Latent infection of HIV

My name is Seth Verkaik and this past summer I researched with Professor Anding Shen in the biology department along with a couple other students. As many people know, there is currently no cure for HIV, only treatment. A large part of this is because of a latent reservoir that forms in our T-cells. If active T-cells become infected and then return to a resting state or if resting T-cells are infected, they do not actively produce more HIV virus until the T-cells become activated again and when they are not actively producing virus. There is treatment for the active T-cells that produce more virus, but there is not treatment for getting rid of the latent reservoir of HIV in the resting T-cells. Our research is looking at the formation of this latent reservoir and what other cells aid in the formation of it. Each student had one specific thing they were researching and for me it was looking at the role of lymphatic endothelial cells in the formation of the latent reservoir in T-cells. Lymphatic endothelial cells are cells that line the vessels of your lymph system and they interact with the HIV virus and T-cells in our body and are important to research when looking at HIV.

On a typical day, I do many different things. Often I will have to split cells from one container to two new containers so they don’t become overgrown. I also have to plate cells in wells to conduct the experiments in, infect cells, and add media to cells so they have enough nutrients. Our experiments typical consist of 7 to 11 days. First, blood is drawn from a donor and we separate out only the T-cells from the donor’s blood. The same day we also plate the endothelial cells and the T-cells in the same wells. The second day of each experiment, all we have to do is infect all of the cells with HIV virus. From this point all that is left to do is replace the media so the cells won’t die and then run the cells through a machine called the flow cytometer to look at infection rates. This typically happens 6 days after the cells were infected.

I have been able to make some conclusions based on the research from this summer. I have found that lymphatic endothelial cells do increase productive infection rates. When infection rates of wells containing both T-cells and lymphatic endothelial cells and wells with only T-cells are compared, the T-cells that are in contact with endothelial cells have infection rates are often 2 to 3 fold higher than the infection rates of T-cells alone. Also, our research has shown that lymphatic endothelial cells also increase latent infection in T-cells as well.

Being able to do research at Calvin has been very beneficial to me. Because I have only completed my freshman year so far, I have not had a lot of lab experience yet. Researching this summer has helped me become much more comfortable in a lab setting. It also has taught me how to use a lot of lab equipment more precisely and efficiently along with teaching me how to better analyze data and be able to draw conclusions from that data. Also, I have learned a lot about how the immune system works because professor Shen doesn’t want us to mindlessly be doing work, she wants us to know what we are doing and how it fits into the bigger picture. Because of this she has spent a couple days teaching us about HIV infection and other parts of the immune system and it is very interesting to learn about, especially when it affects what you are working on every day. Being able to do research this summer has been very beneficial to me.