



Coral polyps cause a stir

Though often appearing as a single organism, reef-building corals are actually colonies of individual polyps. Dense canopies of cilia cover the polyps and stir the fluid layer in the immediate vicinity. To gain insight into the complex flow that's created, Vicente Fernandez, Roman Stocker, and colleagues at MIT have used video microscopy to track the paths of 2- μm fluorescent beads around the coral *Pocillopora damicornis*, also known as cauliflower coral. In this image (part of the Gallery of Fluid Dynamics at the 2012 meeting of the American Physical Society's Division of Fluid Dynamics) naturally occurring green fluorescent protein gives the coral its green appearance; the brightly colored polyps are about 1 mm in diameter. Arced bead tracks, generated from 120 video frames taken at 10 frames per second, reveal the mixing that is occurring perpendicular to the coral surface.

The ciliary mixing enhances mass transport near the surface. Reef-building corals are symbiotic hosts to zooxanthellae—photosynthetic, single-celled algae that provide up to 90% of the corals' nutrients. The augmented transport may fuel that relationship by increasing the rates of photosynthesis and carbon fixation. But it can also promote the invasion of the coral surface by microbial pathogens. Understanding such effects may provide key insights into coral disease and threats to the fragile ecosystems of coral reefs. (Image by the Stocker Group, Civil and Environmental Engineering, MIT.)

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