ABSTRACT

TITLE:	Determination of the Involvement of Aldolase in the Glycolytic Pathway of Acidobacterium Capsulatum Through GC-MS and 13C-NMR Spectroscopic Analysis
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ABSTRACT: Acidobacterium capsulatum, a gram-negative, capsulated acidobacterium was initially isolated from acid mine drainage in Japan. Since then, genotypes of the acidobacteria have been identified in pristine aquatic and soil environments. The high diversity and the wide distribution of acidobacteria in pristine and contaminated environments suggest these organisms are involved in nutrient cycling in the environment and may have unique metabolic properties. For example, in glycolysis, the annotated genome shows no aldolase gene but has a transaldolase gene, suggesting an alternate to the standard glycolytic pathway. GC-MS and NMR analysis were used to determine if 13C-labeled metabolic products could be detected after being excreted from A. capsulatum grown with 13C[2]-labeled glucose as the sole carbon source. Cell supernatant was investigated after five different growth periods. The cells were removed by centrifugation and the supernatant was freeze-dried and acidified. The supernatant was then analyzed through 1H-NMR, 13C-NMR and GC-MS to determine if any 13C-labeled carbon was excreted by the cells through metabolism in the form of metabolites or polymers. This showed that glucose is consumed, as determined by a 13C[2]-labeled acetate standard, though no significant amount of labeled metabolites was seen after 9 days of growth. Therefore, further research must be performed to determine glucose metabolism of A. capsulatum. Determination of whether a pathway, which does utilize the enzyme aldolase, is supported or whether an alternate pathway is supported is the inspiration for further investigation.