

EXAMINATION OF SPECIFIC AMINO ACID RESIDUES OF *DESULFOVIBRIO*
DESULFURICANS CYTOCHROME C_3 IN ELECTRON TRANSFER

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ABSTRACT

Sulfate-reducing bacteria are strictly anaerobic microorganisms that are able to utilize a variety of electron donors and couple the oxidation of those compounds to the reduction of sulfate. Many SRB are capable of altering the redox state of uranium from soluble U(VI) to the insoluble mineral uraninite U(IV). Of interest in this investigation is the predominant c-type tetraheme cytochrome, cytochrome c_3 , implicated as a metal reductase in SRB metabolic processes. Mutant cytochrome c_3 proteins were generated and electron transfer capabilities examined. UV spectroscopy was used to observe the redox properties of wild-type and mutant cytochromes with the addition of uranium and molybdate. Oxidation and reduction was observed to be similar to non-mutant, for the mutations F19A, C45A, K66A, K72A, and M80K. However, the K14A mutant was not oxidized when molybdate was added to the reduced protein. This lysine residue may represent a critical point of interaction between the cytochrome and the metal.