

Sae Rome Choi

Graduation Year: Junior

College: Engineering

Major(s): Chemical Engineering

Minors(s): N/A

Scholar Group Membership: No

Did you received other funding for this project?: No

Could you have completed this project without CUSE funding? No

More details on CUSE funding assistance? CUSE funding was an extremely important in order for me to stay here in South Bend and carry on my research. An a student living outside of United States, it is not an easy task to stay here far away from home as it presents various financial limitations. I would really like to express my appreciation to CUSE for offering me this opportunity this summer.

Project Title: Interaction between Adipocytes and Cancer Cells

Project Location: University of Notre Dame

ND Faculty Mentor: Pinar Zorlutuna

Project Type: Research

Why did you undertake this project/experience? Deepen your knowledge of a topic or issue, Prepare for professional school (MD, MBA, JD), Career discernment and/or preparation

Did your funded experience help you:

[Deepen your understanding of your coursework or field of study]: Very Much

[Discern your interests and post-bac goals]: Very Much

[Become confident in your ability to set and achieve your goals]: Very Much

[Gain a more nuanced view of local, national, or global communities]: A Little

[Improve your written and verbal communications skills]:A Little

Tell us about your experience.

Over the summer, my main objective included finishing the design of my microfluidics device, and run several experiments to verify the functionality of the device. Moreover, I have also done experiments to compare the growth of 3T3L1 cells and adipocytes in different stiffness of hydrogels.

First of all, through the experiments with 3T3L1 cells and hydrogels, I grew 3T3L1 cells and adipocytes in GelMA low and GelMA high hydrogels. I grew a total of 24 samples, 12 for 3T3L1 cells and 12 for adipocytes. Each three sets were imaged at different time points: day 1, day 5, day 7, and day 9. For imaging, live/dead staining method was used. In addition to imaging, Alamar blue assay method was also used to analyze the growth of the cells. In the process of this experiment, I have experience various failures. These include failures in making the hydrogels and staining methods. However, the failures had taught me to figure out more

accurate ways of following the protocols. This has helped me a lot in gaining experience in the methods of analyzing cell growth and using the microscope.

Other than the experiment above, majority of the summer was dedicated to finalizing my device. In completing the device, I have run into many different troubles and failures. First, the flow through the device was not flowing out through the outlet stream but was leaking through the top chamber due to lack of pressure applied on the top chamber. Various trials were performed, but all of them had leakage failures. As a solution, I made a thin layer of PDMS and glued in to the top of the device, completing sealing the top chamber. Hence, the flow had successfully exited out of the device via the outlet stream. Another trouble was failure to form cell spheroids in the wells of hydrogels in the device. This problem arose because after forming the hydrogels and seeding the cells in the microwells, I had to manually move the hydrogel into the device using a spatula. Therefore, it was highly likely that the hydrogel could be distorted and the cells to be lost in the process. To solve this problem, I have tried moving the hydrogels in the device first and then seeding the cells in the device, but this had failed again for an unknown reason. Another possible solution was to increase the stability of the hydrogel by increasing the volume of hydrogel before it is solidified via UV treatment. This provided a more stabilized environment for the cells in the wells in the process of transporting the hydrogel into the device. Therefore, it led to a successful growth of cells in the device.

I learned many laboratory techniques this summer, but I believe a more valuable experience for me was to learn how to cope with different failures and how to use that experience for a more successful result. I am certain that these will help me continue to successfully design and perform experiments in Dr. Zorlutuna's lab throughout this school year.

Describe the impact this project had, both on you as a student-scholar and on the people you worked with.

As a student-scholar, this project had broadened my understanding of how microfluidics device are performed and how different cell line behave in certain ways depending on its environments. This will further guide me to develop more complex research questions in the future and work in a more cooperative environment with other graduate students. Moreover, my project with adipocytes was a joint project with my PI, Xiaoshan Yue. My experimental results with adipocyte and 3T3L1 cells will support her paper regarding 3T3L1 cells.

Describe how this experience is connected to your plans as a student or future professional.

My goal for joining this lab was to gain research experience in order to determine whether I would be a good suit for graduate school. More and more I do research here, I am learning how much dedication and sacrifice is required to accomplish a meaningful result. I am still not too sure about my career path. More than the scientific knowledge I have gained, I have learned how to work as a team and overcome barriers. Whether I decide to go into industry or to medical school, I believe what I learned over the summer will guide me through whatever failures or

obstacles I may face in my future career.

What advice would you give other students who are planning to pursue similar projects?

One thing I realized doing research is that a lot of the things I have planned to not always go as planned. It may be delayed, thrown out completely, or may be extremely successful too.

However, whatever the circumstances are, one needs to be always prepared to any kind of result and must come up with another plans that sometimes ends up being a more successful experiment. In addition, research requires a lot of patience and reading literatures outside of active laboratory work. Nonetheless, don't be discouraged and understand that it is all part of a long procedure that will lead to a greater end.

I acknowledge that this form has been filled out truthfully and to the best of my ability. I understand that this information will be shared with many different CUSE constituencies. As such, I have provided as much useful information as I was able. I understand that CUSE will not complete my award disbursement until this form is successfully completed. If I have any questions or concerns, I will contact CUSE before submitting this form. To illustrate that you understand all of these points, please enter your Notre Dame email in the box below.

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