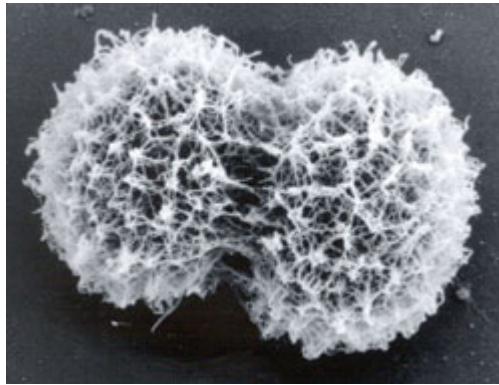


## Microbe Munches Coal Pollutants

In a 40-year old dump in Upstate New York, scientists have found a microbe busy at work cleaning up man's toxic messes.

The newly discovered microbe breaks down naphthalene in coal tar, a residue left behind from the production of gas from coal for street lamps and homes in the 19th and 20th centuries.

Chemicals from coal tar can contaminate groundwater and there are hundreds of these potentially hazardous sites throughout the United States.



Two *P. naphthalenivorans* cells dividing.  
Image © National Academy of Sciences, U.S.A..

Scientists have been searching for techniques to identify microbes that could eliminate or at least decrease hazardous waste in the ground left behind by nuclear power or other types of pollution.

Using a new technique never before tested in the field, scientists put non-radioactive markers on naphthalene and released it into the soil. When carbon dioxide emissions indicated that bacteria were breaking down the naphthalene, the scientists used DNA fingerprinting to identify and isolate the useful microbe from among the thousands that inhabit the soil.

Then they were able to grow a naphthalene-metabolizing bacterium in the laboratory that matched the DNA fingerprint of the active microbe in the soil.

“So few organisms that are actually active [at toxic sites] have been characterized,” says Eugene L. Madsen of Cornell University in Ithaca, New York, who led the study.

Naphthalene itself is not a major health concern, but the new approach could speed the discovery of other microbes that break down more dangerous chemicals in coal tar.

“I think the work represents an interesting twist,” says Lawrence P. Wackett of the University of Minnesota in St. Paul.

“It shows the potential of identifying novel microorganisms in the environment that are degrading pollutants,” he says. In some case these organisms may be difficult to grow in the laboratory so the technique offers a way to study them in the soil.

Madsen says he hopes that the study will spark the interest of the US Department of Energy (DOE) to sequence the genome of the newly discovered bacterium, which they have named *Polaromonas naphthalenivorans*.

The DOE's Genomes to Life Program funds genome sequencing of microbes that are thought to play a role in environmental cleanup.

Jeon, C. O. *et al.* Discovery of a previously undescribed bacterium with distinctive dioxygenase that is responsible for in situ biodegradation in contaminated sediment. Proceedings of the National Academy of Sciences USA. Published online the week of October 27-31, 2003.