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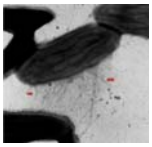

31/7/2009

More efficient electricity-making Geobacter

Power output increased by eight times

by Helen Tunnicliffe

Geobacter sulfurreducens is covered in fine hair-like filaments called pili

RESEARCHERS at the University of Massachusetts in Amherst, US, have discovered a strain of the electricity-producing bacteria *Geobacter* which is eight times more efficient that any previously discovered.

The strain of *Geobacter sulfurreducens*, KN400, is derived from a naturally occurring bacteria found in river sediments. It is covered in fine hair-like filaments called pili, which are 25 nm in diameter. These are important for the production of a biofilm which allows the *Geobacter* to transport electrons. The bacteria produces electricity from organic matter in soil, sediment and wastewater.

Research leader Derek Lovley experimented with a way to manipulate the environment of the bacteria to cause selective pressure and produce a strain that generates more energy. He and his team grew *Geobacter* as normal on graphite electrodes with acetate as a food source. They then passed a 400 mV current through the electrode, forcing the bacteria to push harder to force the electrons through the biofilm and through the electrode. After five months, the KN400 strain was isolated and found to be able to push eight times more electrical current through the electrode. It also required a thinner biofilm before electricity was produced.

KN400 could find a use in microbial fuel cells and bioremediation. Lovley believes that aside from just producing power it could simultaneouly treat domestic wastewater while generating energy for mobile electronic devices, vehicles, and implanted medical devices.

“I’m really happy with this outcome. It’s exceptionally fast feedback to us and a very satisfying result,” says Lovley, adding: “I’m still a little amazed that they make electricity, but I’m happy to be exploring how to harness that ability. I’m sure there’ll be applications developed in the future that we can’t even envision right now.”

The research was published in *Biosensors and Bioelectronics* (doi: 10.1016/j.bios.2009.05.004) and was supported by the Office of Naval Research and the U.S. Department of Energy.

back to news