Carbohydrate utilization by marine fungi in the global ocean

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Video Byte

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Abstract

In terrestrial and freshwater ecosystems, fungi are essential for nutrient cycling, releasing carbon dioxide into the atmosphere and inorganic nitrogen and phosphorus into the soil. In contrast, in marine environments, fungi are often considered to be associated with debris and less essential to the element cycle than other microbes such as prokaryotes and phytoplankton. A recent study sought to better understand the role of open-sea, or pelagic, fungi in carbon cycling in the ocean. Using multi-omics techniques and existing genomic datasets, researchers performed a global analysis of carbohydrate-active enzymes (CAZymes) – key enzymes in carbon cycling – in ocean fungi. They found that pelagic fungi are active in carbohydrate degradation, as indicated by a high ratio of CAZyme transcripts. Certain fungal classes – Dothideomycetes and Leotiomyces – were the primary fungi responsible for carbon degradation in the ocean, and the abundance, expression, and diversity of fungal CAZymes were higher in the mesopelagic than in the epipelagic zone. These results demonstrate that pelagic fungi use a wide variety of CAZymes to participate in carbon cycling, uncovering an important and previously unappreciated role for these fungi in ocean niches.