Microplastics in Coastal Marine Animals: Defining the problem



Microplastics are small particles of plastics that are released into the environment when larger plastic materials break down. How much plastic is in our local environment, and where does it go when fish (and humans!) encounter or consume it?



In a project funded by WHOI Sea Grant in 2020, the research team, led by WHOI biologists Mark Hahn and Neel Aluru and including MIT/WHOI JP student Jordan Pitt, analyzed killifish from Old Silver Beach in Falmouth, and Monument Beach in Bourne, to see if microplastics could be detected. They found microplastics between 4 and 250 micrometers in both the GI tract and muscle tissue of the killifish.





To determine what mechanism was at work to cause microplastics to move to muscle tissue, the researchers conducted lab experiments using zebrafish, which have the majority of the same genes as humans, making them an important model for understanding the impacts of microplastics on human health.

In laboratory studies, polystyrene nanoplastics (50 nm in size) were labeled with a green fluorescent material. Larval zebrafish were then exposed to these nanoplastics in two different ways: oral exposure or exposure in the water. Plastic ingested by the zebrafish orally quickly cleared the gut, but zebrafish exposed in the water took up nanoplastics through their gills or skin where it moved to other tissues.



KEY TAKEAWAY



Plastic is all around us, but how we are exposed to it matters! We saw more nanoplastic particles taken up into the body when they were in the fish's water than when they were given by mouth!





