# Electrical interactions between cable bacteria and other microbes in marine sediments

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Cable bacteria filaments conduct electrons over centrimetre-scale distances to couple the oxidation of sulfide in deeper anoxic sediment to oxygen reduction at the sediment surface. This activity results in strong acidification of the suboxic zone and concomittant dissolution of iron sulfide and other minerals which may impact the sediment microbial community. Cable bacteria may also influence the microbial community directly through syntrophic interactions and direct interspecies electron transfer.

The microbial community of marine sediments was studied using 16S amplicon and whole metagenome shotgun sequencing. Cable bacteria were quantified using qPCR with a primer set detecting marine cable bacteria related to the genus Candidatus Electrothrix. In aerobic incubations of marine sediment, cable bacteria amounted to approximately 6% of bacterial 16S amplicons. Comparative analysis of incubations of the same sediment in which cable bacteria had not (yet) developed, showed a strong enrichment of a population of Alphaproteobacteria related to Rhodospirillales in the sediment with cable bacteria. Metagenomic sequencing resulted in an almost complete genome bin representing the Rhodospirillales species, which contained a high number of genes coding for cytochrome c proteins suggesting there might be a capacity for extracellular electron transfer. Representative cultures were tested for the utilization of different growth substrates and cyclic voltammetry was employed to study the ability for extracellular electron transfer. Together with an evaluation of substrate fluxes in the sediment and the current density generated by the cable bacteria, these data provide insight into why the Rhodospirillales species thrives in the presence of cable bacteria.

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