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11 Dec 2003 16:18:07 GMT
Genome map shows how bacterium gobbles radiation

WASHINGTON, Dec 11 (Reuters) - A bacterium that can remove uranium contamination from groundwater may also be able to generate electricity, U.S. researchers said on Thursday.

Scientists who deciphered the gene map of Geobacter sulfurreducens say it has more than 100 genes that should enable it to make chemical changes in metals that would generate electricity.

Writing in the journal Science, they said the bacterium might be useful in generating electricity deep underwater, for instance, and might be far more useful than previously thought in cleaning up the environment.

"The genome of this tiny microorganism may help us to address some of our most difficult cleanup problems and to generate power through biologically based energy sources," U.S. Secretary of Energy Spencer Abraham said in a statement.

"This genome sequence and the additional research that it makes possible may lead to new strategies and biotechnologies for cleaning up groundwater at DOE (the Department of Energy) and at industry sites."

The team at The Institute for Genomic Research in Rockville, Maryland and at the University of Massachusetts found G. sulfurreducens had 100 or more genes that appear to encode for various forms of c-type cytochromes. These are proteins that help move electrons back and forth.

It also has genes that help it find metallic compounds. Plus the bacterium, previously thought to be able to exist only in the absence of oxygen, may have genes that would allow it to function when oxygen is present.

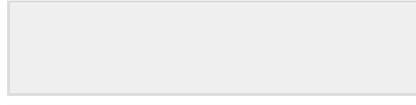
"We've provided a comprehensive picture that has led to fundamental changes in how scientists evaluate this microbe," said Barbara Methe, the TIGR researcher who led the study.

The first Geobacter species to be discovered, G. metallireducens, was found in sediments from the Potomac River, which separates Maryland from Virginia in the Washington D.C. area.

G. sulfurreducens was found in a soil sample in Oklahoma that was contaminated by hydrocarbons -- breakdown products of fossil fuel combustion.

University of Massachusetts researcher Derek Lovley and colleagues have previously found that G. sulfurreducens can convert uranium that is dissolved in water to a solid compound called uraninite, which can then be removed.

The bacteria removed about 70 percent of the uranium from a contaminated underground aquifer.



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