

Electric Cable Bacteria in Hudson River Sediments

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The recent discovery of “electric cable bacteria” in marine sediments fundamentally challenges traditional understanding of microbial life at redox transition zones [1] Multicellular assemblages of organisms from representing the Desulfobobaceae can span over 1.5 cm and can transfer reducing equivalents from hydrogen sulfide and sulfide bearing minerals at depth to oxygen at the water-sediment interface at speeds that greatly exceed reasonable diffusion rates.

To determine if similar organisms are present within freshwater systems, we sampled reducing sediments at the confluence of the Hudson and Mohawk Rivers in upstate New York. Samples were sieved to remove predatory organisms, placed in glass test tubes and incubated at room temperature for 2 weeks. Following development of a stratified redox gradient, samples were prepared for scanning electron microscopy using a critical point drying method to preserve biological fine structures. An abundance of filaments reaching more than 1 mm in length were observed at the redox transition zones. These filaments displayed extracellular ridges running the entire length of the filaments, which are characteristic for electric cable bacteria from marine sediments. This presentation provides an update on the biogeochemical and genomic characterization of cable bacteria freshwater systems.

[1] Pfeffer C, Larsen S, Song J, Dong M, Besenbacher F, Meyer RL, Kjeldsen KU, Schreiber L, Gorby YA, El-Naggar MY, Leung KM, Schramm A, Risgaard-Petersen N, Nielsen LP (2012), *Nature* **491**(7423):218-21.