A Visit to Dr. Shaw’s Lab

A quick look into the lab of Dr. Shaw at Oklahoma State University gives one an insight into the world of bacteria, and the diseases in which they may cause. Specifically, Dr. Shaw and his team are focused on studying Coxiella burnetii a zoonotic pathogen known to cause query fever also known as Q fever. The lab is currently focused on studying the virulence mechanism of C. burnetii as well as how gene expression can be changed by the bacteria in their eukaryotic host cells. The aim of his research is to better understand C. burnetti in order to help find new ways to diagnose, prevent, and even treat patients who come into contact with the pathogen.

Q fever usually presents with mild flu-like symptoms. Humans become infected with C. burnetti through aersols of dust that have been contaminated by animal feces or other bodily fluids such as raw milk. Common animal reservoirs include: goats, sheep, and cattle.

It is common for pathogens to use secretion systems to secrete virulence factors from the bacteria into the host. There are several types of secretion systems that can be identified based on their structure, mechanism of action, and composition. Type IV secretion systems are used by pathogenic bacteria such as C. burnetti to pump virulence factors into the eukaryotic host cell. Dr. Shaw is working to better understand this system and how it may be manipulated.

Because of its ability to cause rapid onset and persisting diseases, C. burnetti has been classified by the Center for Disease Control as a bioterror threat. In fact, it has been used in the past as a weapon for warfare. This means that when working with this bacteria, labs like Dr. Shaw’s have to take special measures and precautions to ensure the safety of the public, researchers, and the surrounding environment. Dr. Shaw and his team work safely every day to continue to make small breakthroughs that help the science community better understand C. burnetti.