Chlamydia is a bacterial infection that ranks among the most common of the sexually transmitted diseases. In fact, the infection reaches around three million people in the United States every year. Because the disease is bacterial, it can be treated easily by antibiotics. However, oftentimes, the disease does not produce any symptoms. Because of this, Chlamydia can sometimes go unnoticed. This can easily become a destructive problem. Left untreated, Chlamydia can cause a number of dangerous complications. These include pelvic inflammatory disease and ectopic pregnancy, which is when a fertilized egg attaches outside of the uterine lining. Chlamydia can also increase the risk of cervical cancer.

Dr. Erika Lutter is an Assistant Professor in the Microbiology department of Oklahoma State University who received her PhD in Bacterial Pathogenesis from the University of Calgary. She teaches a number of courses including Pathogenic Microbiology, and her research is primarily focused on Chlamydia. “Ultimately, my lab is researching host-pathogen interactions - we are trying to find out how Chlamydia manipulates our cells, what the long-term changes are that our cells retain after infection clears or is treated, and then what we can do to decrease those effects,” Dr. Lutter says.  “We do this by studying specific proteins made by Chlamydia that interact with our cells proteins and internal machinery. These chlamydial proteins are called inclusion membrane proteins.”

When Chlamydia enters a cell, it must remain there within a secluded space called an inclusion. Remaining there keeps it safe from many of the host cell’s attempts to fight the infection. While within the inclusion, Chlamydia replicates itself. It can then either cause the cell to lyse (burst), or it can secrete the replicated Chlamydia out of the host.

When Chlamydia exits the cell through secretion, it does so through the means of the “inclusion membrane proteins” that Dr. Lutter mentions.

In her most recently published research, Dr. Lutter and her team explored the interaction between a specific inclusion membrane protein, named MrcA, and a Calcium channel that spans the membrane of the cell. Her results indicate that MrcA was recruiting the Calcium channel to assist in the secretion of Chlamydia out of the host cell. “The research we are doing continues to further study the extrusion mechanism of host cell exit and see if it is a mechanism of host cell immune evasion as well,” Dr. Lutter says. “We are also looking to identify more host interacting partners for additional inclusion membrane proteins.”

The average person may not have any interest in Chlamydia or the research being done surrounding it. However, the microscopic discoveries being made by people like Dr. Lutter are vastly important to the progress of human health.

“The average person may not hear about our results, and unless they or someone they care about has had Chlamydia, they might not be concerned,” Dr. Lutter shares.  “However, with it being the most infectious bacterial STI and in the greatest numbers, that might change in their lifetime.  We have found multiple host interactions which may one day lead to targeted therapies or maybe even a vaccine.  We have also studied the mechanism by which Chlamydia exits the host cell, a specific mechanism called extrusion.  We have shown that this actually occurs in an animal model and [is] therefore very likely in humans too.  Understanding its transmission mechanisms may also lead to ways to decrease how easily Chlamydia is transmitted.”