

**Title:**

Subversion of the Host Cell Cycle by Legionella pneumophila

**Authors:**

Dennise A. De Jesús Díaz and Ralph R. Isberg

**Presented by:**

Dennise A. De Jesús Díaz

**Department:**

Department of Molecular Biology and Microbiology, School of Medicine

**Abstract:**

The ubiquitous Gram-negative pathogen *Legionella pneumophila* modulates endocytic and immune host processes to ensure formation of the vacuole compartment where it replicates intracellularly. However, we hypothesize that, as an intracellular pathogen, *L. pneumophila* would exploit additional host networks to replicate. Analyses of host cell cycle dynamics upon *Legionella* infection revealed that *L. pneumophila* infected cells couldn't progress through the cell cycle independently of the cell cycle stage the host cell is at the time of infection. In order to prevent host cells from cycling, *Legionella* requires the presence of a functional Type 4 Secretion System, as cells infected with a *L. pneumophila* mutant defective for translocation have the ability to progress through the cell cycle. Interesting, *Legionella* intracellular growth is enhanced in host cells present at either G1 or G2 of the host cell cycle, but reduced in cells present in S-phase. Our results demonstrate that *L.pneumophila* preferentially infects growth-arrested hosts because S-phase of the host cell cycle is an unstable environment for bacteria replication; the *Legionella* containing vacuole is permeable at this stage allowing the detection of bacteria from the cytosol. Thus, by stopping cell cycle progression *L. pneumophila* prevents detrimental consequences and preserves its ability to replicate.