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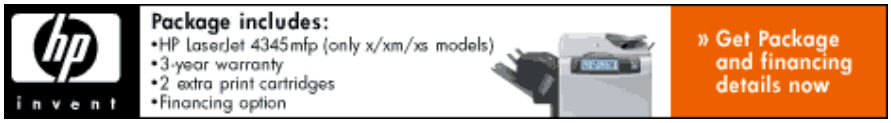

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Microbes pave way for 'nanowires'

Scientists promise organically-based nanotech applications

Robert Jaques, vnunet.com 29 Jun 2005

US scientists have discovered a process by which micro organisms create tiny biological structures that are highly electrically conductive, paving the way for organically-based nanotechnology applications.

According to researchers at the University of Massachusetts Amherst, the conductive structures, known as "microbial nanowires", are produced by a micro organism known as Geobacter.

Microbiologist Derek R. Lovley who lead the research team that found nanowires, explained that the microbes' structures are only 3-5 nanometres in width (20,000 times finer than a human hair) but quite durable and more than a thousand times as long as they are wide.

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"Such long thin conductive structures are unprecedented in biology," said Lovley. "This completely changes our concept of how micro organisms can handle electrons, and it also seems likely that microbial nanowires could be useful materials for the development of extremely small electronic devices."

Dr Aristides Patrinos of the US Department of Energy, which funds the Geobacter research, added: "The remarkable and unexpected discovery of microbial structures comprising microbial nanowires may enable a microbial community in a contaminated waste site to form mini-power grids.

"These 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."

Geobacter microbes are the subject of intense investigation because they are useful agents in the bioremediation of groundwater contaminated with pollutants such as toxic and radioactive metals or petrol.

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They also have the ability to convert human and animal waste or renewable biomass into electricity. To carry out these processes, Geobacter must transfer electrons outside the cell onto metals or electrodes.

Previous studies in Lovley's laboratory demonstrated that Geobacter produces fine, hair-like structures, known as pili, on just one side of the cell.

Lovley's team speculated that the pili might be miniature wires extending from the cell that would permit Geobacter to carry out its unique ability to transfer electrons outside the cell onto metals and electrodes.

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