Title

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Authors

Woyke, Tanja
Copeland, Alex
Xie, Gary
et al.

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Single cell genome reconstruction of an uncultured, proteorhodopsin-containing Flavobacterium

Tanja Woyke[1], Alex Copeland[1], Gary Xie[3], Cliff Han[3], Jan-Fang Cheng[1], Hajnalka Kiss[3], Jimmy Saw[3], Pavel Senin[3], Michael E. Sieracki[2] and Ramunas Stepanauskas[2]

1 DOE Joint Genome Institute, Walnut Creek, California, **2** Bigelow Laboratory for Ocean Sciences, West Boothbay Harbor, Maine, **3** Los Alamos National Laboratory, Los Alamos, New Mexico

ABSTRACT

Determining the genetic makeup of predominant microbial taxa with specific metabolic capabilities remains one the major challenges in microbial ecology and bioprospecting, due to the limitations of current cell culturing and metagenomic methods. The complexity of microbial communities and intraspecies variations hinders the assembly of individual genomes from metagenomic shotgun libraries. Here we report the use of single cell genomics to access the genome of a proteorhodopsin-encoding flavobacteria from Gulf of Maine bacterioplankton. We use high throughput fluorescence-activated sorting of single cells, whole genome amplification via multiple displacement amplification, PCR-screening and subsequent shotgun sequencing of this single amplified genome (SAG), allowing the genomic analysis of its novel photometabolic system and the sequence comparison to environmental marine sequence data.

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