

RESEARCH ARTICLE

# Archaeal and Bacterial Communities Associated with the Surface Mucus of Caribbean Corals Differ in Their Degree of Host Specificity and Community Turnover Over Reefs

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## OPEN ACCESS

**Citation:** Frade PR, Roll K, Bergauer K, Herndl GJ (2016) Archaeal and Bacterial Communities Associated with the Surface Mucus of Caribbean Corals Differ in Their Degree of Host Specificity and Community Turnover Over Reefs. PLoS ONE 11(1): e0144702. doi:10.1371/journal.pone.0144702

**Editor:** Gabriel Moreno-Hagelsieb, Wilfrid Laurier University, CANADA

**Received:** July 1, 2015

**Accepted:** November 23, 2015

**Published:** January 20, 2016

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**Data Availability Statement:** Data is available from GenBank under the following accession numbers: KU243153 to KU243335.

**Funding:** Financial support was provided by Marie Curie fellowship (Seventh Framework Programme) FP7-299320 and fellowship M1363-B20 from the Lise Meitner Program of the Austrian Science Fund (FWF) to PRF. Additional support by the Austrian Science Fund (FWF) projects I486-B09 and P23234-B11 to GJH. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

## Abstract

Comparative studies on the distribution of archaeal *versus* bacterial communities associated with the surface mucus layer of corals have rarely taken place. It has therefore remained enigmatic whether mucus-associated archaeal and bacterial communities exhibit a similar specificity towards coral hosts and whether they vary in the same fashion over spatial gradients and between reef locations. We used microbial community profiling (terminal-restriction fragment length polymorphism, T-RFLP) and clone library sequencing of the 16S rRNA gene to compare the diversity and community structure of dominant archaeal and bacterial communities associating with the mucus of three common reef-building coral species (*Porites astreoides*, *Siderastrea siderea* and *Orbicella annularis*) over different spatial scales on a Caribbean fringing reef. Sampling locations included three reef sites, three reef patches within each site and two depths. Reference sediment samples and ambient water were also taken for each of the 18 sampling locations resulting in a total of 239 samples. While only 41% of the bacterial operational taxonomic units (OTUs) characterized by T-RFLP were shared between mucus and the ambient water or sediment, for archaeal OTUs this percentage was 2-fold higher (78%). About half of the mucus-associated OTUs (44% and 58% of bacterial and archaeal OTUs, respectively) were shared between the three coral species. Our multivariate statistical analysis (ANOSIM, PERMANOVA and CCA) showed that while the bacterial community composition was determined by habitat (mucus, sediment or seawater), host coral species, location and spatial distance, the archaeal community composition was solely determined by the habitat. This study highlights that mucus-associated archaeal and bacterial communities differ in their degree of community turnover over reefs and in their host-specificity.