Biogeography and environmental genomics of the Roseobacter-affiliated pelagic CHAB-I-5 lineage

The identification and functional characterization of microbial communities remains a prevailing topic in microbial oceanography as information on environmentally relevant pelagic prokaryotes is still limited. The Roseobacter group, an abundant lineage of marine Alphaproteobacteria, can constitute large proportions of the bacterioplankton. Roseobacters also occur associated with eukaryotic organisms and possess streamlined as well as larger genomes from 2.2 to >5 Mbp. Here, we show that one pelagic cluster of this group, CHAB-I-5, occurs globally from tropical to polar regions and accounts for up to 22% of the active North Sea bacterioplankton in the summer. The first sequenced genome of a CHAB-I-5 organism comprises 3.6 Mbp and exhibits features of an oligotrophic lifestyle. In a metatranscriptome of North Sea surface waters, 98% of the encoded genes were present, and genes encoding various ABC transporters, glutamate synthase and CO oxidation were particularly upregulated. Phylogenetic gene content analyses of 41 genomes of the Roseobacter group revealed a unique cluster of pelagic organisms distinct from other lineages of this group, highlighting the adaptation to life in nutrient-depleted environments.

General information
Publication status: Published
Organisations: Department of Systems Biology, Bacterial Ecophysiology and Biotechnology, University of Oldenburg, University of Göttingen, University West of Florida
Publication date: 2016
Peer-reviewed: Yes

Publication information
Journal: Nature Microbiology
Volume: 1
Issue number: 7
Article number: 16063
ISSN (Print): 2058-5276
Ratings:
Web of Science (2016): Impact factor
Web of Science (2016): Indexed yes
Original language: English
Keywords: Biogeography, Microbial ecology, Microbiology
DOIs: 10.1038/nmicrobiol.2016.63
Source: FindIt
Source ID: 2304421186
Research output: Contribution to journal › Journal article – Annual report year: 2016 › Research › peer-review