You’re Stressing Me Out

Every living organism goes through stress, humans, dogs, cats, and even the cells that live inside your body, but when a human as a whole goes through stress it doesn’t mean a life and death situation. When your cells go through stress it is a life and death game, but what happens when bacteria and cells go through stress? Do different stressors make cells go through a different type of stress or is it all the same? What happens at the protein level all the way up to the population? These are just a few questions that Dr. Matthew Cabeen has been asking.

Dr. Cabeen is a part of the Oklahoma State University Microbiology Department where he teaches Intro to Microbiology and runs his own lab, The Cabeen Lab, where he has two different projects currently in progress.

“Here’s as analogy, think of putting a cucumber behind a cat and then watching what happens when the cat turns around. then after, putting a different fruit or vegetable behind the cat and doing the same thing” says Dr. Cabeen. Putting different kinds of stressors in the presence of the bacteria and watching what happens is the basis of what Dr. Cabeen is trying to accomplish. The model bacterium that Dr. Cabeens lab is using is *Bacilius* subtilius and by turning on and off stress responses for the bacteria the future can look toward finding a way to helps cells to survive and be more fit. “I thought that it was a really fascinating problem that has a lot of unanswered fundamental questions”. There are a lot of scientific discoveries that were made only for the knowledge to know about the world not because of a disease or illness, but because of those discoveries it paved the way for other discoveries that have saved countless lives.

Using a fluorescent microscopy Dr. Cabeen has the ability to see single cells, they couple that fluorescent microscopy with microfluidics which basically means in lay-man’s terms, there is a steady stream of fluid flowing constantly through and keeping those cells alive. How the researchers can tell if the cells are under stress is when they look into the microscopy the are shown are a bright green color

People know about natural stressors like sunlight and chemicals from different fumes in factories and the and then there are the stressor people don’t normally think about such as ethanol, salt or acid and these are just a few of the stressors that Dr. Cabeen has been using to run his experiments “we have used ethanol, salt, acid, H2O2 so far in our experiments” and when using the model bacteria it is perfect for this type of an experiment because it can easily reacts with stressors.

One of Dr. Cabeens favorite aspects of any kind of research is the unknown of it “I love being the first to find something”. With all research comes the unexpected, whether in the hypothesis or in the unexpected results “so with the proteins A-D we believed that with different types of stressors that they would act differently, but what has been found is that they actually acted the same, but with different stressors different proteins lite up with the ethanol the A and C proteins would light up, but with the salt B and D lite up” originally the hypothesis was that all the stressors would light or not light up and act differently depending on the stressor and they found the unexpected they surprised himself.

Striving toward new and innovative research are what makes it possible for people to function and survive, with this type of study there might be a way to improve antibiotic resistance or help with biofilm formation, the possibilities are endless. It will allow people to fully understand what natural stressors do to the human body like sunlight, gas and chemicals that people breathe in every day. All it takes is for one person to ask the question and figure out the answers, that is how a better life is made for all. Something like stress response this is the type of study people should be wanting to look at and look for the answer. “though there’s many more decades of work ahead for us I hope that maybe we can find the answers to some of these questions”