The Effect of Microplastic Type on Pharmaceutical Sorption in the Waterways of New York City

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Microplastics are pervasive throughout marine ecosystems but little is known about their effect on these ecosystems or on human health. One potential danger of microplastics is the sorption of organic contaminants to these plastics in marine environments. This study investigated the relationship between microplastic composition and pharmaceutical sorption in the waterways of New York City. Eight types of plastics were left in mesh baskets at The Englewood Cliffs, The North River Wastewater Treatment Plant, Pier 25, Newtown Creek, Flushing Bay, and The Harlem River. After retrieval, these plastics were analyzed for pharmaceuticals. Surface water samples, sediment samples, and tow samples were also collected from these sites. Atenolol, sulfamethoxazole, and ibuprofen were found in surface water samples from all five sites. These pharmaceuticals were also found sorbed to microplastics, thus proving that microplastics can serve as vectors for the transport of pharmaceuticals through marine environments. This study also determined that plastic surface area has a greater effect on pharmaceutical sorption than plastic composition. Future work on this topic should include investigating the relationship between microplastic shape and pharmaceutical sorption.