Engineering Fluorescent Fusion Protein with Novel Electron Uptake Gene in *Shewanella Oneidensis*

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Electron Uptake?

• How *Shewanella* “eats” and “breathes”

• *Shewanella oneidensis* can breathe insoluble materials by taking electrons from their food and depositing them onto a mineral or poised electrode

• The electron reduction pathway is well characterized
Novel Electron Uptake Genes

- We identified five genes possibly involved in electron uptake
- One of those five, SO3662, is thought to produce a ferredoxin (Fe-S protein)
- We aim to determine the localization of this protein encoded for by SO3662
- It is hypothesized that this protein is associated with the cytoplasmic membrane
Gene Insertion and Expression

- Our *E.coli* plasmid contained a gene encoding for a cyan fluorescent protein (CFP)
- We inserted SO3362 on the front and back end of the CFP
- The plasmid was transferred from *E. coli* into *S. oneidensis* via conjugation.
- Expression of the gene was induced for a period of time
Analysis of SO3662 Localization

TRIP-Counterstain

CFP - Cyan Fluorescent Protein Expression

Overlay of both CFP and TRIP

*Scale Bar is 10 microns
Why does this matter?

• Biotechnology implications
• Electrosynthesis research
• Microbial Fuel cells
• Characterization of proteins involved in electron uptake
• Understanding the mechanisms of this process will allow us to manipulate the extracellular electron uptake pathway
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