

## The NIBB Internship program

The NIBB Internship program, started in 2009, is a hands-on learning course for overseas students designed to give high-quality experience in real world research and focused education of biology. At the same time, this program aims to internationalize the graduate students of SOKENDAI (Graduate University for Advanced Studies), giving them the opportunity to get to know students and interns with various cultural customs. Another goal of the program is to build connections through providing education to the people who will form the core of international research networks in the future.

To participate in this program, applicants who would like to experience research at NIBB must supply the name of the lab they would like to visit as well as their reasons for choosing it, and a letter of recommendation. Based on this information applicants are chosen to spend set periods of time participating in specific research activities in the lab they applied for. Round trip airfare and housing expenses are provided by the NIBB Internship Program.

In FY 2018 there were 36 applicants, out of which seven interns were selected. These interns were from universities located in six countries (China, Indonesia, Philippines, Thailand, Vietnam, and Japan) and spent periods ranging from two to twelve weeks experiencing life as a member of a research team. Moreover, one intern from the Republic of Serbia stayed at NIBB on two weeks by their own travel grants.

### Report from a participant

**Sheena Josol**

**University of Santo Tomas, Philippines**

My name is Sheena Josol and I am a Biochemistry graduate from University of Santo Tomas, Philippines. As someone who had just earned her Bachelors degree, I admit to having limited knowledge which I believed is meant to be enhanced. Thus, it is incredibly fulfilling to be selected on this Research internship program hosted by one of the prestigious research facilities in Japan. I was specifically granted a chance to spend my internship in the Division of Quantitative Biology under the supervision of Professor Aoki.

In my 2 months stay, I was given two research projects which independently aimed to (1) reconstitute tumorigenesis and oncogene addiction in a manner dependent to Trimethoprim and (2) dissect molecular mechanisms of stochastic ERK activation, both of which involved the use of wildtype MCF10A cell lines. In the first project, the oncogene of interest that we intended to induce are the ones involved in ERK signaling pathway--the G protein KRas and the protein kinase BRaf specifically its KRasG12V and BRafV600E mutant version respectively which are widely implicated in several human cancers.

The first step in inducing oncogene addiction was to establish the needed cell lines which in this case is a Dihydrofolate reductase (DHFR)-expressing MCF10A cell line. As we all know the best way to ascertain the function of one biomolecule is to remove it from the system and see what happens

next. The TMP-DHFR system makes it all possible. This model system works in such a way that it requires the protein of interest to be fused to a destabilizing domain like DHFR which targets it for degradation. The protein is then rescued by the addition of TMP that binds the DHFR and inactivates it which in turn enables it to regulate the stability of protein in a rapid, reversible and tunable manner.

Through imaging, western blotting and cell proliferation assay which I spontaneously did during the course of my internship, I was able to analyze the stabilizing effect induced by TMP, quantify the expression levels of induced oncogenes and examine whether our selected cell line acquire cancer like phenotypes after oncogene induction respectively. As for my second project, due to limited time I was not able to achieve the main goal of studying the stochastic ERK activations.

I am beyond grateful to every member of the lab who humbly imparted their knowledge to me especially to Aoki-sensei and to my mentor Reina-san who patiently taught and guided me with everything. I would also like to express my gratitude to Onoda-san, the secretary in our lab, whose unflinching efforts made my first ever Autumn experience the best. I really appreciate the good laugh I've shared with everyone during lunch time and all the parties they have prepared just for me.

Overall, this experience has not only filled me with significant learnings in the field of science but also let me gain great memories, learn meaningful life wisdom, establish lasting friendship with people from different parts of the world and lastly brought me to wonderful places that made me appreciate the beauty of Japan more. Indeed, Japan is a beautiful country but more than everything else, I think the culture of hardworking, disciplined and kind people makes it more special.

