A trans-outer membrane porin-cytochrome protein complex for extracellular electron transfer by *Geobacter sulfurreducens* PCA

Objective

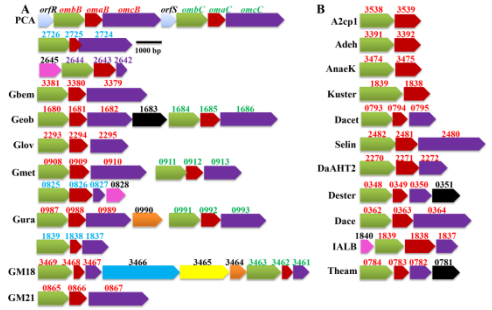
- Understand the electron transfer mechanisms across the outer membrane, which is a physical barrier of electron conductance, of the Gram-negative bacterium *Geobacter sulfurreducens* PCA.

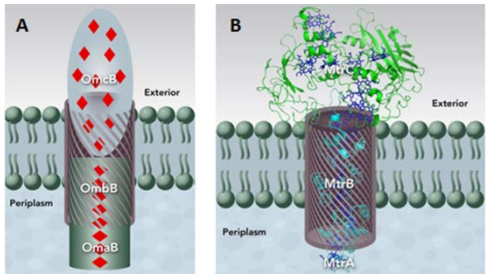
Approach/Results

- An integrated approach including genomic analyses, protein purifications and characterizations and genetic analyses is employed.
- The porin-cytochrome protein complexes are identified and confirmed to transfer electrons across the outer membrane of *G. sulfurreducens* PCA.

Significance and Impact

- Discover a novel class of trans-outer membrane porin-cytochrome protein complexes responsible for extracellular electron transfer by a group of phylogenetically and functionally diverse bacteria.
- Demonstrate the importance of the porin-cytochrome protein complexes in trans-outer membrane electron transfer by the Gram-negative bacteria.
- Contribute to construction of genome-enabled, biogeochemical models for global cycling of carbon, Fe, Mn and probably other elements, such as S and Se.





The porin-cytochrome protein complex is a common mechanism shared by the Gram-negative bacteria from different phylogenetic and functional groups to transfer electrons across the outer membrane .

Liu Y., Wang Z., Liu J., Levar C., Edwards M. J., Babauta J., Kennedy D., Shi Z., Beyenal H., Bond D. R., Clark T. A., Butt J. N., Richardson D. J., Rosso K. M., Zachara J., Fredrickson J. and Shi L. (2014)" A trans-outer membrane porin-cytochrome protein complex for extracellular electron transfer by *Geobacter sulfurreducens* PCA." *Environmental Microbiology Reports* 6(6): 776-785. DOI: 10.1111/1758-2229.12204.