STEPS Students Report

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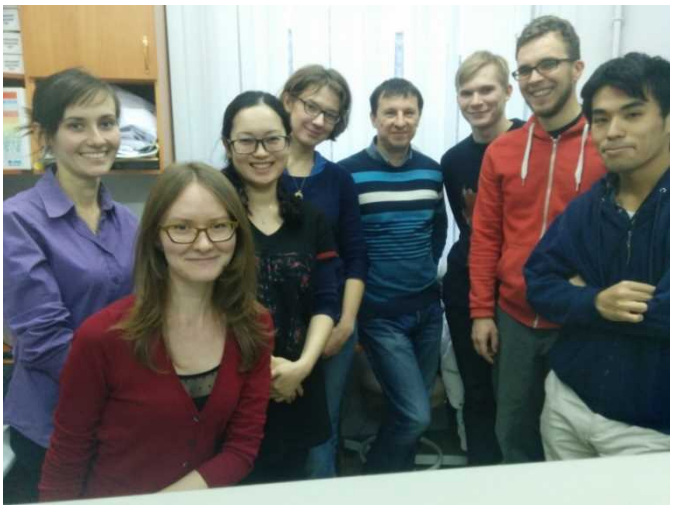
Before starting the program, I spent a long time to find an appropriate laboratory and understand their research background. It was a very tough work to obtain any information about Russian laboratories on the Internet because many laboratories have not prepared their English websites and not frequently updated them. At last, I fortunately found a laboratory where a new interesting technology called "single particle FRET (spFRET)" is utilized. Conventionally, structures of biomolecules, such as proteins and DNAs, were detected with x-ray crystallography, but spFRET enables us to detect more dynamic and heterologous characters of structural changes of each biomolecule. To learn the method and understand its potentials and limitations, I decided to stay in Prof. Studitsky's laboratory for a month. In order to apprehend what kinds of information were already revealed in their research and why they use the technology, I have read their previous research articles and related papers. By reading their websites and articles, I also got fundamental knowledge about the measurements with single molecular sensitivity. After I got a contact with Dr. Nikitin, who is a main member of the laboratory, he helped my understanding of their research.

In the Russian laboratory, I have performed spFRET experiments and discussed the results and methodologies with lab members. In the first two weeks, I prepared a DNA sample for spFRET experiments by following their procedures. The process, including PCR reactions, gel electrophoresis, enzyme treatment, and dialysis, was carefully optimized in the laboratory. In the latter two weeks, spFRET measurements were performed on the DNA samples in several experimental conditions to reproduce their experiments and reveal what kinds of additives, such as other DNAs and DNA-interacting proteins, affect the results. The spFRET signals were easy to obtain, but difficult to interpret. Therefore, we discussed what the best (most unbiased) criteria for extracting true spFRET signals from noisy background are. Moreover, we discussed what kinds of information can be obtained from the results. With the experiments and discussion, I obtained deeper understanding about the spFRET technology, which may be applied to my own research in the future.

Throughout the program, I had two helpful experiences. First, I could see another lifestyle of researchers. It was very surprising that researchers worked only 6 hours a day in the laboratory. But, researches may effectively proceed because a wide range of professionals

worked in the same floor and they could routinely give special advice to each other. The other finding was that although it was too difficult to communicate in Russian, we can talk and discuss in English. I was also glad to find that it was similar to me what they are trying to do and how they think about research. These experiences are useful to decide my future career.



It was my first stay in a foreign laboratory. All the things I have experienced during the program were interesting and stimulating to me. I am truly grateful to STEPS program, Prof. Studitsky lab members, and everyone who supported my fruitful stay.