Abstract Submitted
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Relevance of Aromatic Amino Acids for Electron Conduction along *Geobacter* Pili Protein.[1] RAMESH ADHIKARI, University of Massachusetts Amherst, NIKHIL MALVANKAR, Yale University, MARK TUOMINEN, DEREK LOVLEY, University of Massachusetts Amherst — It has been proposed that the charge transport though *Geobacter sulfurreducens* pili protein occurs through the aromatic amino acids forming helical conducting chain within pili.[1] X-ray studies of pili show that the aromatic amino acids are packed close enough (3-4 Å) for pi-stacking to occur. Conductivity of the pili network increases with lowering temperature indicating metallic-like transport mechanism. [2] However due to the complexity of charge percolation path in 3D network, the intrinsic conductivity of an individual pili was not known. Here, we report transport measurements of individual pili of *G. sulfurreducens.* The conductivity, similar to that of organic polymers, shows that the pili may have implications in materials research. In addition, the conductivity value is sufficient to explain the respiration rate of the *G. sulfurreducens*. Further studies of pili from different natural and genetically modified species with varying amount of aromatic amino acid density demonstrate that it can play a decisive role on the magnitude of the conductivity. [1] Malvankar, N. S. et al. mBio 6, e00084-00015 (2015). [2] Malvankar, N. et al. Nature Nano. 6, 573-579 (2011).

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