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| **Abstract:** | The article provides information on a bacteria that undergoes the process of underwater photosynthesis discovered by J. Thomas Beatty, a microbiologist at the University of British Columbia, in 2005. According to Beatty, several light-producing processes may occur when 570 degree Fahrenheit water from thermal vents hits cold, deep ocean currents including sonoluminescence from imploding gas bubbles. |
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## Photosynthesizing Life-Form Exists Without Sunlight

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**GEOLOGY** --Long confined to sun-loving, surface-dwelling organisms, the process of photosynthesis went underwater this year--7,843 feet under.

J. Thomas Beatty, a microbiologist at the University of British Columbia, and a team of researchers found a new type of bacteria off the coast of Central America. They are the first known organisms to derive energy by photosynthesis while living in an environment naturally devoid of sunlight.

Beatty believes that when 570 degree Fahrenheit water from thermal vents hits cold, deep ocean currents, several light-producing processes may occur: sonoluminescence from imploding gas bubbles; chemiluminescence from chemical reactions (analogous to fireflies lighting up); crystalloluminescence from the formation of crystal bonds; and triboluminescence from the breaking of those bonds. Nonetheless, the light emitted is so slight that very few bacteria can grow. "There are fewer than two cells for every milliliter," says Beatty. That's proportionally less than a single grain of sugar in a cup of coffee.

Even so, the organisms are important. Before the development of photosynthesis, which creates oxygen, Earth's surface was bombarded by ultraviolet radiation and was relatively inhospitable to life. This led researchers to argue that photosynthesis--and early life-evolved around hydrothermal vents on the ocean floor, safe from surface radiation.

Beatty's bacteria may help support that hypothesis.

The discovery may also shed light on how life could evolve on other planets, including Jupiter's moon Europa. Suggestions of hydrothermal activity on Europa led researchers to speculate that life there could resemble ecosystems around hydrothermal vents on Earth and would survive on chemosynthesis, extracting energy from chemicals. "We're saying, 'Well, not so fast,'" Beatty says. "Maybe there's a small component of photosynthesis to this ecosystem."

PHOTO (COLOR): Deep-sea hydrothermal vents are home to many life-forms.

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By Anne Sasso
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