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"Aminoglycosides Inhibit the Growth of *Chlamydia trachomatis*"

Aminoglycoside antibiotics inhibit protein synthesis and are commonly believed to be ineffective against intracellular pathogens. Previous studies reveal differing results on whether aminoglycosides can affect the growth of *Chlamydia trachomatis*, an intracellular bacterium. My project focused on testing several aminoglycosides on *Chlamydia* to see if they affected chlamydial inclusion formation and recovery of infectious progeny.

Chlamydia has a biphasic developmental life cycle consisting of the infectious extracellular elementary bodies (EBs) and metabolically active intracellular reticulate bodies (RBs). During internalization, the EBs form a vacuole called an inclusion, which is what we quantify to determine the effect of aminoglycosides on these chlamydia infected cells.

The four aminoglycosides that were used in my experiments were streptomycin, kanamycin, hygromycin, and geneticin (G418). I found that varying concentrations of the aminoglycosides had no effect on primary inclusion formation. However, when we measured the recovery of infectious units (IFU), we found a significant effect of aminoglycoside treatment. This led us to hypothesize that the antibiotics penetrate the host cell, but not the chlamydial inclusion during primary infection. However, upon harvest the inclusion membrane is disrupted and the antibiotic has access to the EBs, and when this happens, EBs are unable to form new inclusions.

To test this hypothesis, we performed a mixing experiment in which cell extracts of uninfected, antibiotic-exposed cells, were mixed with extracts of Ct-infected cells that were not exposed to antibiotics during infection. Results showed a dramatic decrease in IFU recovery when extracts from Ct-infected cells were mixed with extracts from antibiotic-exposed uninfected cells. Therefore, *Chlamydia* EBs are sensitive to aminoglycoside antibiotics whose known target is formation of active ribosomes. Our results support early studies revealing the trachoma agent, now known as *Chlamydia trachomatis*, is sensitive to several aminoglycosides.