（Abroad・Domestic）Internship report form（Student） 2018/05/06
(Year/Month/Day)

Name	Md Atiqul Islam
Laboratory	Laboratory of laboratory Animal Science and Medicine
Year (Grade)	D4
Internship institution	Institute for Genetic Medicine, Hokkaido University, Japan
Internship period	Internship period: 05/07/2018 - 05/25/2018 (Departure Date from Sapporo: MM/DD/YYYY, Arrival Date in Sapporo: MM/DD/YYYY)
Purpose	To explore the postdoctoral job opportunities and research networking

- The reason why you chose this institute?

I have been experiencing DNA based experimental methods such as genotyping. So, I realized that I need to extend my understanding with RNA based study that will support to enhance my understanding in molecular genetics to get a post-doctoral position in the field of genetics and infectious diseases. Therefore, I was searching a suitable institute that could full fill my requirements and I have found this institute is suitable for me as because it is well known and equipped with modern facilities to study RNA biofunction and publishing the works in high impact journals. One recent article of this institute that is published in the EMBO journal entitled "Unusual semi-extractability as a hallmark of nuclear body-associated architectural noncoding RNA" that explained about an improved RNA extraction method that bring my high attraction to choose this institute. There might have other well established or famous institute in the world. However, Genetic Medicine, Hokkaido University was most feasible for me in my current situation, as I had to maintain my experimental mice for PhD research. So, there were two important reasons that I focused to choose this institute such as it could full fill my requirements to have a basic experience with RNA based study, facilitating to get a postdoctoral position in the research direction, such as the role of long non- coding RNA for host gene expression or silencing in infectious diseases and it was very feasible in my current PhD course situation so that I was able to monitor my current works in the off days of the internship activity.

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

I have completed internship at Prof. Hirose's lab in the institute for genetic medicine, aiming to understand RNA biofunction as well as to look for future research position and networking. Prof.

Hirose discovered the architectural ncRNAs that function as the skeleton of intracellular structure and his lab also involved in the development of new methodologies for identification of novel genomically encoded functions of ncRNAs. I mainly worked with the guidance of a PhD student (Mahmoud Aly) at Prof. Hirose lab to understand the nuclear stress body and its associating protein components assemble on the block ncRNAs (Satellite III). Nuclear stress bodies (nSBs) were discovered in the late 1980s and recognized its involvement with cellular response to stress agents (Mahl et al. 1989). Nuclear stress bodies (nSBs) are unique subnuclear organelles which form in a response to heat shock. However, the exact molecular mechanism and organizations of nSBs still not well known. I have used different cell lines, such as HeLa, CHO wild type and CHO humanized chromosome 9 cell lines to identify nuclear stress body associating components. First of all, I have used immunofluorescence technique to detect scaffold attachment factor B (SAFB) and Heterogeneous nuclear ribonucleoprotein -M (hnRNPM) that are considered as nSBs components by using HeLa cell line. (Figure 1A, 1B).

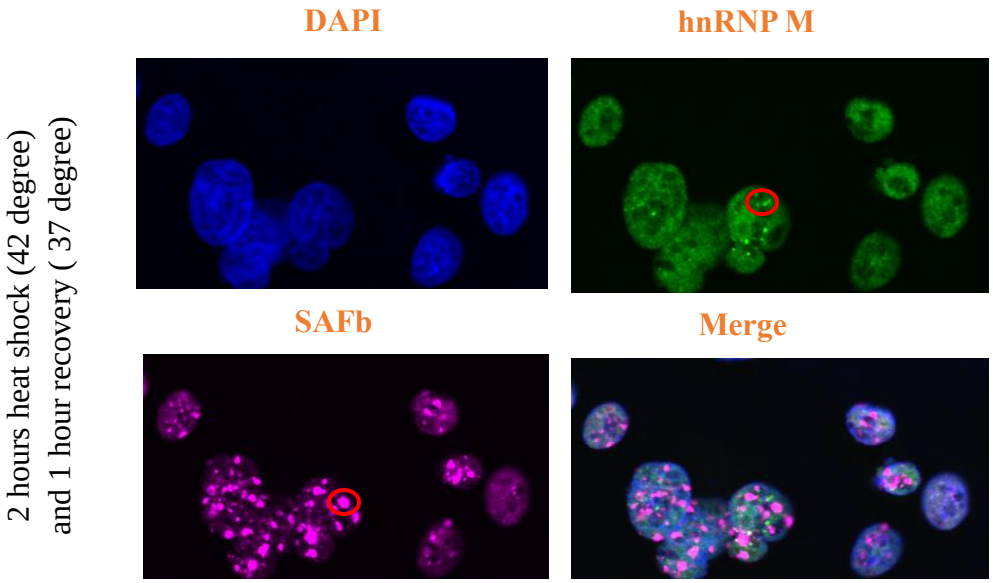

Figure 1 A) Detection of hnRNPM and SAFb of the nuclear stress body in HeLa cells, indicated with red circles.

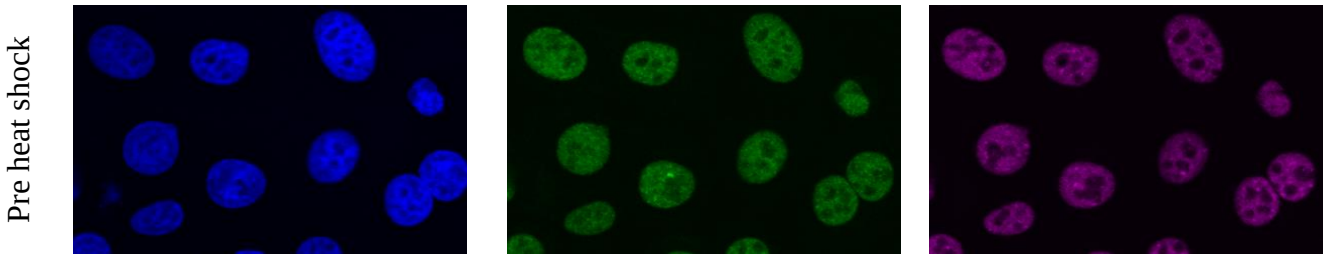

Figure 1 B) No hnRNPM and SAFb of the nuclear stress body (no nSBs)

After that, I detected the lncRNA, Satellite III (SAT III) which is considered as backbone of nSBs where different proteins are assembled such as SAFb and hnRNPM. For this experiment, I have used Stellaris Fluorescence In Situ Hybridization (FISH) technique. We wanted to address a question that in what heat shock condition these components are mostly expressed? To answer this question, I have used the HeLa cell line in different heat shock condition such as 2 hours heat shock, 2 hours heat shock 1-hour recovery, 2 hours heat shock 2-hour recovery, 2 hours heat shock 4 hours recovery and 2 hours heat shock 8 hours recovery. SAT III lncRNA is frequently expressed in all conditions, but highly expressed in 2 hours heat shock and 1-hour recovery (Figure 2), 2 hours recovery. Parallelly, expression of hnRNPM and SAFb to assemble on the blocks of lncRNA (Satellite III) has great variation depending on the heat shock treatment and recovery time. (Unpublished data).

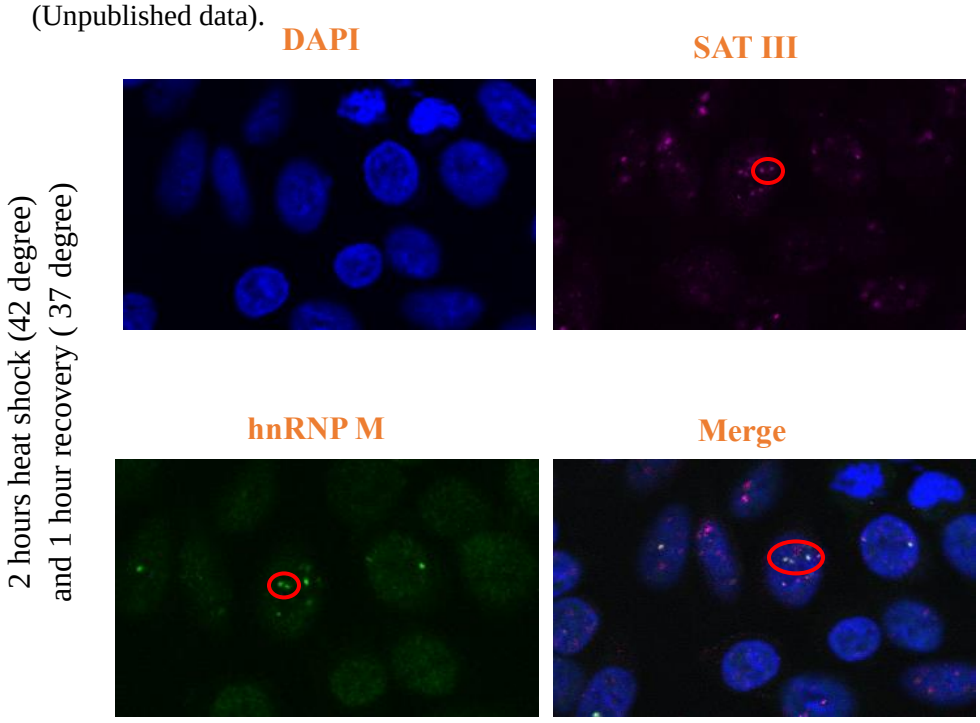

Figure 2: Detection of SAT III and hnRNPM nuclear stress body. Merged panel shows co-localization of hnRNP with SAT III. Indication with red circle shows SAT III, hnRNPM respectively.

One previous study discovered that chromosome human chromosome 9, 12 and 15 could control the expression of nSBs component; SAT III and SAFb. Therefore, we would like to address a new question that hnRNPM and SAFb are composed of the same source of SAT III or different source of chromosomes. I have performed the experiments using Chinese hamster ovary (CHO) cell lines (wild type and humanized chromosome 9) and acquired some interesting data (unpublished).

Although nSBs have not been fully understood about the nature and function. However, it could reveal a large center for the recruitment of transcription and splicing factor which may involve in the global control of gene expression in any adverse situation of the physique.

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

After my graduation, it could open an opportunity for a future research position, even though if I cannot get a job in this institute but it might be possible to use this contact for the future research networking and collaboration and after that, I will be looking for a permanent research position or job in the related field of genetics and infections in connection with laboratory animal medicine in my home country that might be the significant pathway to continue the research works over the next decade of my career with an academic position, where I can use my expertise as a zoonosis control expert to contribute in "one world one health" approach.

- Advice for your junior fellows

- ✓ A good planning/schedule is highly important to manage your works
- ✓ Please also think how to build up your own research community/networks for future research career.

Approval of supervisor	Institution・Official title・Name Graduate School of Veterinary Medicine*Professor* Takashi Agui

※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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