

**P037** Selenate respiration in the hyperthermophilic Archaea  
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Microbes that can reduce selenium oxyanions have been found throughout the bacterial domain. Some of these microbes can utilize selenate as the sole electron acceptor in anaerobic respiration, catalysing the six-electron reduction of selenate ( $\text{SeO}_4^{2-}$ ) to elemental selenium ( $\text{Se}^0$ ). *Thauera selenatis* is one such organism. The selenate reductase from *T. selenatis* has been purified previously and found to be a periplasmic trimeric enzyme. The complex (180kDa) consists of a 96kDa SerA, a 40kDa SerB, and a 23kDa SerC. The catalytic subunit SerA contains molybdenum, iron and acid labile sulphur, and has an apparent  $K_m$  for selenate of 16  $\mu\text{M}$ . *Archaeoglobus fulgidus* is a strict anaerobe found in hydrothermal environments, where the concentration of selenium is significantly raised, therefore making it the ideal habitat for selenate/selenite respiring archaea. *A. fulgidus* contains a gene cluster AF0174-0176 that displays sequence homology to both selenate and nitrate reductases, and is a likely candidate for selenate reductase activity. The aim of the present study is to over-express the AF0174-6 gene cluster in *E. coli* and undertake a detailed biochemical and spectroscopic characterisation of the gene products. Particular focus will be centred on determining the substrate specificity and the reactivity towards both selenate and nitrate.