

Structure of bacterial multiheme cytochromes at the microbial-mineral interface

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Electron transfer by dissimilatory metal-reducing bacteria (DMRB) is facilitated by a series of c-type cytochromes associated with the outer bacterial membrane. Recent studies on *Shewanella oneidensis* MR-1 identified multiheme cytochromes that are required for electron transfer to insoluble iron oxide minerals. It has been shown that two cytochromes (OmcA and MtrC) exposed on the cell surface of DMRB assemble to form a terminal reductase complex interacting with the mineral surface. A combined approach, employing neutron reflectometry using a bacterial-mineral interface model and other complementary biophysical methods, is used to obtain information on the structural organization of these multiheme cytochromes at the interface. The bacterial-mineral interface model is constructed by self-assembly of these cytochromes and phospholipids into biomimetic membranes on an iron oxide thin film representing the mineral interface. Neutron reflectometry provides structural data of this complex interface with sub-nanometer resolution.