Investigating the Plastisphere: The Role of Plastic-Associated Microbes on Microbead Ingestion by the Coral *Astrangia poculata*

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There are currently between 6,350 to 245,000 million metric tons of plastic in the global oceans. Macroplastics that enter the ocean often get weathered down into microplastics (<5mm), now found in all oceans, including remote regions and depths. Microplastics are consumed by a variety of marine organisms and harbor distinct microbiomes. It is unknown whether bacterial biofilms on plastics influence the mobility of plastics throughout the food web. The local coral *Astrangia poculata* feeds on particles in the seawater. This study aims to test if plastics ingestion by *A. poculata* is influenced by surface-associated microbes. Colonies of *A. poculata* were presented polyethylene microbeads (200µm diameter) with various treatments in choice-feeding assays, in which *A. poculata* colonies were presented equal quantities of two treatments of microbeads suspended in seawater. Polyps were dissected to score intake of each treatment. Microbeads were biofilmed in aquarium tanks at Roger Williams University and *in situ* at Fort Wetherill State Park (RI) for three weeks. *A. poculata* consistently ingested non-biofilmed microbeads significantly more than biofilmed microbeads. *A. poculata* was provided pairwise choices of microbeads biofilmed in different bacterial isolates from the *Astrangia* Culture Collection. Ingestion appears to be significantly impacted by the presence of specific bacterial isolates, but it is not yet known whether this is due to avoidance of certain bacteria, or attraction to other bacteria. Ongoing studies include determining the fate of specific bacteria co-ingested with microplastics, via direct or indirect ingestion of microbeads. These studies also include investigating whether coral ingestion of microplastics is affected by an elevated temperature. Ultimately, these studies provide insight into the microbial aspect of the toxicological impact of microplastics in the marine environment, especially on the behavior of filter-feeding organisms.

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