX, Attachment-1.
<b>(2) Preparation Part</b> <i>Participants acquire advanced knowledge of zoonosis including parasitic diseases.</i>	
① Research planning (individual training under supervisor(s))	<p>-The major issue(s) of infectious diseases faced in participant's country / region to be searched and analyzed.</p> <p>-The research plan focused on the survey and control measures of the infectious diseases to be prepared.</p> <p>-The research proposal to be submitted.</p> <p>Participants will develop a research plan by using e-mail and other means with the faculty of each unit.</p> <p>The deadline for the research proposal is 7<sup>th</sup> January, 2022</p>
<b>(3) Main Part</b> <i>Participants acquire advanced knowledge of zoonosis including parasitic diseases.</i>	
② Lectures (individual training)  On-demand	<p>-Special lectures focused on diagnostic, therapeutic, and preventive measures of major infectious diseases will be given by experts.</p> <p>-A report summarizing the outline of the lecture(s) to be prepared or Mini-Test.</p> <p>Course Schedule Participants are required to watch the lectures from 17<sup>th</sup> January, 2022 to 2<sup>nd</sup> February, 2022 (Japan time), and submit report and answer mini-tests for each lecture.</p>
③ Practices (group training)  Live	<p>-Molecular techniques including PCR, gene cloning, and sequencing will be practiced.</p> <p>-A report summarizing the outline of the practice to be prepared and submitted.</p> <p>Scheduled training dates and times The training program is scheduled from 4<sup>th</sup> to 9<sup>th</sup> February, 2022 for 4 days. The time is scheduled to be approximately two hours, from 17:00 to 19:30 Japan time.</p>

Expected Module Output	Subjects/Agendas	Methodology
<p>To understand the outline of countermeasure of major zoonosis, especially of pathogenesis, pathophysiology, prevention, diagnosis and treatment, epidemiology and so on</p>	<p>Lectures on major infectious diseases</p> <ul style="list-style-type: none"> <li>- Recent outbreaks of protozoan diseases (e.g., malaria, trypanosomiasis and babesiosis) and their arthropod vectors, bacterial diseases (salmonellosis, colibacillosis), viral diseases (avian influenza, COVID-19), mycological diseases (aspergillosis), etc., and basic information/technologies relating to diagnosis, prevention, etc.</li> <li>- Case studies on the prevalence of infectious diseases, including basic information/technologies regarding pathologies, clinical conditions and the latest standard therapeutic techniques for these conditions</li> <li>- Case studies based on the lectures above</li> </ul>	<ul style="list-style-type: none"> <li>- Class-room lectures on globally important infectious diseases.</li> <li>- Case studies on globally important infectious diseases.</li> </ul>
<p>To acquire the international diagnostic standard methods for major zoonosis</p>	<p>Lectures on international standard diagnostic techniques</p> <ul style="list-style-type: none"> <li>- Genetic diagnosis technologies, such as PCR and LAMP, for infectious diseases</li> <li>- Serological/molecular diagnosis of harmful microbes in food</li> <li>- Morphological and molecular taxonomical technologies for arthropods as protozoan disease vectors</li> <li>- Laboratory practice on international-standard diagnostic techniques</li> <li>- Laboratory practice based on the lectures above</li> </ul>	<ul style="list-style-type: none"> <li>- Class-room lectures on the diagnostic techniques for globally important infectious diseases.</li> <li>- Laboratory practice on the international standard diagnostic techniques for globally important infectious diseases.</li> </ul>

<p>To understand the countermeasure system of zoonosis in cooperation with the international community and concrete countermeasure in the local community</p>	<p>Lectures on matters related to infectious disease control measures</p> <ul style="list-style-type: none"> <li>- Countermeasures by and trends among international organizations such as WHO and FAO</li> <li>- Countermeasures by the OIE (e.g., survey on disease outbreaks around the world, establishment of international standards concerning livestock product trading and international quarantine, and international standardization of new diagnostic techniques and vaccination)</li> <li>- Countermeasures to fight infectious diseases in Japan and other countries, efforts to fight infectious diseases through public participation, etc.</li> </ul> <p>Case studies on infectious disease control measures</p> <ul style="list-style-type: none"> <li>- Case studies based on the lectures above</li> </ul>	<ul style="list-style-type: none"> <li>- Class-room lectures on the disease control measures.</li> <li>- Case studies on the disease control measures.</li> </ul>
<p><b>(4) Finalization Phase</b>  <i>Knowledge and techniques acquired through the Program are shared in participant's organization and persons concerned.</i></p>		

**The schedule is subject to change due to the coordination of curriculum.**

**<Structure of the program>**

This program mainly covers the following themes. During the Online program, all participants are attached to a suitable research laboratory in one of the following fields in accordance with the purpose and specialty of each participant:

- (1) Research Unit for Functional Genomics
- (2) Research Unit for Host Defense
- (3) Research Unit for Vector Biology
- (4) Research Unit for Molecular Diagnosis
- (5) Research Unit for Advanced Preventive Medicine
- (6) Research Unit for Infection Control
- (7) Research Unit for Bacteriology
- (8) Research Unit for Virology
- (9) Research Unit for Mycology

This program consists of the following components. Each participant is assigned to one of the following nine research units. To avoid congestion in one unit, the applicants are requested to indicate priority among the nine research units and topics in "Questionnaire" (see section VI. ANNEX, Attachment-2) according to their interest, because 70-80% of 9 units is focused on protozoan and the rest percentage is on virus and bacteria. Hence the successful applicant may be advised to accept a topic other

than their 1<sup>st</sup> choice. They will be informed the selected unit and its field with the acceptance information. Reprints of applicant's scientific publications and Inception Reports (see section VI. ANNEX, Attachment-1) will facilitate the process of selection of a suitable research subject/topic for the participant.

Example: 1<sup>st</sup> choice.....3 (a,b)  
2<sup>nd</sup> choice.....5 (b,c)  
3<sup>rd</sup> choice.....8 (a)  
4<sup>th</sup> choice.....7 (a,c)

### **Unit 1. Research Unit for Functional Genomics**

Supervisor: Hiroshi SUZUKI, PhD

The aim of research projects is to focus on analysis of host-parasite interaction contributing to host resistance against protozoan diseases and molecular analysis of protozoan parasites. Current subjects of research are as follows:

- (1) Analysis of genetic control of responses to infection by a variety of host- or parasite-related parameters.
- (2) Regulation of effector function in experimental infection in mice.
- (3) Development of assisted reproductive techniques in mice and dogs.
- (4) Development of gene knockout cattle by using a genome editing technique.

Research Subjects for JICA Participants:

- 1-a Experimental infection of protozoan parasites in genetically modified mice.
- 1-b In vitro fertilization and embryo transfer to eliminate infected pathogen in mice.
- 1-c Genome editing in fertilized eggs in cattle.

### **Unit 2. Research Unit for Host Defense**

Supervisors: Xuenan XUAN, DVM, PhD

Yoshifumi NISHIKAWA, PhD

The research projects focus on the study of host defense mechanisms against protozoan parasite infections by using molecular biotechnologies. Current subjects of research are as follows:

- (1) Elucidation of the mechanisms of host protective immunity against protozoan parasite infections.
- (2) Identification and characterization of novel vaccine candidate genes from protozoan parasites.
- (3) Development of recombinant vaccines against protozoan diseases.

Research Subjects for JICA Participants:

- 2-a Cloning and characterization of vaccine candidate genes from *Toxoplasma gondii*, *Neospora caninum*, and *Babesia gibsoni*.

2-b Development of recombinant vaccines against *T. gondii*, *N. caninum*, and *B. gibsoni* infections.

### **Unit 3. Research Unit for Vector Biology**

Supervisors: Shinya FUKUMOTO, DVM, PhD  
Rika SHIRAFUJI, PhD

The research projects focus on the understandings host immunity and host-pathogen interactions for alternation of their ability to transmit disease-causing protozoa by genetic manipulations of both the animals and pathogens. Current subjects of research are as follows:

- (1) Genetic dissection of host resistance against infection of protozoan parasite.
- (2) Development of genetically modified mosquitoes and ticks, which cannot transmit any pathogens.
- (3) Exploring new molecular methods for detection of pathogens in vector mosquitoes and ticks.

Research Subjects for JICA Participants:

- 3-a Molecular genetics for vector mosquitoes and ticks, including RNA interference and transgenesis for genetic manipulation.
- 3-b Development of rapid DNA amplification methods to detect pathogens in vector mosquitoes and ticks.

### **Unit 4. Research Unit for Molecular Diagnostics**

Supervisor: Naoaki YOKOYAMA, DVM, PhD

The research unit for molecular diagnosis conducts advanced research on the diagnosis and control of bovine and equine piroplasmiasis. The aims of our research unit are to carry out global epidemiological surveys using the diagnostic methods that we have developed, identify and evaluate novel drug and vaccine candidate molecules, and formulate guidelines for disease control in the endemic countries. Our current research activities focus on the following topics:

- (1) Development of new molecular and serological diagnostic methods suitable for confirmative diagnosis and epidemiological surveys of bovine and equine piroplasmiasis.
- (2) Conducting global epidemiological surveys of bovine and equine piroplasmiasis and identification of associated risk factors.
- (3) Development of effective disease control methods and preparation of guidelines for the control of bovine and equine piroplasmiasis.

Research Subjects for JICA Participants:

- 4-a Laboratory diagnosis and global epidemiological survey of bovine and equine



piroplasmosis, and risk factor analysis.

4-b Development of new and effective disease control methods.

### **Unit 5. Research Unit for Advanced Preventive Medicine**

Supervisors: Shin-ichiro KAWAZU, DVM, PhD

Keisuke SUGANUMA, DVM, PhD

Overall objective of the research unit is to develop effective control and diagnosis measures against animal trypanosomoses and zoonotic schistosomiasis. Current research activities are focused on:

- (1) Application of *in vitro* systems to the evaluation of sensitivity of the parasites (trypanosomes) to chemotherapeutic agents and the characterization of virulence-related genes/molecules.
- (2) Development of serological and molecular diagnosis methods.
- (3) Application of population genetics for investigation of epidemiology in the parasitic diseases (trypanosomiasis and schistosomiasis).

Research subjects for JICA participants:

5-a *In vitro* cultivation of blood stream forms (BSFs) of *Trypanosoma brucei*, *T. congolense*, *T. evansi* and *T. equiperdum* for the study of culture- and DNA-based diagnoses.

5-b Production of recombinant antigens for ICT and ELISA.

5-c Molecular diagnosis based on PCR.

### **Unit 6. Research Unit for Infection and Control**

Supervisors: Makoto IGARASHI, DVM, PhD

Masahito ASADA, DVM, PhD

The objective of the research unit is to understand the mechanism of parasitism in toxoplasmosis, cryptosporidiosis, babesiosis and malaria using the techniques of molecular biology. The new antiprotozoal drugs and vaccines have been developed for further control of the diseases. Current subjects of research are as follows:

- (1) Elucidation of molecular mechanism at the protozoa invasion in host cells.
- (2) Detection of protozoan receptors and development of antiprotozoal drugs and vaccines to target the detected receptors.
- (3) Elucidation of protozoan epigenetic system and development of the applied techniques.
- (4) Elucidation of molecular mechanism of host cell modification by the protozoan parasites

Research Subjects for JICA Participants:

6-a Molecular and biochemical analyses of *Toxoplasma*, *Cryptosporidium*, *Babesia* and *Plasmodium*.

6-b Development of ELISA, PCR, and LAMP for diagnosis.

6-c Analyses of effects of chemicals on growth of *Toxoplasma*, *Cryptosporidium*, *Babesia* and *Plasmodium*.

### **Unit 7. Research Unit for Bacteriology**

Supervisors: Masashi OKAMURA, DVM, PhD  
Toyoko HIROI, DVM, PhD  
Eiki YAMASAKI, PhD

Our research interests include the genetics, pathogenesis, and epidemiology of zoonotic and food-borne bacterial pathogens, including *Salmonella* species, *Escherichia coli*, *Listeria monocytogenes*, *Campylobacter* spp., *Streptococcus*, *Mycoplasma* and *Bacillus anthracis*. Current research activities are focused on:

- (1) Diagnostics of zoonotic and food-borne bacterial infections.
- (2) Host factor that influences the susceptibility to bacterial diseases (zoonotic and food-borne diseases).
- (3) Molecular epidemiology of bacterial diseases (zoonotic and food-borne diseases).
- (4) Surveillance of bacterial diseases (zoonotic and food-borne diseases).

Research Subjects for JICA Participants:

- 7-a Genetics, pathogenesis, and epidemiology of bacterial pathogens and the development of diagnostic, preventive and microbial risk assessment.
- 7-b Development of new vaccines to control animal infectious diseases.
- 7-c State of art diagnostic techniques for bacterial diseases.

### **Unit 8. Research Unit for Virology**

Supervisors: Haruko OGAWA, DVM, PhD  
Yohei TAKEDA, DVM, PhD

The research subjects now focus mainly on viral animal diseases including zoonosis such as avian influenza and Newcastle Disease. Current research activities are as follows:

- (1) Elucidation of the occurrence factor and pathogenesis of viral infections.
- (2) Development of new rapid and accurate diagnostic methods due to molecular basis for detecting viral pathogen and its antibody.
- (3) Development of new anti-viral drugs/materials, or vaccines to prevent occurrence of viral infections.
- (4) Molecular epidemiology of avian influenza virus and avian paramyxoviruses including Newcastle disease virus.

Research Subjects for JICA Participants:

- 8-a Development of diagnostic techniques due to molecular basis to detecting viral antigens, genes or antibodies.

## Unit 9. Research Unit for Mycology

Supervisor: Takahito TOYOTOME, PhD

This research unit focus on zoonotic mycoses, mainly aspergillosis. Current research subjects are as follows:

- (1) Azole-resistance in *Aspergillus fumigatus*. The prevalence, the mechanism, and tools for detection.
- (2) Biofilm formation of *Aspergillus fumigatus*. The promoting host factor and the mechanism.
- (3) *Aspergillus fumigatus* infection. The host interaction and pathogenic factors.

Research Subjects for JICA Participants:

9-a Molecular analysis of *Aspergillus fumigatus* genes. PCR, double-joint PCR, protoplasting, gene disruption, and phenotype analysis including MIC determination.

## Major publications

For your information, major publications by each unit are shown as follows:

### Unit 1 (Functional Genomics)

1. Herbas et al.: The effect of  $\alpha$ -tocopherol transfer protein gene disruption on *Trypanosoma congolense* infection in mice. **Free Radic Biol Med**, 47: 1408-1413, 2009.
2. Herbas et al.: Alpha-tocopherol transfer protein inhibition is effective in the prevention of cerebral malaria in mice. **Am J Clin Nutr**, 91: 200-207, 2010.
3. Herbas et al.: Alpha-tocopherol transfer protein disruption confers resistance to malarial infection in mice. **Malaria J**, 9: 101-112, 2010.
4. Kume et al.: Probucol dramatically enhances dihydroartemisinin effect in murine malaria. **Malaria J**, 15: 472, 2016.
5. Suzuki et al.: Potential of vitamin E deficiency, Induced by Inhibition of  $\alpha$ -tocopherol efflux, in murine malaria Infection. **Int J Mol Sci**, 20: 64, 2019.

### Unit 2 (Host Defense)

1. Nishikawa et al.: *Neospora caninum* dense granule protein 7 regulates pathogenesis of neosporosis by modulating host immune response. **Appl Environ Microbiol**, 84: e01350-18, 2018.
2. Liu et al.: Identification and characterization of interchangeable cross-species functional promoters between *Babesia gibsoni* and *Babesia bovis*. **Ticks Tick Borne Dis**, 9: 330-333, 2018.
3. Fereig et al.: Critical role of TLR2 in triggering protective immunity with cyclophilin entrapped in oligomannose-coated liposomes against *Neospora caninum* infection in mice. **Vaccine**, 37: 937-944, 2019.
4. Leesombun et al.: Metacytofilin is a potent therapeutic drug candidate for

toxoplasmosis. **J Infect Dis**, 221: 766-774, 2020.

5. Efstratiou et al.: *Babesia microti* confers macrophage-based cross-protective immunity against murine malaria. **Front Cell Infect Microbiol**, 10: 193, 2020.

### Unit 3 (Vector Biology)

1. Umemiya-Shirafuji et al.: Transovarial persistence of *Babesia ovata* DNA in a hard tick, *Haemaphysalis longicornis*, in a semi-artificial mouse skin membrane feeding system. **Acta Parasitol**, 62: 836-841, 2017.
2. Umemiya-Shirafuji et al.: Intracellular localization of vitellogenin receptor mRNA and protein during oogenesis of a parthenogenetic tick, *Haemaphysalis longicornis*. **Parasit Vectors**, 12: 205, 2019.
3. Soga et al.: Improvement of an in vitro drug selection method for generating transgenic *Plasmodium berghei* parasites. **Malar J**, 18: 215, 2019.
4. Shirozu et al.: Prevalence and phylogenetic analysis of *Cryptosporidium* infections in Yezo sika deer (*Cervus nippon yesoensis*) in the Tokachi sub-prefecture of Hokkaido, Japan. **Parasitol Int**, 76: 102064, 2020.
5. Shirozu et al.: Development and evaluation of a novel loop-mediated isothermal amplification (LAMP) method targeting *Theileria* parasites infecting Yezo sika deer. **Parasitol Int**, 77: 102130, 2020.

### Unit 4 (Molecular Diagnostics)

1. Sivakumar et al.: Genetic analysis of *Babesia* isolates from cattle with clinical babesiosis in Sri Lanka. **J Clin Microbiol**, 56: e00895-18, 2018.
2. Myagmarsuren et al.: A seroepidemiological survey of *Theileria equi* and *Babesia caballi* in horses in Mongolia. **J Parasitol**, 105: 580-586, 2019.
3. Sivakumar et al.: Discovery of a new *Theileria* sp. closely related to *Theileria annulata* in cattle from Sri Lanka. **Sci Rep** 9: 16132, 2019.
4. Sivakumar et al.: Host range and geographical distribution of *Babesia* sp. Mymensingh. **Transbound Emerg Dis**, (in press), 2020.
5. Otgonsuren et al.: Molecular epidemiological survey of *Babesia bovis*, *Babesia bigemina*, and *Babesia* sp. Mymensingh infections in Mongolian cattle. **Parasitol Int**, 77: 102107, 2020.

### Unit 5 (Advanced Preventive Medicine)

1. Suganuma et al.: Isolation, cultivation and molecular characterization of a new *Trypanosoma equiperdum* strain in Mongolia. **Parasit Vectors**, 9: 481, 2016.
2. Molefe et al.: Oral administration of azithromycin ameliorates trypanosomosis in *Trypanosoma congolense*-infected mice. **Parasitol Res**, 116: 2407-2415, 2017.
3. Büscher et al.: Equine trypanosomosis: enigmas and diagnostic challenges. **Parasit Vectors**, 12: 234, 2019.
4. Angeles et al.: Detection of canine *Schistosoma japonicum* infection using recombinant thioredoxin peroxidase-1 and tandem repeat proteins. **J Vet Med Sci**, 81: 1413-1418, 2019.
5. Macalanda et al.: *Schistosoma japonicum* cathepsin B as potential diagnostic

antigen for Asian zoonotic schistosomiasis. **Parasitol Res**, 118: 2601-2608, 2019.

#### **Unit 6 (Infection Control)**

1. Kaewthamasorn et al.: Genetic homogeneity of goat malaria parasites in Asia and Africa suggests their expansion with domestic goat host. **Sci Rep**, 8: 5827, 2018.
2. Hakimi et al.: Genome editing of *Babesia bovis* using the CRISPR/Cas9 system. **mSphere**, 4: e00109-19, 2019.
3. Sarwono et al.: Repurposing existing drugs: Identification of irreversible IMPDH inhibitors by high-throughput screening. **J Enzyme Inhib Med Chem**, 34:171-178, 2019.
4. Endo et al.: Isolation, structure determination and structure–activity relationship of anti-toxoplasma triterpenoids from *Quercus crispula Blume* outer bark. **J Wood Sci**, 65: 3, 2019.
5. Salama et al.: Molecular characterization of *Cryptosporidium* spp. from migratory ducks around Tokachi subprefecture, Hokkaido, Japan. **J Vet Med Sci**, 82: 571-575, 2020.

#### **Unit 7 (Bacteriology)**

1. Hiroi et al.: GEP100/BRAG2: activator of ADP-ribosylation factor 6 for regulation of cell adhesion and actin cytoskeleton via E-cadherin and alpha-catenin. **Proc Natl Acad Sci USA**, 103: 10672-10677, 2006.
2. Yamasaki et al.: Detection of cholera toxin by an immunochromatographic test strip. **Methods Mol. Biol.**, 1600: 1-7, 2017.
3. Okamura et al: Differential distribution of *Salmonella* serovars and *Campylobacter* spp. isolates in free-living crows and broiler chickens in Aomori, Japan. **Microbes Environ**, 33: 77-82, 2018.
4. Yamasaki et al.: Rapid serotyping of *Salmonella* isolates based on single nucleotide polymorphism-like sequence profiles of a *Salmonella*-specific gene. **Foodborne Pathog Dis**, 18: 31-40, 2020.
5. Ojima et al.: Characteristics of systemic infection and host responses in chickens experimentally infected with *Salmonella enterica* serovar Gallinarum biovar Gallinarum. **J Vet Med Sci**, 83: 1147-1154, 2021.

#### **Unit 8 (Virology)**

1. Gronsang et al.: Characterization of cross-clade monoclonal antibodies against H5N1 highly pathogenic avian influenza virus and their application to the antigenic analysis of diverse H5 subtype viruses. **Arch Virol**, 162: 2257-2269, 2017.
2. Thampaisarn et al.: Characterization of avian paramyxovirus serotype 14, a novel serotype, isolated from a duck fecal sample in Japan. **Virus Res**, 228: 46-57, 2017.
3. Takeda et al.: Antiviral activities of *Hibiscus sabdariffa L.* tea extract against human influenza A virus rely largely on acidic pH but partially on a low-pH-independent

Mechanism. **Food Environ Virol**, 12: 9-19, 2020.

4. Nishiyama et al.: Rapid detection of anti-H5 avian influenza virus antibody by fluorescence polarization immunoassay using a portable fluorescence polarization analyzer. **Sens Actuators B Chem**, 316: 128160, 2020.
5. Takeda et al.: *Saxifraga spinulosa*-derived components rapidly inactivate multiple viruses including SARS-CoV-2. **Viruses** 12: E699, 2020.

### **Unit 9 (Mycology)**

1. Onishi et al.: Azole-resistant *Aspergillus fumigatus* containing a 34-bp tandem repeat in *cyp51A* promoter is isolated from the environment in Japan. **Med Mycol J**, 58: E67-E70, 2017.
2. Toyotome et al.: First clinical isolation report of azole-resistant *Aspergillus fumigatus* with TR<sub>34</sub>/L98H-type mutation in Japan. **J Infect Chemother**, 23: 579-581, 2017.
3. Toyotome et al.: A simple method to detect the tandem repeat of the *cyp51A* promoter in azole-resistant strains of *Aspergillus fumigatus*. **Med Mycol**, 56: 1042-1044, 2018.
4. Muraosa et al.: Characterisation of novel-cell-wall LysM-domain proteins LdpA and LdpB from the human pathogenic fungus *Aspergillus fumigatus*. **Sci Rep**, 9: 3345, 2019.
5. Toyotome et al.: Prospective survey of *Aspergillus* species isolated from clinical specimens and their antifungal susceptibility: A five-year single-center study in Japan. **J Infect Chemother**, 26: 321-323, 2020.

### **III. Applying Conditions and Procedures**

#### **1. Expectations from the Participating Organizations:**

- (1) This program is designed primarily for organizations that intend to address specific issues or problems identified in their operation. Participating organizations are expected to use the project for those specific purposes.
- (2) This program is enriched with contents and facilitation schemes specially developed in collaboration with relevant prominent organizations in Japan. These special features enable the project to meet specific requirements of applying organizations and effectively facilitate them toward solutions for the issues and problems.
- (3) Applying organizations are also expected to be prepared to make use of knowledge acquired by the nominees for the said purpose.

#### **2. Nominee Qualifications:**

Applying Organizations are expected to select nominees who meet the following qualifications.

##### **(1) Essential Qualifications**

###### **I. This training program is designated for participants who should:**

- 1) be a holder of a Bachelor of Science or Master of Science Degree in Biology, Zoology or related field, or a graduate of Veterinary Medicine or Medical Science;
- 2) be currently employed as a lecturer of an university/college, a researcher of a national/public institute, and/or a technician of an administrative agency;
- 3) engaged in Livestock Hygiene field and have at least 5 years of working experience in the said field with sufficient skills of mathematics and English.
- 4) Language: competent command of spoken and written English, which is equal to TOEFL iBT\* 72 (PBT\*\* 533, CBT\*\*\* 200) or more (The program is commanded by English. Please attach an official certificate on the participants' English ability such as TOEFL, TOEIC, etc., if possible.)  
\*CBT: Computer Based Testing / \*\*PBT: Paper Based Testing
- 5) Health: must be in good health, to participate the Program.
- 6) Internet connection: Stable and fast (desirable 20 Mb and more) connection to the internet will be required for the Online Program. Also, to take part in online discussions, participants must prepare appropriate devices.

###### **II. Other requirements that should be met by the applicant:**

Should be nominated by their respective government / authority in accordance with the procedures mentioned in section III 4. (Procedure for Application and Selection)

## **(2) Recommendable Qualifications**

- 1) Age: between the ages of twenty-five (25) and fifty (50) years.
- 2) Gender Consideration: JICA is promoting gender equality. Women are encouraged to apply for the program.

## **3. Required Documents for Application**

### **(1) Application Form:** The Application Form is available at **the JICA office (or the Embassy of Japan)**.

If you have any difficulties/disabilities which require assistance, please specify necessary assistances in the Medical History (1-(d)) of the application forms. It may allow us (people concerned in this course) to prepare better logistics or alternatives.

### **(2) Photocopy of passport:** You should submit with the application form, if you possess your passport. If not, you are requested to submit its photocopy as soon as you obtain it.

\*Photocopy should include the followings:

Name, Date of birth, Nationality, Sex, Passport number and Expire date.

### **(3) Inception Report and Questionnaire:** should be submitted with the Application Form. The detailed information is provided in the section VI. ANNEX, Attachment-1 and 2.

### **(4) Nominee's English Score Sheet:** to be submitted with the application form. If you have any official documentation of English ability. (e.g., TOEFL, TOEIC, IELTS)

## **4. Procedures for Application and Selection :**

### **(1) Submission of the Application Documents:**

Closing date for applications: **Please inquire to the JICA office (or the Embassy of Japan)**.

(After receiving applications, the JICA office (or the Embassy of Japan) will send them to **the JICA Center in JAPAN** by **30<sup>th</sup> September 2021**)

### **(2) Selection:**

After receiving the documents through proper channels from your government / authority, the JICA office (or the Embassy of Japan) will conduct screenings, and then forward the documents to the JICA Center in Japan. Selection will be made by the JICA Center in consultation with concerned organizations in Japan. *The applying organization with the best intention to utilize the opportunity of this program will be highly valued in the selection.* Qualifications of applicants who belong to the military or other military-related organizations and/or who are enlisted in the military will be examined by the Government of Japan on a case-by-case basis, consistent with the Development Cooperation Charter of Japan, taking into consideration of their duties, positions in the organization,



and other relevant information in a comprehensive manner.

**(3) Notice of Acceptance**

Notification of results will be made by the JICA office (or the Embassy of Japan) **not later than 15<sup>th</sup> October 2021.**

**5. Conditions for Attendance:**

- (1) to strictly adhere to the program schedule.
- (2) not to change the program topics.
- (3) not to share videos, online contents, materials, etc. used in this training or use them for any other purpose.
- (4) Comply with JICA's copyright rules (a written oath is required for the use of videos, online contents, materials, etc.)
- (5) to participate the main part, require submitting Research Plan after preparation part.
- (6) to refrain from engaging in any political activities, or any form of employment for profit or gain.

## ***IV. Administrative Arrangements***

**1. Organizer:**

(1) **Name:** JICA Hokkaido Center (Obihiro)

(2) **Contact:** Ms. TAJIMA Yoko / Mr. SAKIGAWA Masashi (obic\_kccp@jica.go.jp)

**2. Implementing Partner:**

(1) **Name:** Obihiro University of Agriculture and Veterinary Medicine

(2) **URL:** <https://www.obihiro.ac.jp/en>

(3) **Remark:** National Research Center for Protozoan Disease URL:  
<https://www.obihiro.ac.jp/facility/protozoa/en>

**3. Online Program Venue :**

The online program is designed that participants are supposed to participate in from their home or office. However, if their home or office do not have enough internet environment to participate for online program, please contact JICA office (or the Embassy of Japan) in your country / region.

**4. Expenses:**

The following expenses will be provided for the participants by JICA

- (1) Expenses related to the online program will be paid according to the regulations of each JICA Office, if necessary.
- (2) Details will be provided at the time of notification of acceptance.

## V. Other Information

### 1. Certificate

Participants who have successfully completed the training program will be awarded a certificate by JICA.

### 2. Other related programs

Participants who have successfully completed the training program will be provided some chances to try to apply for some other related programs such as JICA Development Studies Program (JICA-DSP), JICA-AGRONET Program, and NRCPD Visiting Researcher Program to study in Japan.

### 3. Contact Information

For enquiries and further information concerning the program, please contact the following office.

#### **JICA Hokkaido (Obihiro)**

1-2, Minami 6, Nishi 20, Obihiro-city, Hokkaido, 080-2470, Japan

Tel: 81(\*)-155(\*\*)-35-1210 / Fax: 81(\*)-155(\*\*)-35-1250

E-mail: [obic\\_kccp@jica.go.jp](mailto:obic_kccp@jica.go.jp)

[\*Country code for Japan, \*\*Area code for Obihiro]

## VI. ANNEX:

### Attachment-1

#### **Inception Report**

Applicants are requested to prepare an Inception Report on the following issues and submit it to the respective JICA Office (or the Embassy of Japan) in your country / region with Application Form.

**This Report will be used for the screening of successful applicants as well as for the selection of the most suitable training subject for the participants. Applicants who do not attach your Inception Report and Questionnaire to the Application Form will not be accepted.**

#### **a. Purpose**

- (1) To clarify issues and problems presently faced in their work in order to facilitate the acquisition of knowledge and ideas leading to solutions during the training.
- (2) To provide advanced information regarding issues and problems faced by participants to instructors and organizations concerned with the program as a point of reference in finding solutions.

#### **b. Contents**

- (1) Name of program
- (2) Name of participant and country (or region)
- (3) Name of organization
- (4) Brief introduction of work you have been in charge of for the last one year

- (5) Problem facing in the applicant's country / region
- (6) Fields of particular interest in the program and its reason

**c. Layout**

Typewritten in English, less than 5 pages (12-point font, double spaced, A4 size paper)

**d. Presentation**

The Inception Report is to be presented by each participant using Power Point at the beginning of the program.

- (1) The time allocation for each presentation of the Inception Report will be about 10 minutes.
- (2) It is advisable to bring some materials such as pictures or other visual aids for your presentation.

**QUESTIONNAIRE**

NAME of the Applicant: \_\_\_\_\_

COUNTRY (or REGION): \_\_\_\_\_

1. Please list the four Research Units and indicate the subjects offered to JICA participants in order of preference. (See section II. Description, 9. Expected Module Output and Contents) Participants are not assured to be assigned to the high-priority unit in the case the unit will be chosen by other participants, because each unit could accept only one or two participants.

First Choice: ( )

Second Choice: ( )

Third Choice: ( )

Fourth Choice: ( )

2. Please describe briefly your experience, if any, in the research subjects you have chosen above.

(1)

(2)

(3)

(4)

3. Please check following techniques which you have mastered.

1) Culture of pathogens: ( ) viruses, ( ) bacteria, ( ) protozoa,  
( ) fungi

2) ( ) SDS-PAGE, ( ) Western blot

3) ( ) IFAT, ( ) ELISA

4) ( ) Molecular cloning, ( ) DNA sequencing, ( ) PCR

4. Please list your publications, if any.

## *For Your Reference*

### **JICA and Capacity Development**

The key concept underpinning JICA operations since its establishment in 1974 has been the conviction that “capacity development” is central to the socioeconomic development of any country, regardless of the specific operational scheme one may be undertaking, i.e. expert assignments, development projects, development study projects, training programs, JOCV programs, etc.

Within this wide range of programs, Training Programs have long occupied an important place in JICA operations. Conducted in Japan, they provide partner countries with opportunities to acquire practical knowledge accumulated in Japanese society. Participants dispatched by partner countries might find useful knowledge and re-create their own knowledge for enhancement of their own capacity or that of the organization and society to which they belong.

About 460 pre-organized programs cover a wide range of professional fields, ranging from education, health, infrastructure, energy, trade and finance, to agriculture, rural development, gender mainstreaming, and environmental protection. A variety of programs are being customized to address the specific needs of different target organizations, such as policy-making organizations, service provision organizations, as well as research and academic institutions. Some programs are organized to target a certain group of countries with similar developmental challenges.

### **Japanese Development Experience**

Japan was the first non-Western country to successfully modernize its society and industrialize its economy. At the core of this process, which started more than 140 years ago, was the “*adopt and adapt*” concept by which a wide range of appropriate skills and knowledge have been imported from developed countries; these skills and knowledge have been adapted and/or improved using local skills, knowledge and initiatives. They finally became internalized in Japanese society to suit its local needs and conditions.

From engineering technology to production management methods, most of the know-how that has enabled Japan to become what it is today has emanated from this “*adoption and adaptation*” process, which, of course, has been accompanied by countless failures and errors behind the success stories. We presume that such experiences, both successful and unsuccessful, will be useful to our partners who are trying to address the challenges currently faced by developing countries.

However, it is rather challenging to share with our partners this whole body of Japan’s developmental experience. This difficulty has to do, in part, with the challenge of explaining a body of “tacit knowledge,” a type of knowledge that cannot fully be expressed in words or numbers. Adding to this difficulty are the social and cultural systems of Japan that vastly differ from those of other Western industrialized countries, and hence still remain unfamiliar to many partner countries. Simply stated, coming to Japan might be one way of overcoming such a cultural gap.

JICA, therefore, would like to invite as many leaders of partner countries as possible to come and visit us, to mingle with the Japanese people, and witness the advantages as well as the disadvantages of Japanese systems, so that integration of their findings might help them reach their developmental objectives.



***CORRESPONDENCE***

For enquiries and further information, please contact the JICA office or the Embassy of Japan. Further, address correspondence to:

**JICA Hokkaido Center (Obihiro)**

**Address:** 1-2, Minami 6-chome, Nishi 20-jo, Obihiro-city, Hokkaido 080-2470, Japan  
TEL: +81-155-35-1210 FAX: +81-155-35-1250