Tracking the Fate of Polyethylene Microbeads and Microbead-Associated Microbes in Exposure Assays of the Coral, *Astrangia poculata*

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Microplastics (<5mm diameter) are detrimental to marine life and are found in even the most remote oceanic regions. Microplastics are consumed, often unintentionally, by a variety of marine organisms, including *Astrangia poculata*, a temperate heterotrophic coral. *Astrangia poculata*, a suspension feeder, feeds on zooplankton and other particles in the water column making it vulnerable to incidental microplastics ingestion, either directly from the water column, or via contaminated prey. This study aims to use *A. poculata* and its copepod prey, *Pseudodiaptomus pelagicus*, as an experimental system to track the fate of microplastics and microplastics-associated microbes. In this study, we developed methods to reliably coat polyethylene microbeads with GFP-tagged *Escherichia coli*. Also, *P. pelagicus* was fed GFP-E. coli-biofilmed UV-fluorescent polyethylene microbeads, and the copepods were subsequently fed to *A. poculata.* Fluorescence imaging was used to image the microbeads and *E. coli* cells. Data demonstrated that *A. poculata* ingested microplastics via contaminated *P. pelagicus*. *Astrangia poculata* was also directly fed GFP-E. coli biofilmed microbeads and imaged via epifluorescence microscopy. Imaging is ongoing to localize GFP-*E.coli* cells resulting from this ingestion; however, initial findings suggest that *E. coli* is transferred into *A. poculata* via direct ingestion and indirect ingestion (via *P. pelagicus*) of the microbeads. These findings will provide important insight and new methods for exploration of the fate of microplastics and their associated microbes throughout food webs, specifically via indirect ingestion of microplastics in marine organisms across multiple trophic levels.

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