The Masked Nature of Chlamydia

Chlamydia is a sexually transmitted disease (STD) that you may have heard about in school or at the doctor’s office. Chlamydia is a pathogen that is transferred from an infected person to another person through vaginal, anal or oral sex. Sexually transmitted diseases are highly undesired, and chlamydia happens to be an exceptionally harmful STD. In a recent interview with Dr. Erika Lutter, a pathogenic microbiology professor at Oklahoma State University, we discussed chlamydia due to her interest in the pathogen. Dr. Lutter, originally from Canada, has studied chlamydia for years after getting her doctorate degree.

Chlamydia can lay dormant in a host undetected for years. Symptoms may be apparent in men, but symptoms in women are not always apparent. This is important because dormant chlamydia in a host may cause internal damages without the hosts’ knowledge. In women, whether the presence of chlamydia is known or not, it may lead to detrimental health problems such as miscarriages, infertility issues, cervical cancer, etc.

Currently in the United States, chlamydia is thought to be the most shared sexually transmitted infection. When I asked Dr. Lutter why she studies chlamydia, she said, “The reason we work on chlamydia is it gives us the chance to address the long-term consequences. It’s very easy to treat these infections; one Z-pack clears the infection and there’s very few antibiotic-resistance issues. The real issues are the secondary complications. This refers to increased risk for cervical cancer, pelvic inflammatory disease, ectopic pregnancy. There is also a correlation with chlamydia infections and decreased fertility.”

Chlamydia is an important pathogen to study because it is unique in how it manipulates antibodies and the host cell. The infection can be inactive in a person for years, silently damaging the body. In men, chlamydia symptoms may be apparent and seen on the genitals. Unfortunately for women, chlamydia is not always as apparent because the area of infection is the cervix. Women can go years without knowing that they are infected with this pathogen. This can lead to many health problems including cervical cancer, miscarriage and infertility among many other complications.

Chlamydia is unique by entering a host and “disguising” itself as a host cell to prevent antibodies from attacking it and removing it from the body. When asked how chlamydia affects the inside of the body, Dr. Lutter said, “Chlamydia is an obligate, intracellular pathogen, so it goes inside of the cell and it replicates. But inside our cell it manipulates the cell quite a bit and what happens is we take antibiotics to kill the chlamydia, but that doesn’t undo the damage that has happened inside of those cells. So those cells can replicate which can lead to increased inflammation and increased scarring. It can also lead to some of these changes we think might be pre-cancerous and that’s one of the ways the risk of cervical cancer can increase. That all happens after the chlamydia infection has been cured, even years later.”

Microbiologists want to understand how chlamydia enters and exits the host cell, and how it replicates and transmits. By finding out how chlamydia works, microbiologists like Dr. Lutter can help find ways to prevent the pathogen from avoiding host antibodies, replicating and transmitting. When Dr. Lutter was asked what she studies specifically about chlamydia, she said, “My lab works to figure out what chlamydia is doing once it enters the cell and how it manipulates the cell. So, chlamydia is stuck inside of its inclusion and it doesn’t actually interact with any host cell components. It secretes these proteins that cover the inclusion and these proteins interact with host proteins. Two of the interacting partners we found were myosin and myosin phosphatase. Chlamydia uses myosin to exit out of the host cell. It does something unique called extrusion. It exits out of the infected cell in a sac which is covered in the host membrane. Our bodies try to recognize cell from non-cell, and we don’t really try to attack our own bodies. If we do, that is known as an autoimmune disorder, so we don’t want to do that. If chlamydia is now masked by a eukaryotic membrane and they look like our cells, our immune systems don’t attack it. So, we study the fact that these extrusions exist and the mechanism by which myosin is involved in exiting the host cell. We think these sacs may be very important when it comes to transmission and so forth.”

Pathogens like chlamydia need to be studied more for us to know how to help fully rid our bodies of these ‘sacs of chlamydia. As mentioned by Dr. Lutter, chlamydia can be a very detrimental pathogen, especially if left undiagnosed and untreated. It is crucial that chlamydia is the focus of study for microbiologists like Dr. Lutter. Eventually, they may find a way to help stop chlamydia from lingering in our bodies after treatment.

Sources:

Dr. Erika Lutter, Oklahoma State University

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<https://www.cdc.gov/std/chlamydia/stdfact-chlamydia.htm>