Marine Plastics and Microbial Communities

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Plastic production has increased exponentially over the last decades and a large percentage of this plastic ends up in the ocean. Consequently plastic pollution in the ocean has become one of the major environmental concerns of our time. Once in the ocean plastic pieces become rapidly colonized by a complex and diverse microbial community, composed of both eukaryotes and prokaryotes. It is thought that these communities might have a major impact on the fate of plastic in the ocean and on the health of marine ecosystems. However, knowledge on this topic is highly lacking.

My research focuses mostly on investigating the bacterial component of these communities. Firstly, I aim at understanding how certain factors might affect the development of these communities. These factors include the type of the colonized plastic, exposure to solar radiation, season and geographical location. Secondly I aim at understanding whether specific bacterial taxa prefer certain plastic types over the others. There are several types of plastic, with polyethylene (PE) and polypropylene (PP) being the most abundant, making up more than 90% of the plastics collected at the ocean´s surface. And it appears that in certain cases, certain bacteria do prefer specific plastic types. This could potentially indicate which species we should study when searching for plastic-type specific degraders. And thirdly, by studying the metagenomes of an isolated community that can survive and develop with PE as their sole carbon source, I aim at understanding the main players and metabolic pathways that can potentially lead to PE biodegradation.