


Student Free Design Activities (One Health on-site Training)

報告書 Report

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活動報告 [Activity Report]

※活動内容が判る様な写真や図表を加えて下さい。 / Provide photos, tables and figures that clearly show the activities during the period.

タイトル [Course Title]	One Health Ally Course (Sub-module 4): “Surveillance of foodborne diseases in Mongolia (AY2022)”
実施期間 [Periods]	5 <sup>th</sup> – 14 <sup>th</sup> , October, 2022
共同実施者 [Other participants]	Ichikawa Yoshiki, Suwanthada Pondpan, Hoshika Takashi, Ukita Makoto
言語 [Language]	English
実施場所 [Location]	Ulaanbaatar, Mongolia
申請時計画の実施報告 [Report how you carried out your plan in the application form]	
<p>The sub-module 4 was organized under the JICA project at School of Veterinary Medicine (SVM), Mongolian University of Life Science (MULS). All activities were well arranged with the great support of both JICA’s staffs and Mongolian counterparts.</p> <p>1) Research activities</p> <p>Antimicrobial resistance (AMR) is a major problem that affects our ability to treat infections in all countries and all people. Resistant organisms can easily spread through human and animal migration, food or water, and resistant genes can be transferred from one species to another. Animals are regarded as an important reservoir of AM bacteria or resistance genes which could cause bacterial infection to humans. Thus, the emergence of AM bacteria originated from animals have become a growing area of concern. The research activities of me and other students during this</p>	

time in Mongolia focused on 03 experiments in relation to monitoring the prevalence and analyzing the resistant status of some common foodborne pathogens in dairy cattle, including:

- *Campylobacter* spp.: While there was a detection of the AMR of *Campylobacter* spp. from chicken in Mongolia, no drug-resistant *Campylobacter* spp. were isolated in ruminant. Therefore, we want to confirm the prevalence of *Campylobacter* spp. in several ruminant farms around Ulaanbaatar, the capital of Mongolia.
- FQ (Fluoroquinolone)-resistant and ESBL (Extended Spectrum beta Lactamase)-producing *E. coli*: In June 2022, the FQ-resistant and ESBL-producing *E. coli* were isolated from domestic dogs but not from camel in Mongolia. This time, we collected the fecal samples from dairy farms and confirmed the circulation of these bacteria.
- Detection of milk-borne pathogens using qPCR: Milk and other dairy products have played a major role in the daily life of Mongolian. However, the lack of capacity in detection of some milk-borne pathogens like *Brucella* sp., *Listeria* has raised a big societal concern. Thus, JICA supported the qPCR system for the Department of Public Health (SVM) in order to solve this problem. So, we were learned to use the system for detecting the *Brucella* sp. in milk collected from the dairy farm.

#### Methods and Materials:

- Sampling: Dairy farms are in Tuv province, located just 60km from Ulaanbaatar city. Fecal samples were randomly collected from 10 cows by using sterilized cotton swabs. Milk samples were randomly collected from 05 cows into sterilized tubes. All samples were stored until isolation at the department of Public Health (SVM) on the same day of sampling.



Figure 1. Fecal sampling



Figure 2. Milk sampling

- Isolation of bacteria were conducted following the methods approved by Prof. Horiuchi. In brief, the samples were isolated by using the specific methods according to the bacteria species. Antimicrobial resistance of the isolates was analyzed using the E-test. E-test strips include nalidixic acid (NA), erythromycin (EM), ciprofloxacin (CL) and tetracycline (TC).
- Milk samples were analyzed by using the milk ring test for the surveillance of brucellosis. Furthermore, the results were confirmed by the qPCR system.



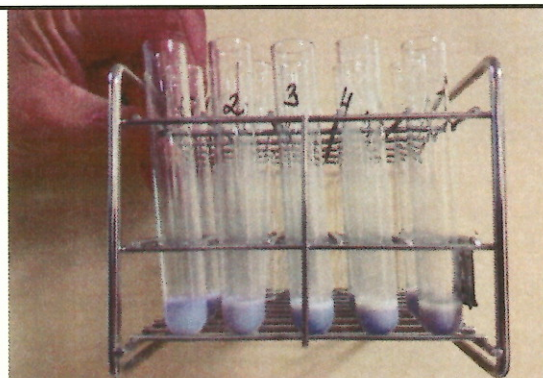


Figure 3. Milk-ring test



Figure 4. E-test

## 2) Other activities

During the stay, besides the research activities in studying the food-borne diseases in ruminant, we visited several organizations in Ulaanbaatar, that was very important for understanding the actual situation of livestock industry in Mongolia and particularly, the strong collaboration between Japan and Mongolia has considered as one important pillar for the development of this country.

Organization	Representatives	Activity
Department of Public Health, School of Veterinary Medicine, Mongolian University of Life Science (MULS)	Dr. Naymosor Dr. Sandagdorj	Introduction of the department: History, members, research areas, and contribution of JICA and Hokkaido University to the development of the department
JICA Project at MULS	Dr. Sugimoto Dr. Ganzorik	Introduction of the JICA project at the MULS: Overall goal, achievements and challenges
Institute of Veterinary Medicine	Dr. Vanaabaatar Batbaatar Dr. Altanchimeg Adilbish	Introduction of the institute: History, roles in livestock industry in Mongolia (vaccine production), and strong collaboration with Japan counterpart (Obihiro University, Hokkaido University)
JICA Mongolia Office	Mr. Shinichi Tanaka Dr. Keigo Nakamura	Introduction about the cooperation of JICA in Mongolia, focusing on the major issues: <ul style="list-style-type: none"> <li>- Weak governance aimed at creating a healthy and optimal macro-economy</li> <li>- Environmental imbalance caused by rapid expansion of urban areas and economic development</li> <li>- Vulnerable group of society who are lagging behind in receiving basic social services</li> </ul> Major projects implemented in Mongolia was introduced, along with the potential cooperation opportunities and challenges of JICA in this country.
Mongolia-Japan Teaching	Dr. Adilsaikhon	The first teaching hospital in human medicine in Mongolia with the complete support from



Hospital	Mendsaikhan Dr. Bolortuya Batbileg	Japan, in both aspects of finance and human resources.  Discussing about the medical system and national insurance in Mongolia.
Ulaanbaatar Veterinary Department	Dr. Narantuya Ayushjav	Introduction of the department:  - Important roles in ensuring the food safety for the local people in Ulaanbaatar; and in preventing the transmission of infectious diseases;  - Collaboration with other countries (Vietnam) in exporting the meat products;
Unu Enkh Neuro Rehabilitation Hospital	Mr. Ryo Kubota	Introduction about the JOCV (Japan Overseas Cooperation Volunteers) program and the activities of Mr. Ryo Kubota at the hospital.



Figure 5. Group photo with Department of Public Health (SVM)



Figure 6. Mr. Ryo Kubota is supporting his patient

#### 目的達成状況報告 [Report how you achieved your goal/objectives listed in the application form]

The sub-module 4 in Mongolia was a great experience for a PhD student like me. It has provided an opportunity for understanding more about the research activities in the area of food-borne diseases in Mongolia, and the important roles of JICA in the development of Mongolia during the last few decades. In addition, the course helped me grow, be more understanding to a new people, new cultures, new locations and new ways of life.

##### 1) Results of research activities:

*Campylobacter* spp. and *E. coli* were successfully isolated from the samples. However, there was no resistant *E. coli* isolates (0/15). In contrast, all *Campylobacter* spp. isolates were resistant to EM, CL and TC; while there was 2 isolates resistant to NA (12.5%).

By using the milk ring test, 01 sample was positive to Brucellosis (1/5; 20%). The results was confirmed by using the qPCR system.

According to the preliminary results, it may be concluded that there is the circulation of antimicrobial resistant-*Campylobacter* spp. in dairy cattle in Mongolia. In contrast, it is early to have conclusion about the situation of FQ-resistant and ESBL-producing *E. coli* as well as milk-borne pathogens from milk in Mongolia. The results will be confirmed by further experiments.

##### 2) Research networking



As a young researcher, I always know the importance of networking for career advancement in academia. The course was a great chance to meet and to discuss with people from not only academic field but also from governmental management in Mongolia. In Mongolia, I met and had discussion with several Mongolian researchers who graduated PhD course in Japan. It is great experience to learn about their career pathway after graduation, because Mongolia academic environment shares some similar points to my hometown. In addition, I also met my senior researcher who graduated from the same laboratory in Japan (Dr. Dagvaa) and we discussed about the opportunities for doing the joint projects in dairy cattle in Mongolia in the future.

### 3) JICA activities in developing countries

The sub-module 4 was greatly supported by the JICA Mongolia. After the meeting with people from JICA, I understand about the core role of JICA not only in Mongolia but also in other developing countries around the world: meeting the diverse needs of developing countries; strengthening collaboration between communities in developing countries and Japan; and encouraging local citizens in Japan to employ their knowledge, experience, and technologies for international cooperation activities. In case of Mongolia, JICA has recognized the major issues and proposed the solutions in both short-term and long-term from governmental level to local level.

### One Health Approach 実践報告 [Report how your activity could link to One Health Approach]

Not only in Mongolia, but also in other countries around the world, our society faces an enormous challenge to sustainably produce enough food for a healthy life. One Health approach can be applied to food safety, sustainable food production and environment stewardship by bringing together interdisciplinary teams to create a One Health network to address these challenges. With the emphasis on food-borne diseases in Mongolia, the course provided a great experience about One Health approach by working with people from multidisciplinary background. For example, *Campylobacter* spp. is major causes of food-borne bacterial infectious worldwide and its socioeconomic costs associated with campylobacteriosis is up to several billion dollars annually. In Mongolia, there are limited reports about the prevalence of the bacteria in animal products, until the previous report in 2021 of Prof. Horiuchi and colleagues about the *Campylobacter* spp. in chicken. In order to reduce the burden of campylobacteriosis in Mongolia, an One Health approach with collective efforts of public health authorities, veterinarians, clinicians and researchers and politicians is required. In addition, antimicrobial resistance (AMR) is the one that best the One Health approach. AMR is linked to each of the three One Health' components due to the irresponsible and excessive use of antimicrobials in various sectors (agriculture, cattle raising, and human medicine). There is increased public and scientific interest regarding the administration of therapeutic and sub-therapeutic antimicrobials to animals, due primarily to the emergence and dissemination of zoonotic pathogens that are resistant to most frontline antimicrobials, including expanded-spectrum cephalosporins, aminoglycosides, and even fluoroquinolones.

### 備考 [Remarks]

Besides the main activities in relation to food-borne diseases surveillance in Mongolia, the course also was a great chance to learn about the culture, cuisine and people here. Furthermore, I also found some opportunities for cooperation with counterpart in Mongolia, not only for the academic purpose, but also for the economic purpose.

- ※ 報告書を作成後、担当教員に確認をお願いし署名をもらってください。PDFファイルとしてVetLog上の提出書類「Student Free Design Activities報告書」としてアップロードして下さい。
- ※ Please ask your instructor to check this report and get his/her signature before you submit to WISE Office. The scanned report is to be submitted strictly through VetLog.