

This report should be submitted within 2 weeks after you return to Japan.

(Abroad) Internship report form (Student)

2017/12/11 (Year/Month/Day)

Name	Woongchul SHIN
Laboratory	Biochemistry
Year (Grade)	DC 3
Internship institution	Institute of Molecular Biotechnology (IMBA), Vienna, Austria
Internship period	Internship period: 30/10/2017 - 24/11/2017 (Departure Date from Sapporo: 27/10/2017, Arrival Date in Sapporo:28/11/2017)
Purpose	The goal of the internship is to learn scientific knowledge and techniques in the field of gene editing technology from world leading researcher and to get the information on future carrier path after graduation

- The reason why you chose this institute

Institute of Molecular Biotechnology (IMBA) is one of the world leading institutes focusing on applicable research into future medicine to improve the quality of life for all mankind. The great vision for all mankind of IMBA attracts me to apply for the internship. Also, through the SaSSOH 2016, I had a chance to meet the principle investigator of the institute (Dr. Koo) directly. During his presentation and conversation, I could feel his confidence and humble personality. It gave me huge impression. That makes me choose the institute and principle investigator.

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

I visited Institute of Molecular Biotechnology (IMBA) in Vienna, Austria for my internship. 2016, October, my supervisor, Prof. Kazuhiro Kimura, suggested me to search for host laboratory and principal investigator for my internship and I started the preparation. First, I deeply discussed with my supervisor about the purpose or aim of this official internship to make it more meaningful time. I made the aim of this overseas activity to learn scientific knowledge and techniques in the field of gene editing technology from world leading researcher and to get the information on future carrier path after graduation. After finishing the discussion, I started to write e-mail to ask hosting the internship to a principal investigator Dr. Koo who I met in 2016 SaSSOH in Institute of Molecular Biotechnology (IMBA) with sincerity and he delightfully gave me an invitation letter. The IMBA is an independent research organization founded as a joint initiative of the Austrian Academy of Sciences in cooperation with the company Boehringer Ingelheim, an international pharmaceutical company with headquarters in Germany. IMBA operates in

close collaboration with the Research Institute of Molecular Pathology, Boehringer's basic research center both located next to each other at the Campus Vienna Biocenter. IMBA's vision is to understand the fundamental molecular mechanism in molecular biological processes and currently focus in cell biology, RNA interference, and epigenetics research performed by independent research groups. After receiving the acceptance mail from IMBA, I adjusted schedule and contents of the internship discussing with my supervisor and Dr. BK Koo. Finally, the internship period was fixed to 1 month in Nov. 2017 and the main schedule and contents of the internship is aiming to learn CRISPR/Cas 9 and organoid model to introduce the techniques into my research. Another important purpose of the internship is discussion with BK Koo on my future carrier path. After fixing the schedules, I applied my internship to Leading office and got the interview from Leading committee and staffs. With internship permission from Leading committee, I started booking flight to Vienna and accommodation with help of Leading staffs. After finishing every preparation, I flighted into Vienna end of October.

The first week of internship, was mainly focusing on introduction of the host laboratory and IMBA. Staffs from IMBA took me to introduce the facility. The most impressing system was core facility in IMBA. The core facility is supportive system for researcher who works in IMBA. Core facility in IMBA includes Bioinformatics department for sequence analysis, scientific data mining with hardware and software infrastructure, Bio-optics facility for analytical flow cytometry, cell sorting and microscopy, Genomics department for DNA microarray services and next-generation sequencing devices, Protein chemistry department for mass spectrometry experiments, Max Perutz Library provides information service for all literature needs, and Animal house department for managing mice colonies and Service department for the workshop management. Also, I got the introductory lecture on organoid and CRISPR/Cas 9 system from senior postdoctoral researcher. The organoid is a simplified version of an organ model made by adult stem cell. It is a major technological breakthrough that has already been established as an essential tool in many basic biology and clinical applications. Also, CRISPR/Cas9 has triggered a revolution in which laboratories around the world are using the gene editing technology for innovative applications in biology. Dr. Koo in IMBA has investigated on adult stem cell in intestine using organoid model and CRISPR/Cas9 technology and obtained excellent results on this field. Also from first week, I started to attend regular seminar which is held on every Monday from 1:00 P.M. Every time, 2 or 3 people who work at IMBA present their recent research results and I was surprised of their high level of the research which is going on IMBA. Also, laboratory in IMBA has regular group meeting on Friday afternoon. One researcher introduces his or her recent research to laboratory member in turn. From second week, I started to culture of intestinal organoids in different media conditions. With help of laboratory member, I could culture the organoid successfully. From 3rd week, I started to genetic manipulation of organoid using lenti virus infection and electroporation with the designed gRNA and Cas9 cDNA vectors or GFP vector. In final week of internship, I discussed with Dr. BK Koo for future

carrier path. He gave me information on postdoctoral position and grant in European research facility. He also gave me the advice what I have to prepare before graduation.

Through the internship, I could broad my horizon for researches and it was unforgettable experience to me. During preparation and attending the internship, I could learn various knowledge on research and get great advices and information on my future carrier path. It was really great opportunity to me and I really appreciate the leading committee and staffs, BK Koo's laboratory member and my laboratory member for supporting me attending the internship.

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

Experiencing a high level of research institute in Europe is most huge positive impact to me. I could see how their project is going on by attending their laboratory meeting. Also, I could see their great facilities to support researchers working in IMBA and it was huge stimulation to me. Also, I could get the information on postdoctoral position and grant in Europe by talking with BK Koo. I think it will be an opportunity for finding a job after graduation. Learning culture of intestinal organoid and CRISPR/Cas 9-based genetic manipulating is also great positive impart to me.

- Advice for your junior fellows

First of all, I want to say do your best attending the internship with through preparation. Although attending the internship is ourselves, Leading office, host laboratory and our laboratory put much time and effort to support our successful internship. I also got a lot of support from them. Thus, I think we have to prepare and attend the internship with holding sincerity and appreciation for not only for ourselves but also for the people who support you.

Approval of supervisor	Institution • Official title : Hokkaido University, Graduate School of Veterinary Medicine, Professor Name : KAZUHIRO KIMURA
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- ※1 Send the electronic file to the Leading School section, International Affairs 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 of the Leading Program will first confirm the content of this report and report will be forwarded to the Educational Affairs Committee for credits evaluation.

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