

*Shewanella* and *Geobacter* are facultative anaerobic bacteria capable of respiring a wide range of substrates including radioactive nuclides and insoluble minerals and electrodes. While our understanding of the molecular mechanism of extracellular electron transfer in *Shewanella* is quite thorough, basic parameters of cellular physiology have only recently been described. Specifically the role of formate generation and substrate level phosphorylation in energy conservation will be shown. Energetic strategies necessarily change in natural microbial communities and we are beginning to understand how these changes occur in an engineered co-culture system.