

Specific Aims

The chlamydial developmental cycle is unique among bacteria. For *Chlamydia* to successfully establish a productive infection it must complete multiple rounds of differentiation, alternating between the infectious elementary body (EB) cell type and replicative reticulate body (RB) cell type. Two histone related proteins, Hc1 and Hc2, are central regulators of the chlamydial developmental cycle and likely influence gene expression by binding to specific nucleating sites on the chromosome, thereby influencing access of regulatory proteins and the RNA polymerase to the promoters of key genes involved in the control of differentiation. Many genes are known to be regulated during the chlamydial developmental cycle (1, 2). However, the specific genes directly involved in controlling development have not been identified. The genes directly regulated by Hc1 and Hc2 and genes that control the expression of Hc1 and Hc2 are likely central to developmental regulation in *Chlamydia*.

Therefore, the overall goal of the research addressed in this application is to understand the role of Hc1 and Hc2 in gene regulation during chlamydial development.