A Rieske ferredoxin typifying a subtype within Rieske proteins: Spectroscopic, Biochemical and Stability studies

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Abstract

A new subtype of archaeal Rieske Ferredoxin has been identified in the genome of the thermoacidophilic archaeon *Acidianus ambivalens*. The gene is inserted in an atypical genomic context in a gene cluster encoding a NiFe hydrogenase. Sequence and phyletic analysis showed that the protein is related to bacterial Rieske Ferredoxins but not to any of the known archaeal Rieske proteins. The recombinant 14 kDa protein isolated from *E. coli* behaved as a dimer in solution. It contained ~2 Fe/mol and all visible and EPR spectroscopic features typical of Rieske centre-containing proteins. However, its redox potential (+170 mV) was significantly higher than those of canonical Rieske Ferredoxins. This difference is rationalised in terms of the protein structure environment, as discrete amino acid substitutions in key positions around the metal centre account for the higher potential.

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