

# Oil-eating microbes give clue to ancient energy source

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Microbes that break down oil and petroleum are more diverse than we thought, suggesting hydrocarbons were used as an energy source early in Earth's history, scientists heard today at the Society for General Microbiology's Autumn meeting being held this week at Trinity College, Dublin. These microbes can change the composition of oil and natural gas and can even control the release of some greenhouse gases. Understanding the role of microbes in consuming hydrocarbons may therefore help us access their role in the natural control of climate change.

"Hydrocarbons like oil and natural gas are made up of carbon and hydrogen, they are among the most abundant substances on Earth," said Dr Friedrich Widdel from the Max Planck Institute for Marine Microbiology in Bremen, Germany. "Even though we use them as fuel sources, they are actually very unreactive at room temperature. This makes them difficult to use as a biological energy source, particularly if there is no oxygen around."

For over 100 years scientists have known that microbes such as bacteria can use hydrocarbons like oil and gas as nutrients. But this process usually requires supplies of oxygen to work at room temperature. "Scientists were always fascinated by the microbes that do this because hydrocarbons are so unreactive," said Dr Widdel. "But it is even more surprising to find an increasing number of microbes that can digest hydrocarbons without needing oxygen."

"The striking diversity of micro-organisms that can break down hydrocarbons may reflect the early appearance of these compounds as nutrients for microbes in Earth's history; Bacteria and archaea living with hydrocarbons therefore may have appeared early in the evolution of life," said Dr. Widdel.

These bacteria and archaea thrive in the hidden underworld of mud and sediments. You can find them in sunken patches of oil under the sea, in oil and gas seeping out underground, and maybe even in oil reservoirs. Their product, hydrogen sulphide, may nourish an unusual world of simple animal life around such seeps via special symbiotic bacteria.

Scientists have identified particular symbioses between archaea and bacteria that are capable of consuming the greenhouse gas methane before it can escape from the ocean's sediments. Others that have been discovered contribute to the bioremediation or cleaning up of petroleum contaminated water supplies in underground aquifers.

"This astounding oxygen-independent digestion of hydrocarbons is only possible via unique, formerly unknown enzymes," said Dr Widdel. "By getting a better understanding of the way these enzymes and microbes are functioning we will also have a better understanding of natural greenhouse gas control and the way hydrocarbons are naturally recycled into carbon dioxide."

Source: Society for General Microbiology

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