

## SUPPLEMENTAL MATERIALS

### **FIGURE S1. CAAP experiment with $\Delta mtrAB/omcA$ and $\Delta SO\_2240$ fluorescent motile cells near $MnO_2$ after photo-bleaching.**

Left column shows GFP labeled cells at  $t = 0$  while right column shows experiment at time = 2 h. Significant accumulation and attachment occurs in WT MR-1. EET deletion mutants  $\Delta mtrAB/omcA$  (B) and methyl accepting chemotaxis mutant  $\Delta SO\_2240$  (C) do not accumulate or attach in significant numbers relative to WT. The black vertical scale bar on bottom right represents 100  $\mu m$ .

All Supplemental Video files can be downloaded here: <https://figshare.com/s/700c93156db04ddb0d7f>

### **VIDEO S1. Top view time-lapse video of wild type MR-1 cells during CAAP**

**experiment.** MR-1 cells false colored to represent z-axis contour with red top 30 $\mu m$ ; blue 0  $\mu m$  bottom, during accumulation and attachment on  $MnO_2$  (purple), over 1 hour and 30 min. In final still frame, MR-1 cells are colored green.

### **VIDEO S2. Revolving 3D axis perspective of time-lapse video of wild type MR-1**

**cells.** MR-1 cells are false colored to represent z-axis contour with red top 30 $\mu m$ ; blue 0  $\mu m$  bottom, during accumulation and attachment on  $MnO_2$  over 1 hour and 30 min.

### **VIDEO S3. MR-1 congregation behavior around $MnO_2$ .**

### **VIDEO S4. MR-1 congregation behavior around $Fe(OH)_3$ .**

### **VIDEO S5. SB2B congregation behavior around $MnO_2$ .**

[VIDEO S6](#). **SB2B behavior around Fe(OH)<sub>3</sub>.**

[VIDEO S7](#). **CN32 congregation behavior around MnO<sub>2</sub>.**

[VIDEO S8](#). **CN32 congregation behavior around Fe(OH)<sub>3</sub>.**

[VIDEO S9](#). **W318-1 behavior around MnO<sub>2</sub>.**

[VIDEO S10](#). **W318-1 congregation behavior around Fe(OH)<sub>3</sub>.**

[VIDEO S11](#). **Ana3 behavior around MnO<sub>2</sub>.**

[VIDEO S12](#). **Ana3 behavior around Fe(OH)<sub>3</sub>.**

[VIDEO S13](#). **PV4 behavior around MnO<sub>2</sub>.**

[VIDEO S14](#). **PV4 behavior around Fe(OH)<sub>3</sub>.**

[VIDEO S15](#). **Time-lapse bacterial reduction of MnO<sub>2</sub>.** MR-1 cells can be seen swimming at speeds of 40–80 μm/s around an MnO<sub>2</sub> particle as it is being reduced. The bacteria for this experiment were sealed in an anaerobic capillary tube, with LB, ~15 min before recording. The tube remained sealed until the MnO<sub>2</sub> particle was fully reduced. Video was recorded using a combination of ×40 and ×100 optical microscopy to allow observation of the particle reduction and the microbial response respectively. Originally published in (2010) Proc. Natl. Acad. Sci. U.S.A.

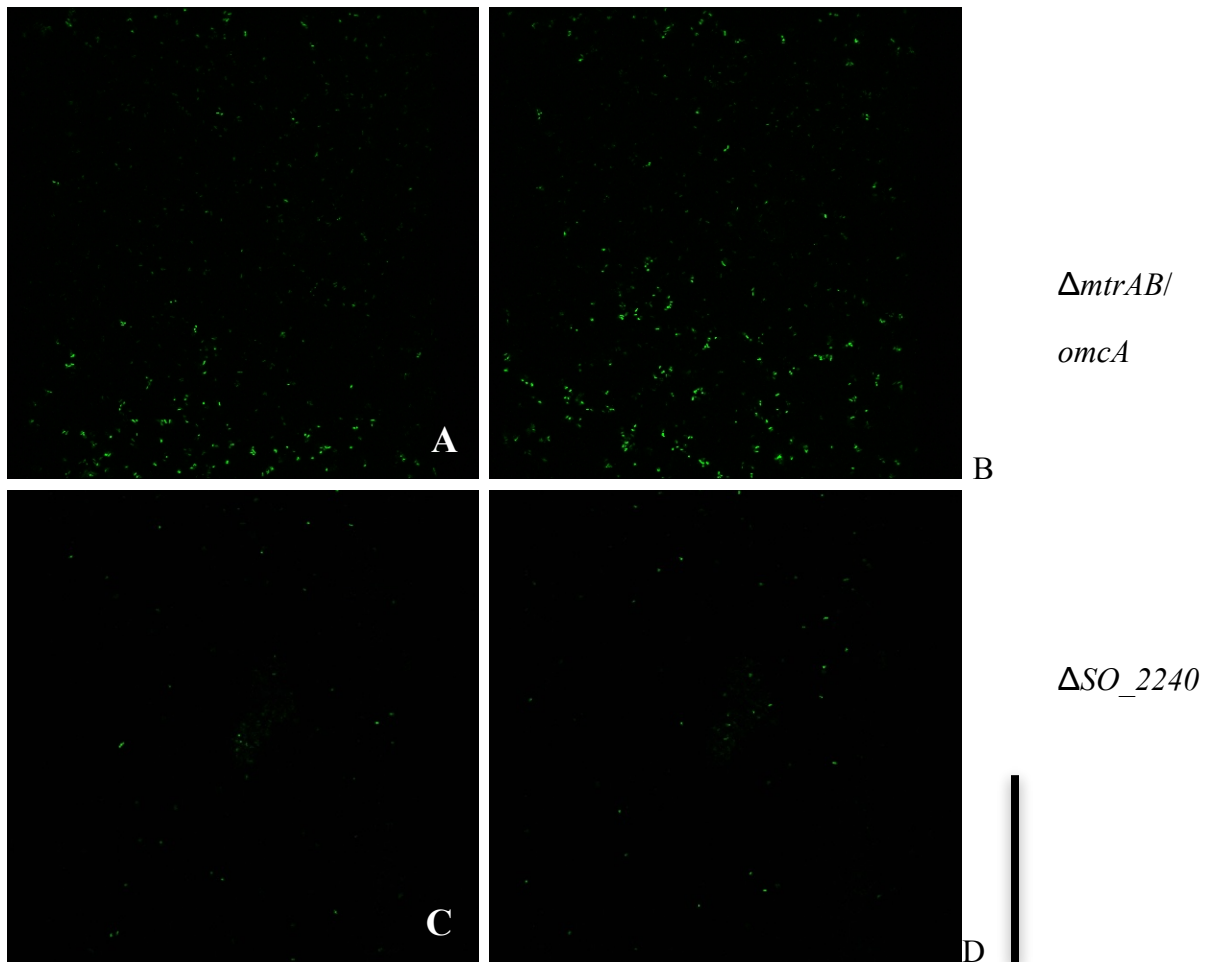
[VIDEO S16](#). **Time-lapse bacterial reduction of Fe(OH)<sub>3</sub>.** MR-1 cells can be seen swimming at speeds of 40–80 μm/s around an Fe(OH)<sub>3</sub> particle as it is being reduced. The bacteria for this experiment were sealed in an anaerobic capillary tube, with LB, ~15

min before recording. The tube remained sealed until the  $\text{Fe}(\text{OH})_3$  particle was partially reduced. Video was recorded using a combination of  $\times 40$  and  $\times 100$  optical microscopy to allow observation of the particle reduction and the microbial response respectively.

Originally published in Harris, (2010) Proc. Natl. Acad. Sci. U.S.A.

**[VIDEO S17](#). Top view time-lapse video of wild type MR-1 cells during CAAP**

**experiment.** Video, representing 3 hours of real time, was captured using phase contrast and fluorescent confocal microscopy (600x total magnification). MR-1 cells are labeled with GFP, were sealed inside anaerobic capillary tube containing  $\text{MnO}_2$ , minimal media and 18mM lactate. Originally published in Harris, (2012) Biochemical Transactions.



**FIG S2. Non-accumulation and attachment of cells on  $MnO_2$  after photo-bleaching.**

Left column show GFP labeled cells at  $t = 0$  while right column shows experiment at time = 2 h. Experiment with WT MR-1 can be seen in FIG 1. EET deletion mutants  $\Delta mtrAB/omcA$  (A & B) and methyl accepting chemotaxis mutant  $\Delta SO\_2240$  (C & D) do not accumulate or attach in significant numbers relative to WT. The black vertical scale bar on bottom right represents 100  $\mu m$ .