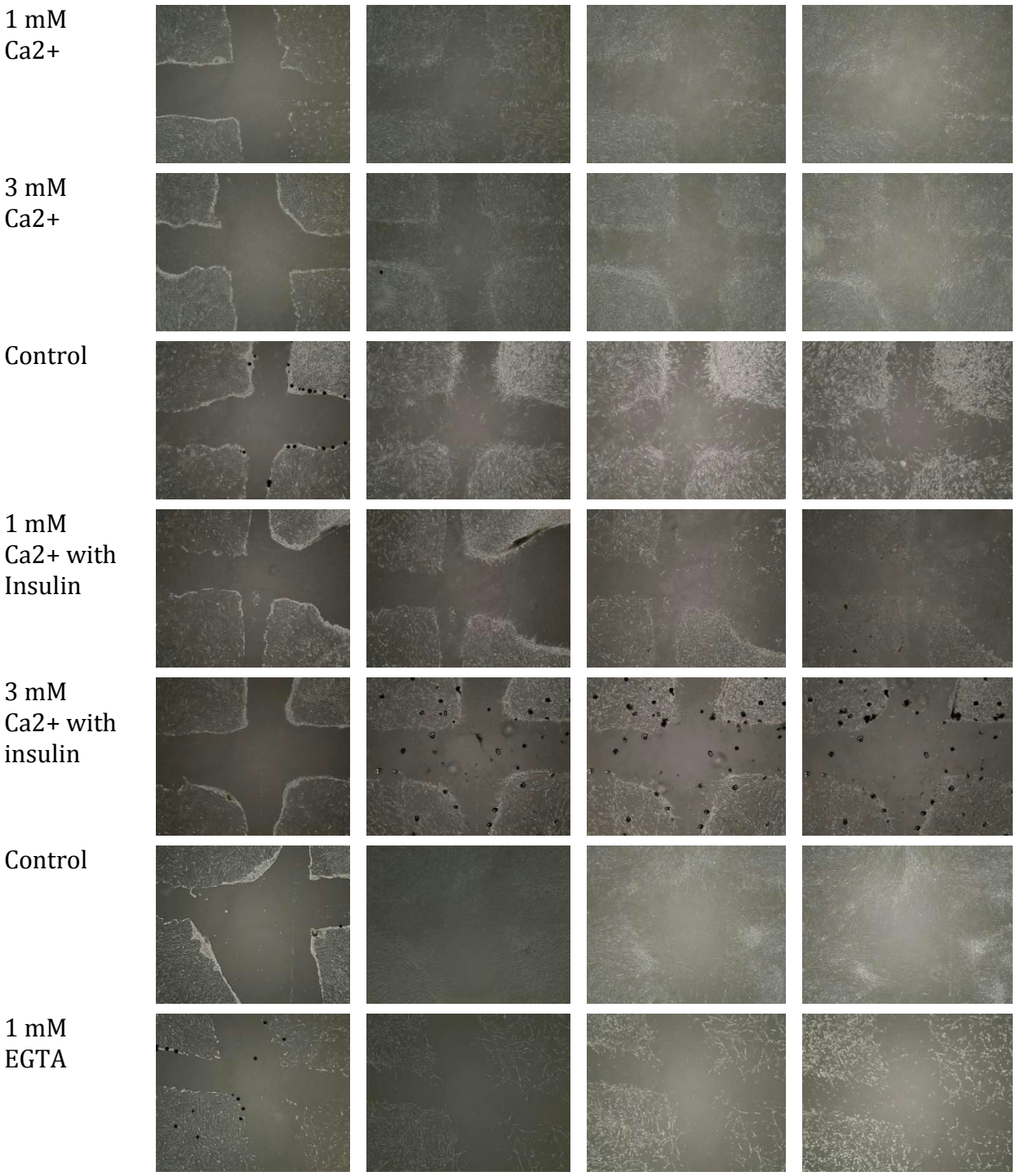
Creech, Oksana
Summer 2015

This summer I had the opportunity to stay on the domain and work with Dr. Seballos and Cid Oculam in the Biochemistry Department investigating Idiopathic Pulmonary Fibrosis (IPF). IPF is a fatal, irreversible disease that causes scarring of lung tissue. Currently, there is no cure for the disease. Although two treatments were recently approved in the U.S. in Fall 2014, neither is preventative or reverses the course of the disease, but at best only slows down further progression. Therefore, more research is necessary to understand the causative agents of the disease. We investigated a model of IPF using cells isolated from healthy donor lungs that we maintained in the laboratory. We observed the protein profile for the cells via the analysis of cellular response to changes in calcium ion (Ca^{2+}) concentration and EGTA and characterization of cell protein profiles. We used numerous techniques such as Live/Dead toxicity to test the viability of the cells in a population based on plasma membrane integrity. We performed scratch assays to determine how quickly a "wound" heals and how it responds to different treatments.

Treatments	T=0	T=24	T=48	T72
Control				


1 mM Ca2+
3 mM Ca2+
Control
1 mM Ca2+ with Insulin
3 mM Ca2+ with insulin
Control
1 mM EGTA

We believe that high Ca^{2+} concentrations may inhibit HSP47 and high concentrations of EGTA with insulin and without insulin may inhibit HSP70. We were able to detect HSP47 and HSP70 from cell lysis and the serum.

This research opportunity has taught me patience and diligence. Not only did I learn new and different techniques that are required in the laboratory, but also, I improved on my previous techniques. I performed Live/Dead toxicity to test the viability of the cells in a population based on plasma membrane integrity. I ran Western Blots to detect the presence of heat shock protein 47 (HSP47) and heat

shock protein 70 (HSP70). HSP 47 binds collagen and HSP70 protects cells from stress and aids in protein folding.

In my lab, I was working with another student, Cid Oculam, who has done research with Dr. Seballos during the school year, and he helped me navigate around our lab and served as a mentor. The last six weeks of research, we took two incoming freshmen from Chattanooga, and Cid and I served as mentors to them. Having Scott and Madison was helpful and exciting. It brought fresh eyes and ideas to the project. They were good about asking for help and guidance. For the first three weeks, Cid and I watched over them in the Tissue Culture room to guide them and serve as a helping hand, if needed.

For me, greatest "lesson learned" was that science is no different than studying for a test. In science, you will not always get results, even after putting in hours and hours of work into preparation and execution. It is disappointing when you don't get results, but sometimes experiments don't work and that's okay because there is always tomorrow. There is always another approach to the same problem and you have to work and figure out what approach works for you.

This internship has affirmed that I want to pursue a career in the medical field, be it a Ph.D route or a general physician. I have learned that science is my passion and I want to continue to working in a field that pushes me beyond my limits. A field that is constantly evolving and improving.