Deep in the ocean, a clam that acts like a plant

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How does life survive in the black depths of the ocean? At the surface, sunlight allows green plants to "fix" carbon from the air to build their bodies. Around hydrothermal vents deep in the ocean live communities of giant clams with no gut and no functional digestive system, depending on symbiotic bacteria to use energy locked up in hydrogen sulfide to replace sunlight. Now, the genome of this symbiont has been completely sequenced and published in *Science*.

"The difference here is that while plants get their energy and carbon via photosynthesis by chloroplast symbionts, this clam gets its energy via chemosynthesis," said Jonathan Eisen, a professor at the UC Davis Genome Center and an author on the paper.

The actual work of photosynthesis in green plants is done by chloroplasts, descended from primitive single-celled organisms that were incorporated into other cells billions of years ago.

"The energy from hydrogen sulfide is used to drive carbon fixation in much the same way that chloroplasts carry out carbon fixation," Eisen said. The symbiotic bacteria also fix nitrogen and produce amino acids, vitamins and other nutrients required by the clam.

Studies of the deep sea have implications for studying the origins of life, Eisen said. Life on Earth may have got its start with microbes living on such chemical reactions, before the evolution of photosynthesis.

"And they're just plain interesting," Eisen added.

If you were thinking that giant clams sound tasty, think again. The hydrogen sulfide gives them a strong smell of rotting eggs.

Source: University of California - Davis

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