Expanding the Scope of Extracellular Electron Transfer in *Geobacter Sulfurreducens*: Insights from Organic Salt Reduction

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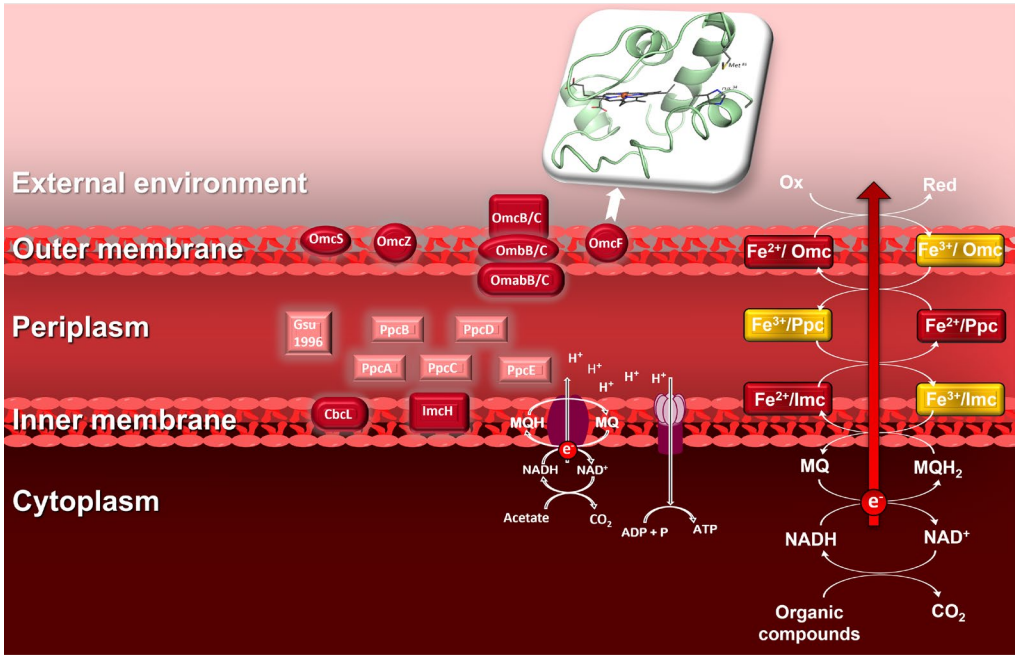
Geobacter sulfurreducens, renowned for its ability to reduce various metal ions through extracellular electron transfer (EET) mediated by cytochromes, remains a subject of intense investigation.[1][2] Previous kinetic studies indicated a constant respiration rate with inorganic salts,[1] prompting us to explore the potential of organic salts to enhance the electron transfer due to their different molecular interactions with the respiratory chain proteins compared to the other options of metal ion-cytochrome interactions.

Our investigation revealed that certain organic salts indeed exhibited higher respiration rates, aligning with our expectations. Some organic salts were identified as effective redox mediators between cytochromes and metal salts, resulting in a notable increase in the rate of metal salt reduction while reducing its associated toxicity.



This discovery not only expands our understanding of EET mechanisms in *G. sulfurreducens* but also presents a promising avenue for optimizing bacterial metal reduction processes through the strategic use of organic compounds as electron shuttles.

[1] M. Karamash, M. Stumpe, J. Dengjel, C. A. Salgueiro, B. Giese, and K. M. Fromm, *Frontiers in microbiology*, **2022**, 13, 909109.
[2] B. Giese, M. Karamash, and K.M. Fromm, *FEBS Lett*, **2023,** 597, 166-173.