

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

University of Cincinnati Undergraduate Scholarly Showcase 2021

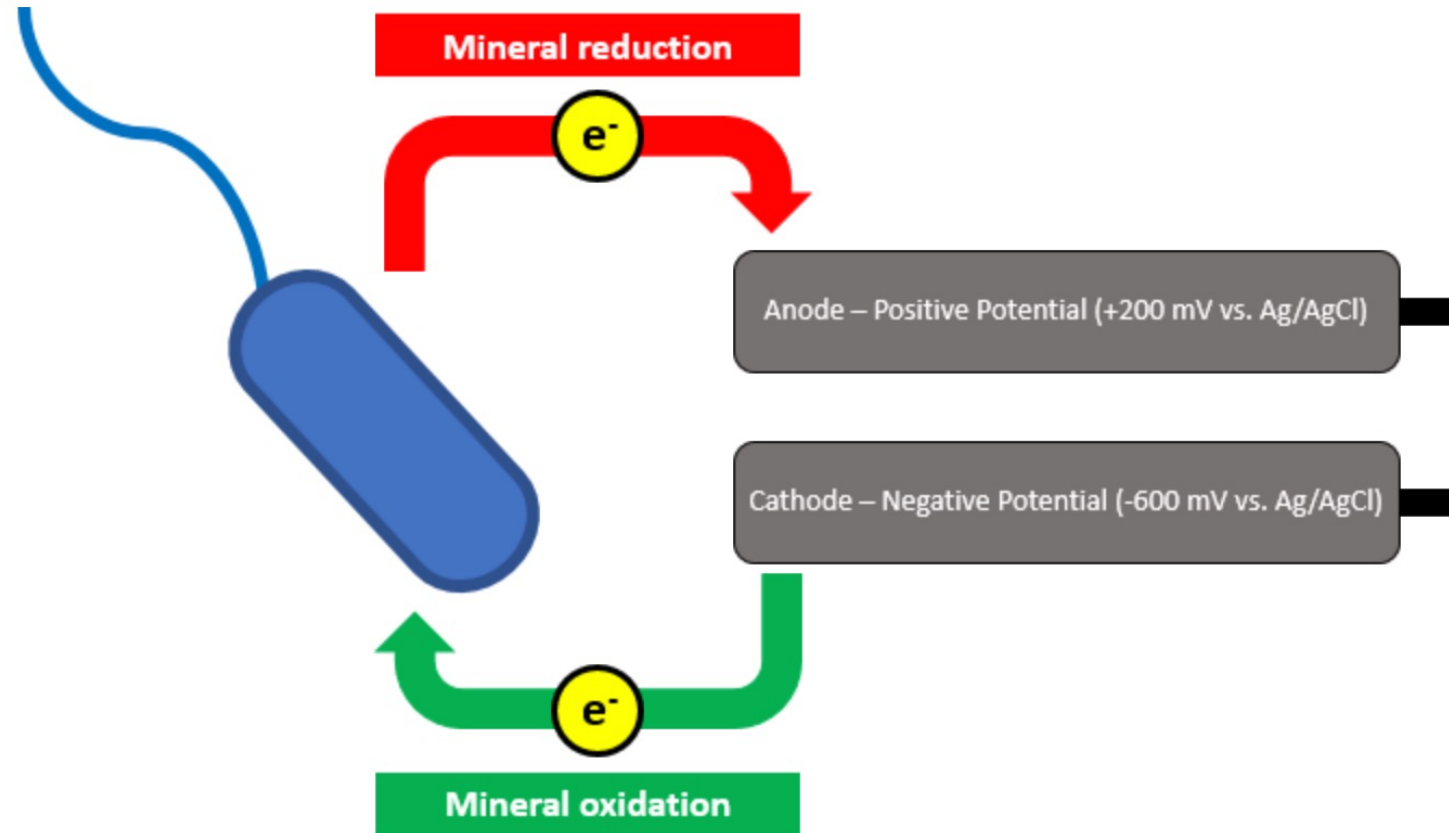
By: Anna Cunnane

**Rowe Labs**



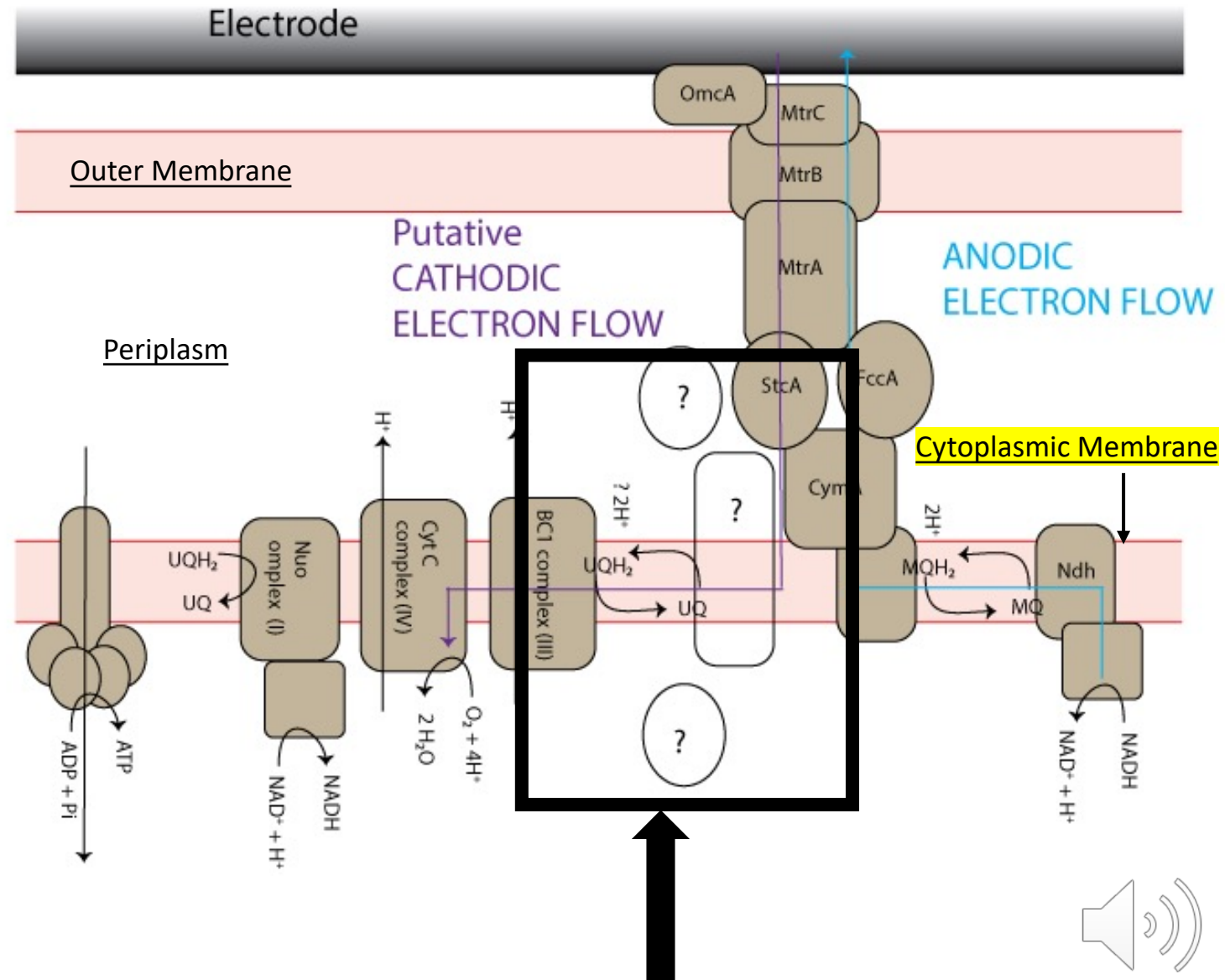
# Electron Uptake?

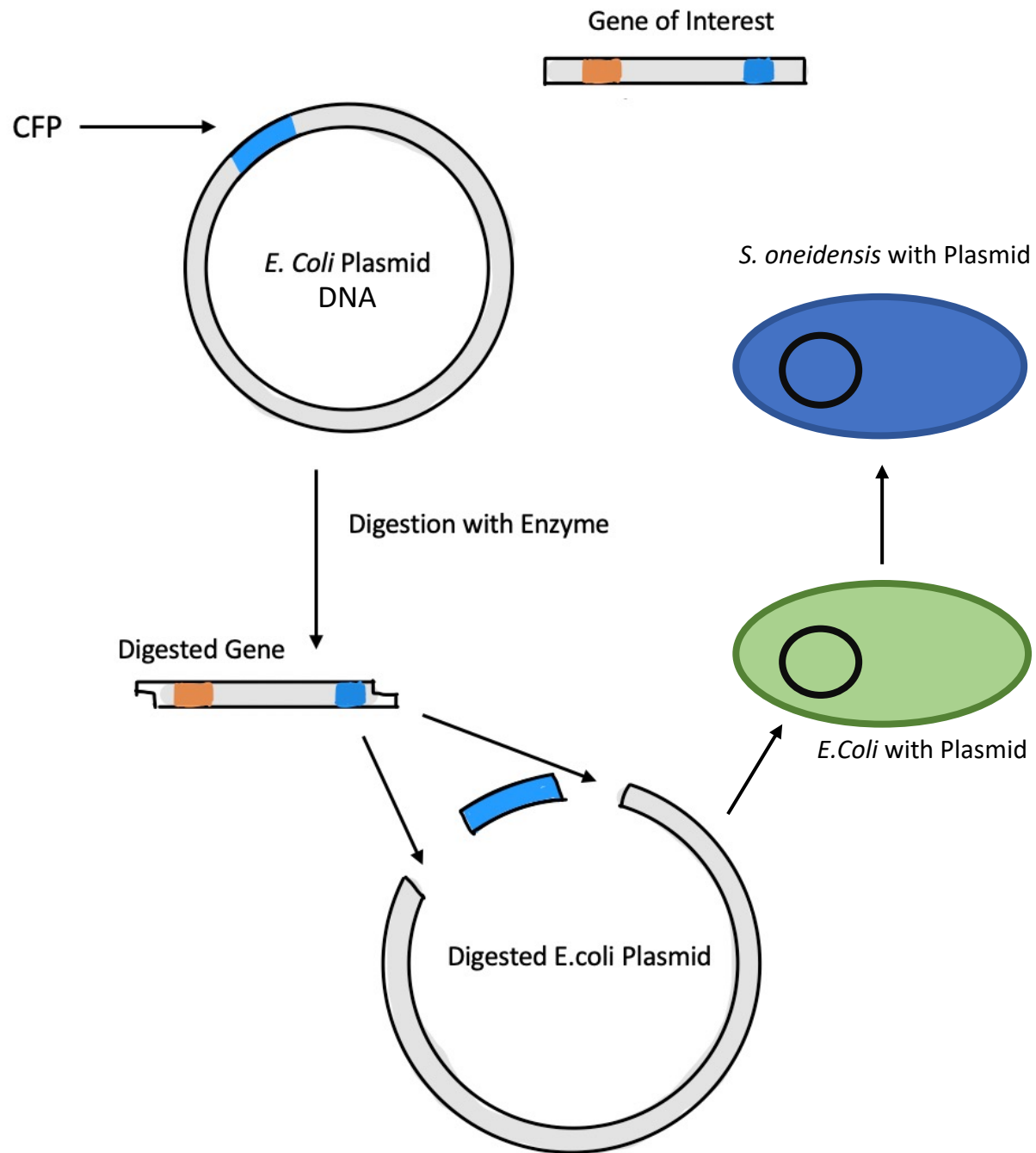
- How *Shewanella* “eats” and “breathes”
- *Shewanella oneidensis* can breathe insoluble materials by taking electrons from their food and depositing them onto a mineral or poised electrode
- The electron reduction pathway is well characterized



# 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



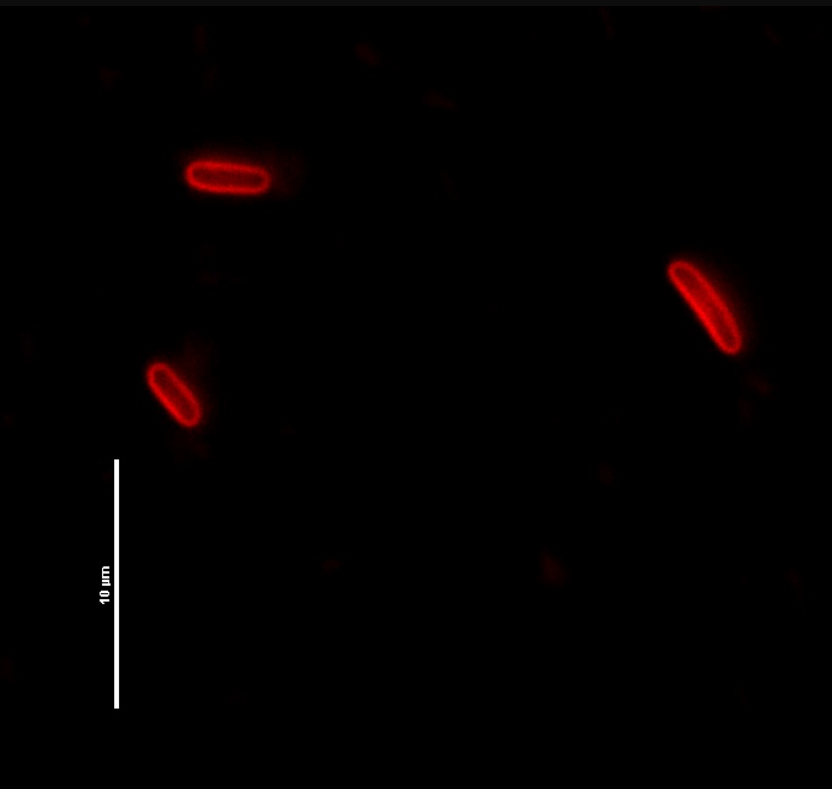


# Gene Insertion and Expression

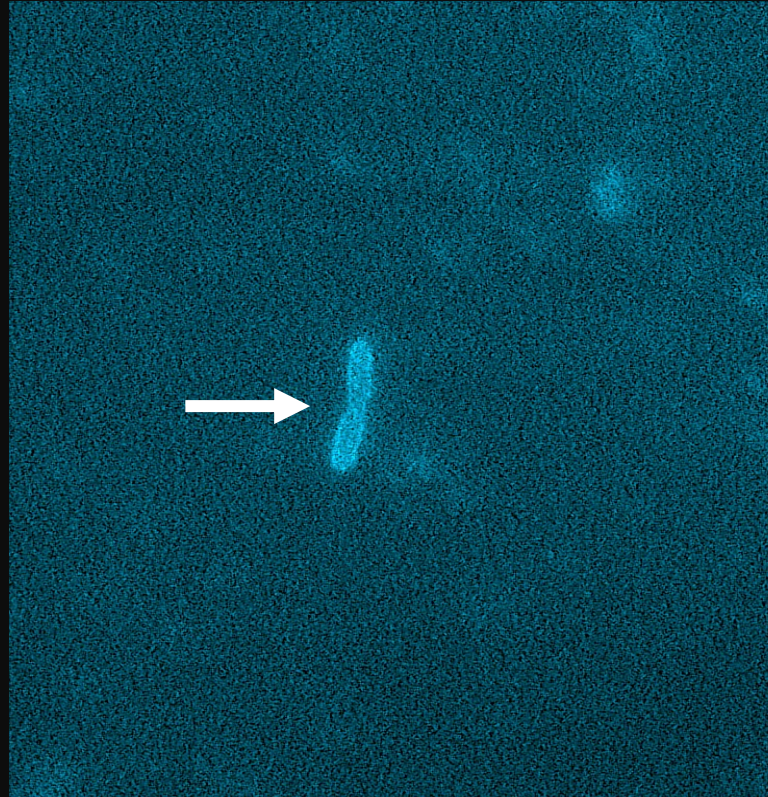
- Our *E.coli* plasmid contained a gene encoding for a cyan fluorescent protein (CFP)
- We inserted SO3362 on the front and back end of the CFP
- The plasmid was transferred from *E. coli* into *S. oneidensis* via conjugation.
- Expression of the gene was induced for a period of time



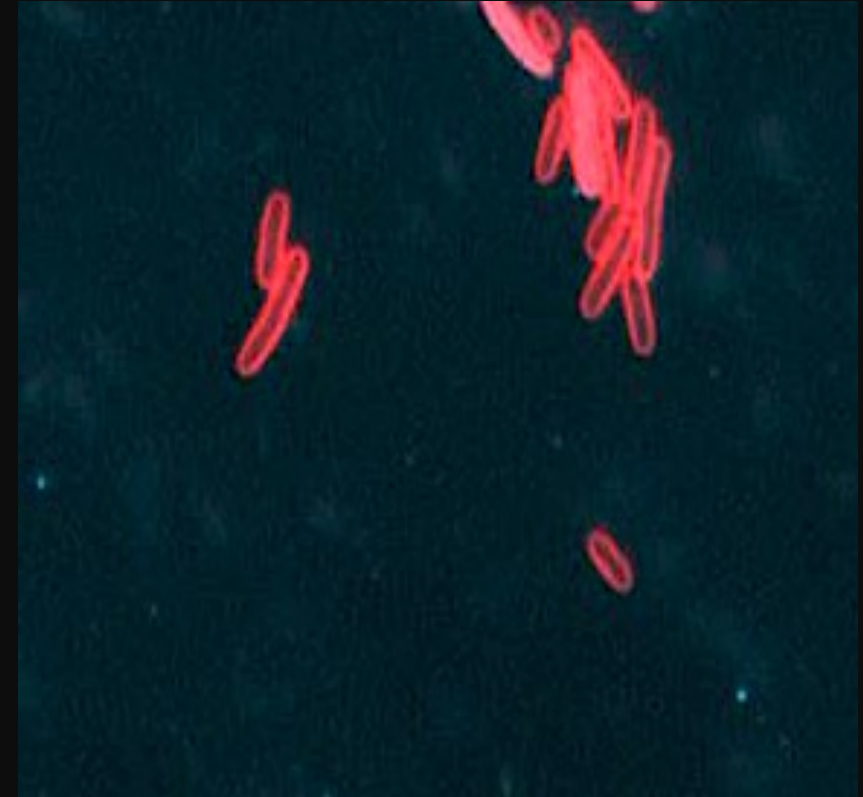
# Analysis of SO3662 Localization



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

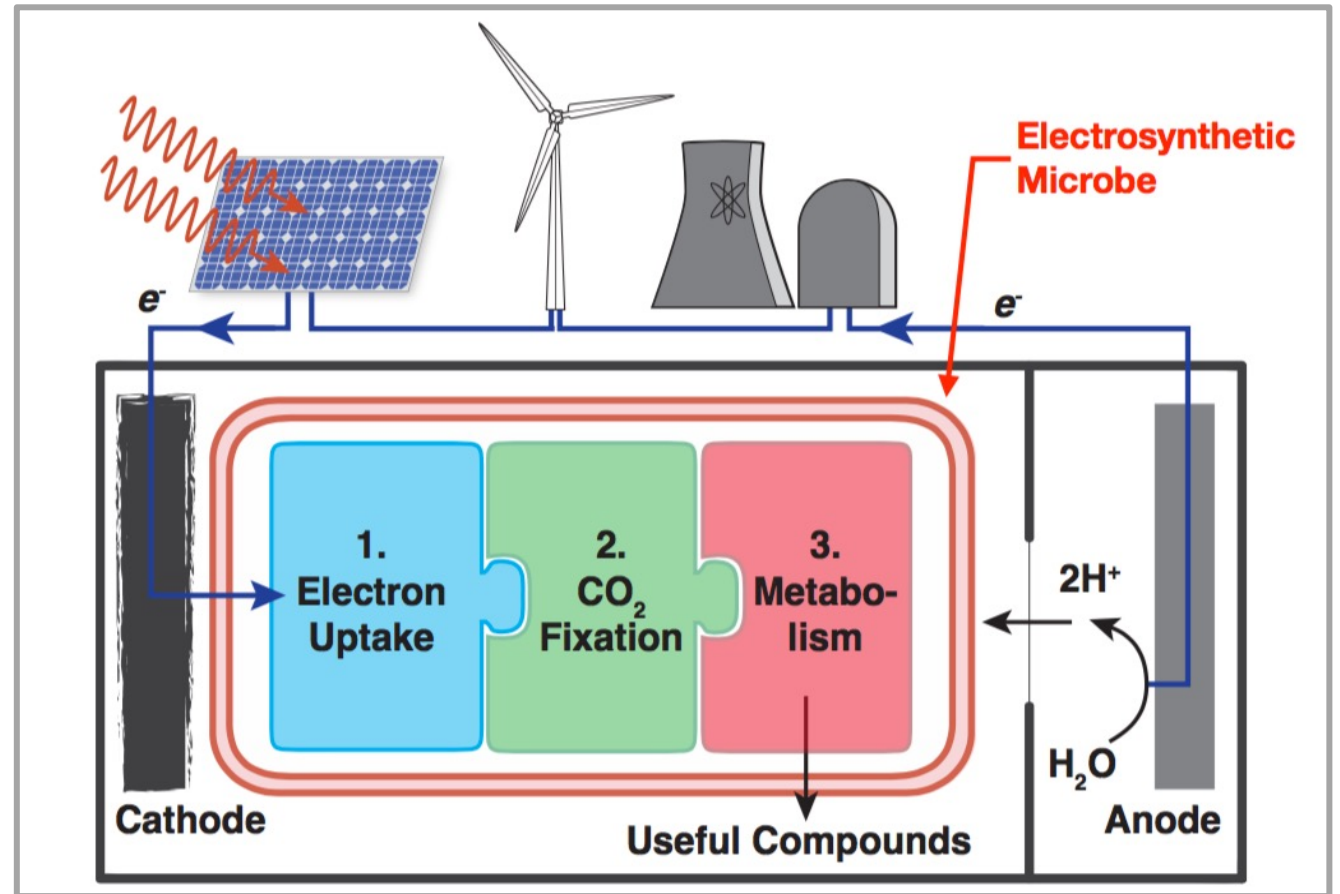


Image from Buz Barstow



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