

## Hydrogen Peroxide Production During *Shewanella oneidensis* Aerobic Respiration Contributes to Death Phase Severity

Katelyn Hino<sup>1</sup>, Aura Rexach<sup>2</sup>, Cara Pina<sup>2</sup> & Brett Pellock<sup>2</sup>

<sup>1</sup>Biochemistry, Providence College, Providence, RI

<sup>2</sup>Biology, Providence College, Providence, RI

We are studying stress adaptation in the dissimilatory metal-reducing bacterium *Shewanella oneidensis*. We have observed that the fraction of surviving cells following death phase in batch cultures of *S. oneidensis* is inversely proportional to the starting nutrient concentration of the medium. Cell-free conditioned medium from post-death phase *S. oneidensis* cultures kills healthy exponentially growing *S. oneidensis* cells. However, the ability of cell-free conditioned medium to kill cells rapidly disappears following harvest of the conditioned medium. Because oxidative stress responses are significantly induced during stationary phase in *S. oneidensis*, we hypothesized that the killing molecule in conditioned medium is hydrogen peroxide. We have found that hydrogen peroxide levels in *S. oneidensis* batch cultures are low during exponential phase and high during stationary phase and death phase. We are currently determining whether reducing the hydrogen peroxide levels in cell-free conditioned medium by enzymatic means mitigates the lethality of the conditioned medium. We are also testing whether boosting expression of *katB*, the *S. oneidensis* catalase gene, protects cells against the lethality of cell-free conditioned medium. Finally, we are determining whether the hydrogen peroxide concentration in cell-free conditioned medium is directly proportional to the starting nutrient concentration. Taken together, these experiments will reveal the extent to which hydrogen peroxide contributes to the severity of death phase in batch cultures of *S. oneidensis*.