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# Silent Poison: How Marine Microplastics Infiltrate Your Brain and Sabotage Mental Health

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## Abstract

Concerns have been growing over the health effects of marine microplastics, which can accumulate in marine organisms and move up the food chain. Increasing evidence suggests that humans are being exposed to microplastics not through acute, large doses, but rather through subtle, continuous, and often unnoticed low-level exposure over time. Research indicates that microplastics consumed via marine life can enter the human body, reach the brain, and possibly cause neurotoxic effects, disrupting nervous system functions. This study was conducted to investigate how such chronic microplastic intake may influence both physical and mental health, particularly brain function. To this end, we produced polyethylene terephthalate (PET) microplastics under 100  $\mu\text{m}$  in diameter and administered them to C57BL/6 mice over a period of approximately 29 weeks, simulating the kind of persistent, low-dose exposure likely experienced in real life. During this time, behavioral tests were carried out to observe potential alterations in anxiety, movement, and cognitive ability. Brain samples were analyzed using lipidomic profiling, DESI-MS (desorption electrospray ionization-mass spectrometry), and Cresyl violet staining. Despite partial excretion, a significant portion of microplastics remained in the body and correlated with noticeable neurological and behavioral changes. These results suggest that prolonged, low-level exposure to marine microplastics—much like the kind that may go unnoticed in daily life—may pose a risk to human brain health and overall mental well-being, emphasizing the importance of addressing this emerging environmental concern.

**Keywords:** Marine microplastics, Chronic exposure, Lipidomics, Behavioral changes, Brain health

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