

# Analysis of the Effects of Substratum Chemistry on Twitching Motility in *Shewanella oneidensis*

Veronica Espinoza  
Colorado School of Mines  
PI: Linnea Ista

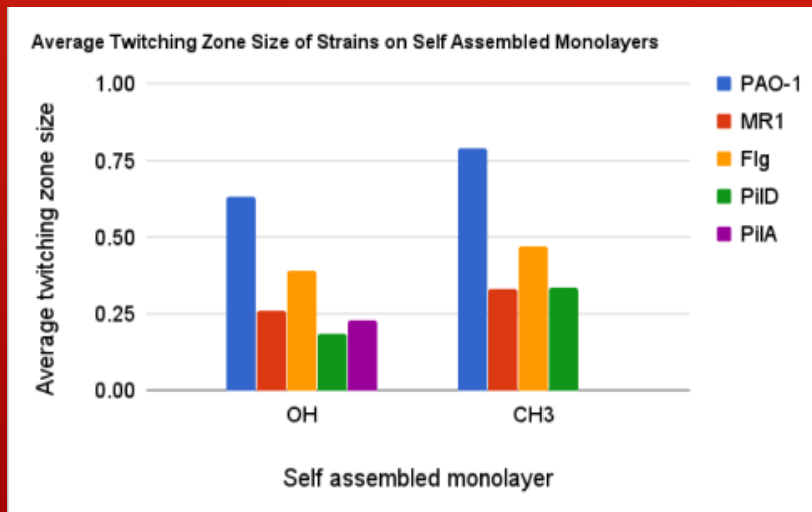
## Problem

Recent studies have demonstrated that twitching motility affects biofilm formation which affect extracellular electron transport (EET) in microbial biofuel cells (MBC). Determining ideal conditions for bacterial motility can help developed efficient MBC.

## Goals

- Confirm that twitching motility occurs in *Shewanella oneidensis*
- Demonstrate that substratum chemistry affects twitching motility in *S. oneidensis*

## Results



- Larger twitching zones on CH<sub>3</sub> SAM
- Similar twitching zone size between  $\Delta pilD$  and MR1
- Different twitching size between  $\Delta pilA$  and MR1

## Methodology

- Used self-assembled monolayer with different functional groups attached to  $\omega$ -substitution alkanethiols.
  - CH<sub>3</sub>, OH, COO<sup>-</sup>, and NMe<sup>+</sup>
- SAMs were stab inoculated with *S. oneidensis* and gene deletion mutants
  - $\Delta pilA$ ,  $\Delta mshA-D$ ,  $\Delta flg$ ,  $\Delta pilD$
- Samples were stain with Coomassie blue and scanned. Images were processed and twitching zone were measured using ImageJ image processing program



## Conclusion

- Substratum chemistry does affect twitching in *S. oneidensis*
- Possible contamination or false deletion mutant in  $\Delta pilD$
- Possible involvement of pilA in twitching motility

## Future Direction

- Continue methodology on remaining SAMs with remaining mutants
- Development of biosensor for bacterial identification