STEPS Students Report

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This summer from 1st of August to 31st of August 2018, I was participating in Students and Researchers Exchange Program in Sciences (STEPS) and studied for one month at the Department of Biological Sciences, Graduate School of Science, The University of Tokyo.

My research was devoted to measuring the activity of mutant SaCas9 protein, which is a tool for genome editing Nowadays it is very important to know how we can use our tools and experience to edit and fix the genome. The genetic diseases of humankind are becoming the most widespread throughout the world in the 21st century. That was a reason I decide to work in the field of Regenerative medicine at MSU and get experience from Tokyo University in the field of Cas9 researching.

First day in Japan was quite hard. It was really hot and humidity was very high. Successfully I find Fujimi office and left my signature in papers and got keys from my dormitory. Few minutes later (approximately 30 minutes), I was in my room. Room was cozy but not very big. I cleaned the room and took some rest. In evening, I was exploring nearest neighborhood: found some supermarkets and drug stores.

Next day was unreal interesting. My coordinator – Valeria-san – met me in the 1st floor of Building of science, give me some information about Tokyo and accompanied me to my laboratory on 6th floor. First man I met was Nishimasu-sensei.
Nishimasu-sensei showed laboratory and explained to me my science work during my stay. My work consisted from introducing the mutations in the plasmids with guide-RNA and sequence for SaCas9. For introduction I was showed how to use the micropipes, how to work with E.coli (March type, Rosetta type), how to use PCR and gel-electrophoresis, microwave appliance for measurement of concentrations of DNA. Also scientists from my lab taught me how to perform different microbiology manipulations, for example how to use shakers, centrifuges, thermostats, autoclaves.

Some days I was sowing bacteria to LB substratum with antibiotics using special revolving stand, ethanol, spatulas and some fire. Colleagues explained me the rules how to work with bacteria and how to cultivate them. After that, I was able to perform another step. This step was consisted from transduction the vectors to human kidney cells. We was working in special clean room and using special box to protect cell from contamination. After adding vectors to the human cells, we left cell for 3 days to

incubate.

While human cells were incubated, I was introducing another point mutation in the SaCas9 vector and purification the proteins. Purification consisted from 2 steps. First steps was affinity-chromatography, another step was cation-exchange chromatography. To conduct these two steps of purification I was need to prepare two types of buffers. All steps must be performed in cold room (the temperature approximately was about -4 degrees).

Finally, when everything was ready we were able to measure the activity of mutant protein. For this task, we used MultiNa. We got great results! Hope our work will help to people in nearest future.

During my stay, my supervisors and all laboratory team members were always ready to help. I never got bored. we were working from early morning until the night. All lab members gave me a lot of advices and ideas how I can improve my skills in science, where to pay more attention.

Some days I spent great evenings with laboratory members: eating in beautiful restaurants, (I had the great welcome party ever!), doing sport at Ueno kickboxing gym, and Nishi-Nippori boxing gym, trying EXTREMLY BIG RAMEN for the first time in my life.

In addition, I traveled through Japan: It was pleasure for me to reach the top of the Fuji-san using Subashiri-trail. One day I visited a medical faculty of Niigata University, the other day I visited the nice city in the mountains – Karuizawa, and the Nikko, even I got to Odaiba Oedo-onsen using the monorail. I learned a lot about Japanese culture, traditions, lifestyle and nature.