One Health Module / One Health Ally Course
Submodule 4 One Health on-site Training
報告書 Report

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活動報告 [Activity Report]

タイトル [Course Title]	Surveillance of foodborne diseases and antimicrobial resistant bacteria in Mongolia
実施期間 [Periods]	2024/06/02-2024/06/12
共同実施者 [Other participants]	Jayaweera Muhandiramge Sasini, Li Yonghan, Do Thanh Thom
言語 [Language]	English
実施場所 [Location]	Mongolia

この活動に参加した理由（200字程度）[The reason why you participated in this activity (around 120words)]

Foodborne disease is one of the most common infections in the world, infecting millions of people every year. In Mongolia, there is a lack of comprehensive data on foodborne bacteria and their antibiotic resistance in animals and humans. My research focuses on foodborne diseases and their antimicrobial resistance in Mongolia, which makes this training highly relevant to my studies. I joined this on-site training to learn new methods and skills, and to connect with farmers, veterinarians, researchers, and staff from national and international projects and institutions within a short timeframe. Additionally, I expected this study trip would enhance my understanding of the One Health approach and multisectoral collaboration.

実施内容（2ページ程度、写真・図表含む）
[Activities details (up to 2 pages providing photos, figures, and tables)]

Team:
Motohiro Horiuchi, Instructor, Laboratory of Veterinary hygiene, Graduate school of Infectious disease
Bulgan Erdenebat D2 student, Laboratory of Veterinary hygiene, Graduate School of Infectious disease
Jayaweera Muhandiramge Sasini D3 student, Division of Bioresources, Graduate School of Infectious Diseases
Li Yonghan D3 student, Graduate School of Health Science
Do Thanh Thom D4 student, Graduate of Veterinary Medicine and Agriculture, Obihiro University

SAMPLING:
We collected 40 rectal swabs and 20 milk samples from 2 sheep and goat (Farm A, B) farms in the Erdene soum

(Tuv province) and 21 rectal swabs and 10 milk samples (Farm C, D) from Khan-Uul district (Ulaanbaatar) cattle farm (Table1, Figure1). We collected samples from more than 1 years old sheep and goat and more than 3 years old cattle. Each sample keep in 5 ml brucella broth during transportation.

Farm ID	Animal species	Sample number	Sample type
Farm A	sheep	10	feces
	goat	10	feces
	Sheep/ goat	10	milk
Farm B	sheep	10	feces
	goat	10	feces
Farm C	cattle	11	feces
	cattle	5	milk
Farm D	cattle	10	feces
	cattle	5	milk

Table 1. Sample information

Figure1. Sampling area

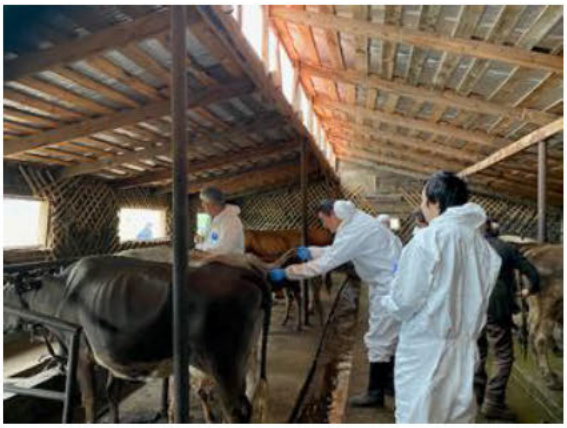
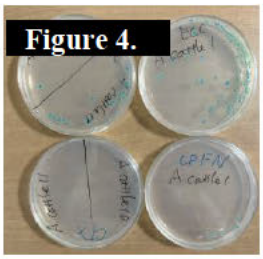


Figure2. Cattle farm sampling

Figure3. Sheep and goat farm sampling

LABORATORY WORKS:

During this training we mainly focused Enterohemorrhagic *Escherichia coli* (EHEC) and Antimicrobial Resistance (AMR) in *E. coli.* For the isolation of each bacteria species, use a selective medium. *E. coli* isolated blue typical colony on Chromagar ECC. EHEC isolated mauve colony on Chromagar STEC and red colony on CT-Macconkey.



Isolation of AMR *E. coli:*

- First we directly plated to CHROMagar ECC, CHROMagar ECC with ciprofloxacin (CPFX) and CHROMagar ECC with cefotaxime (CFX) incubated for 24 hr at 37C.
- Chosen 3 blue colonies from each agar plate, inoculate to 0.5 ml brucella broth incubated for 3 hr at 37C.
- Add 0.5 ml 20% skim milk to each tube. Store at -80C.

Isolation of EHEC

- Add 5ml 2X modified EC broth with novobiocin to remaining brucella broth then incubated for 24 hr at 37C.
- Spread to Cefixime-tellurite supplemented MacConkey agar and CHROMagar STEC incubated for 24 hr at 37C.
- Choose 2 red colonies from CT- MacConkey agar and 2 mauve colonies from CHROMagar STEC, inoculate to 0.5 ml brucella broth incubated for 3 hr at 37C.
- Extracted DNA using the Cica Geneus DNA Extraction Kit.

- Add 0.5 ml 20% skim milk to each tube. Store at -80C.
- Performed qPCR for detection of shiga toxin 1 and 2 gene but unfortunately we did not get result.

Result:

- Almost all samples isolated on CHROMagar ECC except for one (CB-1) which means we isolated *E.coli* most of samples. According to our result, we did not find any CTX and CPFX resistant *E. coli* from sheep and goat samples but we found one CTX resistance and one CPFX resistance E.coli from cattle samples (Table2).
- EHEC isolated from all goat and cattle farm and one sheep farm while we could not detect EHEC from Farm-B sheep (Table2).

Farm ID	Animal species	Sample number	ECC	ECC+CTX	ECC+CPFX	CT-Mac	STEC
Farm A	sheep	10	10	0	0	4	4
	goat	10	10	0	0	5	5
Farm B	sheep	10	10	0	0	0	0
	goat	10	10	0	0	2	2
Farm C	cattle	11	10	1	1	9	4
Farm D	cattle	10	9	0	0	7	5

Table 2. Bacterial isolation result

SOCIAL ACTIVITIES:

During our training period we visited several institutions and met their researchers and staffs.
At the School of Veterinary Medicine (SVM), we met the Dean, Dr. Erdene-Ochir Tseren-Ochir, and Dr. Shinji Takai, the chief coordinator of the JICA project. They explained to us their collaboration and their previous projects and the ongoing projects and activities. We also visited the JICA Mongolia Office, where Dr. Keigo Nakamura, the representative of Agriculture and Private sector Development, gave us brief information about JICA's project in Mongolia including MJ-Vet project. Our visit to the FAO involved discussions with National project coordinator Drs. Enkhtur and Enkhtuya about their project to raise awareness of antimicrobial resistance. At the National Center for Communicable Diseases (NCCD), Dr. Baigalmaa introduced activities of the organization and her organization would like to collaborate with the veterinary sector conducting research on foodborne pathogens which they do not have enough capacity. At the Institute of Veterinary Medicine (IVM) Drs. Altanchimeg and Batbaatar explained about their SATREPS project and then showed their laboratories including their newly established BSL3 laboratory under the SATREPS "Control of Glanders and Tuberculosis project", which is 2nd BSL3 laboratory in Mongolia.

Figure 6. Visited institutions and projects

7今回の活動経験が、今後のOne Healthに関連した活動、国際共同研究、国際協力、国際連携等に与える影響（500字程度）[Impact of the experience on future One Health activities, international collaborative research, international cooperation, international collaboration, etc. (around 300 words)]
Before this training, I was familiar with various institutes and researchers in Mongolia but was unaware of the full scope of their activities. This training broadened my understanding of each field and potential future collaborations. In Mongolia, there was limited data on foodborne bacteria and their antibiotic resistance in both animals and humans. My research focused on foodborne diseases and antimicrobial resistance in Mongolia. I hope my research will contribute to improving the information gap. But I had not presented my research results to other than veterinary field researchers such as human medicine researcher, local and international organization staffs etc. in Mongolia. This training provided the opportunity to discuss my findings on EHEC and AMR *E. coli*, which garnered interest, particularly from FAO coordinators and NCCD researchers. As a result, I will return to Mongolia in October to conduct research on EHEC, *Campylobacter*, and AMR *E. coli* with NCCD researchers. During this period, I will not only conduct research but also share methodologies learned in Japan, and I aim to learn new techniques from them. This research will contribute to the collaboration between human medicine and veterinary medicine, which is an important part of the "One Health" approach. If we detect foodborne bacteria in human patients, it will enhance our research and help us understand the connection between bacteria detected from humans and animals. This will allow us to have more reliable information on the prevalence and characteristics of food poisoning bacteria and AMR and to improve public health status for foodborne infections.
備考 [Remarks]

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