

Structure of a dioxygen reduction enzyme from *Desulfovibrio gigas*



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Author(s): Frazao C, Silva G, Gomes CM, Matias P, Coelho R, Sieker L, Macedo S, Liu MY, Oliveira S, Teixeira M, Xavier AV, Rodrigues-Pousada C, Carrondo MA, Le Gall J

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Abstract: *Desulfovibrio gigas* is a strict anaerobe that contains a well-characterized metabolic pathway that enables it to survive transient contacts with oxygen. The terminal enzyme in this pathway, rubredoxin:oxygen oxidoreductase (ROO) reduces oxygen to water in a direct and safe way. The 2.5 Angstrom resolution crystal structure of ROO shows that each monomer of this homodimeric enzyme consists of a novel combination of two domains, a flavodoxin-like domain and a Zn-beta -lactamase-like domain that contains a di-iron center for dioxygen reduction. This is the first structure of a member of a superfamily of enzymes widespread in strict and facultative anaerobes, indicating its broad physiological significance.

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Reprint Address: Carrondo, MA (reprint author), Univ Nova Lisboa, Inst Tecnol Quim & Biol, Av Republ, Apartado 127, P-2781901 Oeiras, Portugal

Addresses:

1. Univ Nova Lisboa, Inst Tecnol Quim & Biol, P-2781901 Oeiras, Portugal
2. Univ Georgia, Dept Biochem & Mol Biol, Athens, GA 30602 USA
3. Univ Evora, P-7001 Evora, Portugal