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Oxidative Stress and the Metabolism of *Sulfolobus solfataricus*

How do organisms adapt to environmental stress at the metabolic level? The Archaeon *Sulfolobus solfataricus* grows optimally at temperatures exceeding 75°C and high acidity, conditions which expose it to extreme oxidative stress (OS). If this organism, especially suited to such an environment, mitigates oxidative damage through changes at the metabolic level, metabolomic analysis could provide evidence of novel pathways protectant against OS. This can in turn be used to understand how metabolic pathways may have evolved in response to OS. Pathways of potential import to OS regulation were compared using the KEGG Pathway Database between *Sulfolobus* (specifically SsP2) and other organisms to determine any potential homology to known pathways. These included sulfur metabolism, carotenoid and retinol synthesis, and the ubiquinone pathway. Metabolites differentially regulated in oxidatively stressed SsP2 cells (compared to control cells) were investigated for evidence in the literature of involvement in OS. The remainder of this project will focus on linking the metabolites to pathways in order to elucidate where differential regulation might occur in SsP2 and whether there is evidence of novel mechanisms for combating OS.