


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, 2023
実施期間 [Periods]	2023. 06. 11. - 2023. 06. 19.
共同実施者 [Other participants]	SATO Keisuke, ERDENEBAT Temuulen, MAEDA Aiko, KUMAR Ratnesh
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 120 words)]	
<p>Before entering graduate school, I had worked as a Brucellosis inspector for cattle in South Korea, which sparked my interest in the current outbreak of Brucellosis in other countries. Additionally, I have noticed a lack of investigation into foodborne diseases caused by pathogens such as <i>Escherichia coli</i> or <i>Campylobacter</i> spp., as well as a lack of characterization of the causative agents, including antimicrobial resistance, in developing countries. As a veterinarian in South Korea and a PhD student studying bacteria, I personally felt that this program was the best reflection of the value of One Health. Therefore, I applied this program because I want to contribute to the improvement of international public health by utilizing my knowledge and experience.</p>	
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)]	

### DAY 1 (6 / 12)



After departing from Incheon, South Korea, we arrived at Chinggis Khaan International Airport in Ulaanbaatar, Mongolia. We visited the Japan International Cooperation Agency (JICA) branch office located at the School of Veterinary Medicine of Mongolian University of Life Sciences, where we had the opportunity to introduce ourselves and exchange greetings with Dr. Chihiro Sugimoto, the chief coordinator, and other JICA staff. Once we checked in at our accommodation, we headed to cattle farms in collaboration with Mongolian counterpart researchers to identify the causative bacteria of foodborne diseases in Mongolia. Upon reaching the first farm at the scheduled time, we found that all the cattle were grazing freely, as Mongolia still maintains its nomadic culture. While waiting for the cattle to return, we engaged in casual conversations with the Mongolian researchers about Mongolian culture in a traditional house called ger, which served as the farmer. After some time, we were able to collect rectal swabs samples, fecal samples, and milk samples from 10 cows on the first farm. We then proceeded to the second farm and followed the same procedure, collecting samples from an additional 10 cows, totaling 20 cows. After returning to the laboratory, we completed the preparations for the experiments the following day.

### DAY 2 (6 / 13)



To determine the presence of antibiotic-resistant bacteria and Enterohemorrhagic *Escherichia coli* (EHEC) in meat products, we headed to the slaughterhouse in the morning. It was a day for horse slaughter, and we collected a total of 10 samples from five carcasses, dividing them into upper and lower surfaces. After completing the sample collection, we visited the Institute of Veterinary Medicine in Mongolia, where Dr. Batbaatar and the heads of various research departments guided us through the facility. We then returned to the laboratory and began the pre-processing and culturing of the samples collected yesterday and today. After observing the process of extracting DNA of *Brucella abortus* from milk, we inoculated the 20 samples collected from the farm onto CTX and CPF agar for antibiotic-resistant bacteria identification. Simultaneously, we directly inoculated the same 20 samples onto CT-MacConkey agar for EHEC identification without pre-enrichment. For the carcass surface samples, we performed serial dilution and inoculated them onto 3M Petrifilm to determine the presence of Enterobacteriaceae.

### DAY 3 (6 / 14)



This morning, at the JICA office, I had the opportunity to meet with Dr. Sugimoto, who introduced the office and detailed information about the ongoing veterinary education reform and veterinarian retraining project in Mongolia. In this lecture, I was able to see the actual progress in Mongolia's veterinary education level through statistics data. The retraining program for veterinarians, which started in 2021, was designed to further enhance the quality of

veterinary care in Mongolia. However, considering Mongolia's inadequate urbanization and vast territory, it seemed challenging to conduct group education. Therefore, it was necessary to explore effective methods. Afterward, we moved to the laboratory to check the results of the culturing of *E. coli* from yesterday's inoculations. No antibiotic-resistant bacteria were detected in the 20 farm samples. Although some normal bacteria and Enterobacteriaceae were detected in small amounts from surface samples of carcass, Professor Horiuchi mentioned that there were even fewer bacterial counts than in Japanese slaughterhouses, indicating excellent hygiene conditions in the slaughterhouses. After confirming the experimental results, we visited the Mongolian technical college, known as "Kosen" in Japanese. The teachers there were fluent in Japanese, and we had the opportunity to appreciate various works created by the students, such as cars and robots. Kosen, a type of school not found in Korea, provided me with a very novel experience. It seemed to have several advantages, such as the ability to quickly engage in practical work.

#### DAY 4 (6/15)



On that day, we visited several collaborating institutions. First, we visited the General Authority for Veterinary Services in Mongolia and had a discussion with Director Narantsuya. Through the conversation, I learned that Mongolia has been effectively managing Foot-and-Mouth Disease, which was quite surprising considering the recent significant outbreaks even in South Korea, where vaccination against the disease is conducted. After the brief visit, we went to the JICA main office and received explanations about various ongoing projects. Afterwards, we visited the National Center for Communicable Diseases (NCCD) and had discussions with Deputy Director Dr. Baigalmaa and other researchers. The researchers at NCCD showed great interest in our activities and were highly proactive in promoting collaboration between veterinary and medical fields. After visiting a total of three collaborating institutions, we returned to the laboratory and checked the results of the EHEC inoculation on CT-MacConkey agar after pre-enrichment in mEC liquid media. Out of a total of 10 meat samples, colonies were detected in four, and out of 20 fecal and rectal swab samples, pink colonies were observed in 11 samples, while one sample showed white colonies. Due to time constraints, we couldn't perform accurate bacterial identification, however the Mongolian researcher plan to conduct next step to identify EHEC through vtx PCR and vtx immunochromatography.

#### DAY 5 (6/16) – DAY 7 (6/18)



We visited the laboratory to observe an experiment that used RT-qPCR to detect the presence of DNA of *B. abortus* in milk samples. While waiting for the PCR results, Professor Horiuchi gave a lecture on the basic principles and characteristics of RT-qPCR. I could sense the high interest of the Mongolian researchers in the topic. Approximately two hours later, we were able to confirm the amplification of DNA of *B. abortus* in several samples, including milk samples that tested positive in the milk ring test. The remaining DNA will be analyzed using Next-Generation Sequencing to differentiate specific sequences between vaccine strains and field strains of *B. abortus*. This analysis will be valuable in establishing a vaccination program. Early in the morning of June 17th, we headed to Hustai National Park to see the wild horses called Takhi. After three hours, we arrived at Hustai National Park, where we received a brief lecture on the history and key points of interest in the park from Dr. Ganzorig. The weather was excellent so, we had the opportunity to observe wildlife using binoculars while driving through the vast grasslands. We were able to observe various animals such as wild horses, as well as elk, deer, and birds. After few hours of observation, we enjoyed a barbecue to conclude our itinerary with the JICA staff, who had been immensely helpful throughout the week.

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)]

While the term "One Health" has only been around for about 20 years, the concept of considering the interrelationship between humans, animals, and the environment and promoting interdisciplinary and transnational cooperation has existed in the distant past. Personally, I believe that a strong willingness to actively participate in programs and collaboration among various stakeholders are crucial for effectively achieving the goals pursued by One Health. During this business trip, I could feel a strong determination to collaborate among medical and veterinary professionals in Mongolia to eradicate infectious diseases occurring in their country. Despite having a significant livestock population, the level of veterinary education and research in Mongolia has been notably lower compared to other advanced countries. Despite that, the researchers at NCCD welcomed us warmly and showed great interest in the ongoing projects in Mongolia, specifically regarding Hemorrhagic Colitis caused by Shiga toxin-producing *E. coli* and Brucellosis. They asked specific questions about our research methods and progress, and a few days later, NCCD sent some researcher to the College of Veterinary Medicine to learn our ongoing experiments. I believe that the positive effects arising from active collaboration among various institutions in developing countries enhance the value of the diverse types of aid provided by developed countries. I agree that the One Health program has a significant positive impact on doctoral students throughout this series of processes. Students can expand their personal networks and develop a comprehensive and interdisciplinary perspective. Moreover, the knowledge gained directly from such collaborative fieldwork will be immensely helpful in setting the direction of research that can be translated into practical solutions for society, rather than conducting research for the sake of research. The importance of international collaboration and the utilization of interdisciplinary expertise gained through this One Health activity has become one of the crucial considerations for me when seeking employment after completing my doctoral studies. I will continue to actively participate in various activities, striving to understand and promote the value of One Health.

備考 [Remarks]

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