

STRUCTURAL STUDIES OF ACID PHOSPHATASES FROM PATHOGENIC  
BACTERIA

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ABSTRACT

Acid phosphatases are important, ubiquitous, and diverse group of enzymes that catalyze the transfer of phosphoryl from phosphomonoester to water forming inorganic phosphate and alcohol. These enzymes play critical roles in numerous processes and pathways including virulence. It has been suggested that the pathogenic bacteria *Francisella tularensis* utilizes an acid phosphatase to aid in the escape from the phagosome. As part of this research, the three dimensional X-ray crystal structures of three phosphatases from *F. tularensis* were determined. The three structures from *F. tularensis* were AcpA, HAP, and class C. Parallel to those structural studies homologous structures of class C acid phosphatases were determined from *Haemophilus influenzae* and *Bacillus anthracis*, those structures are also reported here. In all five unique acid phosphatase structures were determined in this research project that have led to a better understanding of the novelty of catalytic mechanisms, a clearer understanding of substrate binding, and a new foundation for structural investigation.