Donald Frank

August 14th 2017

BIO 101J

**Lab 10: Infectious Disease Report – Syphilis**

**Causative Agent:** *Treponema pallidum*

**Reservoir:** Humans

**Transmission:** Sexual and Vertical

**Treatment:** Penicillin and other antibiotics

**Prevention:** Condoms/Abstinence

Syphilis is an infectious disease that is present in about 50 million people world wide that can cause skin ulcerations, rashes, sores, eye problems, neurological disorders, heart problems, and death. The causative agent of syphilis is the bacterium ***Treponema pallidum*** *–* an obligate parasite that relies on a human host for survival and reproduction*.* The most common modes of transmission are through sexual intercourse or vertical transmission – mother to child transmission in utero *known as congenital syphilis*. The disease exists in four stages: 1) primary, 2) secondary, 3) latent, and 4) tertiary. Treatment for the disease relies on the use of penicillin and other antibiotics. Preventive measures used to combat syphilis infection are condoms and abstinence from sexual activity and disease screening.

*T. pallidum* is a spirochete – belonging to the phylum Spirochaetes. Members are spiral shaped and gram-negative bacterium that have unique endoflagella that aide in movement. *T. pallidum* is a chemoheterotroph – meaning they obtain energy by the oxidation of electron donors in their environment. Also, *T. pallidum* requires minimal oxygen to survive or is a microaerophilic organism. Being an obligate parasite, *T. pallidum* has a limited metabolic capacity and needs a human host to perform DNA replication, transcription, translation, and repair mechanisms. Without a human reservoir, *T. pallidum* cannot survive.

Syphilis symptoms are classified into four stages. The first stage, or primary stage, begins approximately three weeks after infection with the appearance of a single sore called a chancre. The secondary stage begins after the bacterium infection spreads through the hosts blood stream, which is indicated by a non itchy rash. Secondary symptoms appear about two to eight weeks of being infected and can include: sore throat, fever, headaches, muscle aches, joint-pain, etc. The next stage is the latent stage – an asymptomatic stage that can last three to thirty years. At thjis stage, the infection lies dormant in the body. The final and most severe stage is the tertiary stage. Here, the body is no longer infectious and only about a third of infected bodies progress to this stage. Severe and debilitating results can include gummatous syphilis – formation of tumors, neurosyphilis – infection involving the nervous system, and cardiovascular syphilis – syphliltic aortis and aneurysm.

Syphilis is transmitted mostly commonly by direct contact with a chancre during sexual intercourse – including vaginal, anal, and oral intercourse. Another common form of transmission is veritical transmission; where the mother passes the infection to her child in utero or in the womb. *T. pallidum* only exists in a human reservoir; therefore, it is highly unlikely that syphilis can be contracted by sources outside the human body.

The origin of syphilis is unknown. It is hypothesized that the expeditions of Columbus to and from the Americas is responsible for the transmission of the disease to Europe; however, this hypothesis cannot be proven. Syphilis, throughout history, has been associated with questionable morality. Early treatments included mercury treatment and other chemotherapy that had serious side effects. In 1943, the antibiotic penicillin revolutionized syphilis treatment and other bacterial pathogenic infections. Today, a single intramuscular injection of Benzanthine penicillin G is used as a cure for syphilis in the primary, secondary, or early latent stages. Syphilis is considered a curable disease; however, treatment in the final stages will rid the body of infection, but cannot repair any damage to the body caused by the infection.

Preventive measures can be taken to limit the risk of syphilis transmission. Practicing safe sex and the use of condoms as well as having a healthy sex life can reduce the possibility of contracting the disease. Abstinence is the best policy to combat syphilis. Pregnant mothers can be screened during the early stages of pregnancy to make sure they are not at risk of spreading syphilis or other infectious diseases to their offspring during childbirth. Also, sexually active persons should be regularly tested for sexually transmitted diseases (STD’s) and receive treatment for any infections. Knowledge of STD’s can empower people to not spread infectious diseases inadvertently through sexual activity.

*T. pallidum* is the bacterial pathogenic culprit the causes the disease syphilis, which is still responsible for human deaths world wide. *T. pallidum* requires a human reservoir, and cannot perform metabolic activity without resources provided by its human host. Syphilis has had a torturous past in human history and has caused horrific symptoms to the human body. Today, we do have a cure for syphilis using penicillin and other antiboitics.