Structure of a dioxygen reduction enzyme from Desulfovibrio gigas

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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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