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(Abroad • ~~Domestic~~) OH Ally Course Submodule 4 report form 17thOct,2022 (Year/Month/Day)

(Student)

Name	Pondpan Suwanthada
Laboratory	Bioresources
Year (Grade)	D3
Internship institution	One Health Ally Course submodule4 OH onsite training (Surveillance of foodborne disease in Mongolia AY2022)
Internship period	Internship period: 10/05/2022 - 10/14/2022 (Departure Date from Sapporo: 10/05/2022, Arrival Date in Sapporo: 10/14/2022)
Purpose	To experience the onsite training on the topic of foodborne diseases

- The reason why you chose this institute

In developing countries, foodborne pathogens such as *Escherichia coli* and *Campylobacter spp.* are critical causes of diarrhea. They can pass through the entire food chain and potentially cause lethal diseases. Antimicrobial drugs have been used to compete with these pathogens in humans and animals; meanwhile, the bacteria developed the ability to defeat the drugs designed to kill them and consequently bacteria acquired resistant mechanisms. Mongolia, one of the developing countries, still lacks information on foodborne diseases, leading to infective treatment and antibiotic misuse. And, antimicrobial resistance (AMR) could occur. Therefore, I chose this activity to learn from the beginning step of the foodborne pathogen surveillance.

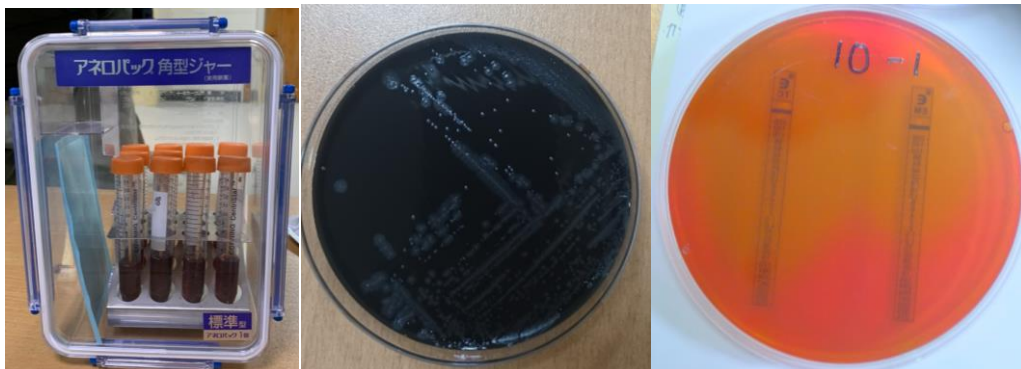
- Result of the activity (about 800 words、 provide photos, tables and figures that clearly show the activities during the period)

Totally 3 research activities were conducted, including the study on *Campylobacter spp.* in production animals, fluoroquinolone (FQ)-resistant and/or Extended Spectrum Beta Lactamase (ESBL)-producing *E. coli* and the detection of milk-borne pathogens using qPCR. On 6th Oct 2022, I experienced sample collections from feces and milk of cattle in the Tuv province located north of Ulaanbaatar, the capital city of Mongolia. Randomly rectal swabs were performed and collected in brucella broth and Preston broth to identify *E. coli* and *Campylobacter spp.*, respectively. Fresh milk collection was done by the farmers and put in sterile



Fecal sampling was performed in the Tuv province, Mongolia.

tubes. To isolate *E. coli*, CHORMagar was selected to use in this study. In addition, antibiotics, including ciprofloxacin and cefotaxime were added to examine the antimicrobial susceptibility. The inoculated agars were incubated at 37°C for 24 hours. On 7th Oct 2022, the result of CHORMagars showed that 85% of samples contained *E. coli*. The result showed that antimicrobial-resistant *E. coli* was not found. Next, three pure colonies from each CHORMagar were selected to conduct pure isolations in CHORMagars and incubated at 37°C for 24 hours. After 48 hours of incubation in the Preston broth, modified charcoal cefoperazone deoxycholate agar (mCCDA) was selected to isolate *Campylobacter spp.* The agars were kept at 37°C for 24 hours under microaerobic conditions by utilizing the AnaeroPack System. Next, on 10th Oct 2022, the pure colonies obtained from the CHORMagars were inoculated to the brucella broth. Mueller–



Preston broth, modified charcoal cefoperazone deoxycholate agar (mCCDA) were selected to isolate *Campylobacter spp.* and E-test were performed determine their antimicrobial susceptibility.

Hinton with lysed horse blood agars were prepared to perform an antimicrobial susceptibility test against ciprofloxacin, tetracycline, erythromycin, and nalidixic acid utilizing E-test. On 11th Oct 2022, the antimicrobial susceptibility test was performed using the inoculated broths. Moreover, DNA extraction from milk was conducted to detect the milk-borne pathogen, particularly Brucellosis, using the DNeasy® PowerFood® Microbial kit. On 12th Oct 2022, I experienced quantitative PCR (qPCR) to detect *Brucella spp.* using obtained DNA. As a result, there were positive farms for Brucellosis; interestingly, abortion in cattle had not been reported. The antimicrobial susceptibility test of *Campylobacter spp.* was evaluated on 13th Oct 2022 because of its incubation period. This is the first time to detect FQ-resistant *Campylobacter spp.* from ruminants in Mongolia. (FQ-resistant *Campylobacter spp.* from chicken was recently reported.)



DNA extraction was demonstrated.

Not only the research aspect, but I also experienced non-research activities. My team and I visited Hostai National Park, home to the rare and endangered Przewalski's horses. The Przewalski's horses are the last truly wild horse with unique mitochondrial DNA, suggesting that they diverged from a common ancestor 500,000 years ago. Therefore, the national park was currently focusing on reproductive physiology to

conserve this breed. Various kinds of animals were observed in the national park, including the Przewalski's horses, reindeer, sheep, goats, and horses. I learn Mongolian history and culture by visiting the museum inside the national park. Moreover, I attended the Tumen Ekh Ensemble of Traditional Cultural Heritage, where a group of outstanding artists and forerunners showed national song and dance ensembles. I was impressed by their capability to create music using metal, stone, bamboo, leather, cattle hair, and wood, which were distinguished from other countries in the world. I also visited several organizations during my time in Mongolia, including the Mongolian University of Life Sciences, Institute of Veterinary Medicine, Ulaanbaatar Veterinary Department, Japan International Cooperation Agency (JICA) Mongol Office, Japan Overseas Cooperation Volunteers (JOCV) at Unu Enkh Neuro Rehabilitation Hospital, Mongolia-Japan Teaching Hospital, and JICA Technical Project office.



A herd of Przewalski's horses

By visiting, I learned about the collaboration with Mongolia and Japan, especially via the JICA project. The project was aiming to achieve human security and quality growth not only in Mongolia but also the countries around the world. To ensure sustainable economic growth and social development, JICA provided financial support and urban infrastructure considering their



The presentation on Mongolia-Japan collaboration.

environment and disaster prevention. For example, JICA provided a project on a start-up accelerator program in Mongolia. The project supported a start-up company targeting solving social problems during the pandemic utilizing new technology such as mobile applications. Finally, selected companies launched their business model and technologies that could contribute to implementing the Sustainable Development Goals (SDGs), for instance, the mobile application for disease prevention. This project was outstanding for me because it could improve the industry's diversification and strengthen the future regional development strategy. Moreover, I was inspired by the volunteer from JOCV who currently was working at Unu Enkh Neuro Rehabilitation Hospital to contribute to the society. He graduated from the university in Japan;

however, he would like to improve the quality of people life not only in Japan, but also developing countries and undeveloped countries.

- What do you think the positive impact of the activity will have on your further career path?

This activity could impact on my future career path both in academic aspect and non-academic aspect. I have learned zoonosis problems of Mongolia where has completely different geographic and problems from Thailand, my home country. Also, this was the first time I experienced onsite training outside Japan and Thailand. The training was challenging because of the limited resources and time. Undoubtedly, I would apply this experience to my future work on the surveillance system in my country. Moreover, I got opportunities to visit several organizations which would help contributing the future research and collaboration.

- Advice for your junior fellows

The only advice I would like to give juniors is to develop a skill apart from studies, suggesting soft skills. This soft skill will help you get through life better and get on with people who came from multidisciplinary and multicultural area.

Approval supervisor	of	Institution • Official title • Name
		Division of Bioresources
		Research Center for Zoonosis Control
		Hokkaido University
		Professor
		Yasuhiko Suzuki

- ※1 Send the electronic file to the WISE Program Office
- ※2 Attach a copy certificate of the content of internship activity that is prepared by the counterpart at the internship institution (any form with a signature of the counterpart).
- ※3 The Steering Committee for the WISE Program will first confirm the content of this report and report will be forwarded to the Educational Affairs Committee for credits evaluation.