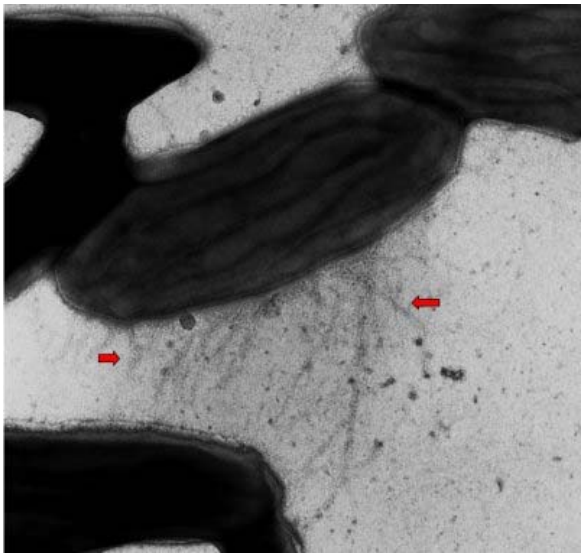
JUNE 29, 2005

MICROBIAL NANOWIRES

Unlocking the Code – Science, Systems and Technological Breakthroughs



Geobacter is quite the interesting genus of bacteria. As extremophiles, they can live quite happily under conditions too toxic for most creatures big or small. Moreover, many *Geobacter* microbes are able to convert those toxins into materials far less dangerous -- a process referred to as "bioremediation" -- sometimes generating electricity in the process.

But in trying to better understand how *Geobacter* is able to do all of this, researchers at the University of Massachusetts at Amherst -- including the original discoverer of the *Geobacter* line -- stumbled across another remarkable characteristic of these creatures: nanowires. *Geobacter* is criss-crossed with tiny (3-5 nanometer wide) protein wires able to conduct electrons out of the cell.

> *The remarkable and unexpected discovery of microbial structures comprising microbial nanowires that may enable a microbial community in a contaminated waste site to*

MONTHLY ARCHIVES (ALL CATEGORIES)

June 2005
May 2005
April 2005
March 2005
February 2005
January 2005
December 2004
November 2004
October 2004
September 2004
August 2004
July 2004
June 2004
May 2004
April 2004
March 2004
February 2004
January 2004
December 2003
November 2003
October 2003

CATEGORY ARCHIVES

Your Turn
A Newly Electric Green
Big Systems
Events
Global Culture
Leapfrog Nations
Money as a Tool
Plausibly Surreal
The Means of Expression
The Second Superpower
The Tech Bloom
To Know it for the First Time
Triggers for Innovation

form mini-power grids could provide new approaches to using microbes to assist in the remediation of DOE waste sites; to support the operation of mini-environmental sensors, and to nano-manufacture in novel biological ways. This discovery also illustrates the continuing relevance of the physical sciences to today's biological investigations." [...]

Ultrafine wires, often referred to as nanowires, are required for further miniaturization of electronic devices. Manufacturing nanowires from more traditional materials such as metals, silica, or carbon is difficult and expensive. However, it is easy to grow billions of Geobacter cells in the laboratory and harvest the microbial nanowires that they produce. Furthermore, by altering the DNA sequence of the genes that encode for microbial nanowires, it may be possible to produce nanowires with different properties and functions.

Another interesting implication of this research is that it suggests a mechanism for microbes to share energy in a mini-power grid. The nanowire pili of individual Geobacter often intertwine, suggesting a strategy by which Geobacter might share electricity.

The article appears in the current *Nature*, and is available for download (PDF) from the Geobacter Project website.

The future will be built with the guts of creatures far too small to see.

Posted by Jamais Cascio at June 29, 2005 03:06 PM | TrackBack

COMMENTS

Wow. Like, really, wow.

[Look at me doing my part to keep the comments section of WorldChanging an industry leader in articulate, intelligent exploration of the world's most pressing issues and the solutions we're developing to address them.]

Posted by: Alex Steffen at June 30, 2005 07:47 PM

Unlocking the Code

WorldChanging Essays

QuickChanges

SEARCH

Search WorldChanging:

Search