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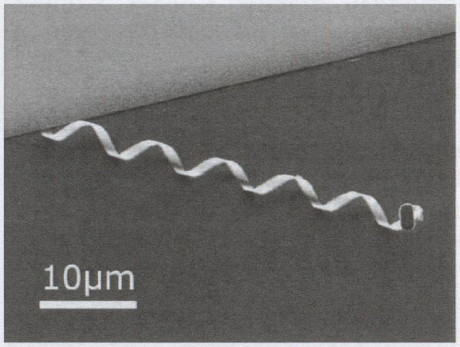
Swiss build micro-robot

Swiss scientists have developed a tiny corkscrew-shaped micro-robot that could be used to repair damaged human arteries.

The bacteria-sized robot, built by researchers at the Federal Institute of Technology in Zurich, is able to swim through liquids with great precision using external low magnetic fields, the institute's online magazine ETH Life has revealed.

The Zurich team's micro-robot is part of growing new research worldwide into small medical robots for sensing, drug delivery or surgery inside the human body.

The miniature device measures between 25-60 micrometres in length (a human hair is around 100 micrometres in diameter), compared with 5-15 micrometres for bacteria.



The "Artificial Bacterial Flagella", which took five years to develop, has been inspired by nature. "It's basically a small corkscrew similar in size and shape to the flagella - the little tail on certain bacteria like E. coli that use them to propel themselves," Bradley Nelson, professor of Robotics and Intelligent Systems at the Federal Insitute of Technology in Zürich, said.

Interacting with the physical world totally changes when working at such a tiny scale, he added.

"If you made yourself ten thousand times smaller, water would feel like molasses. If you had a paddle that just went back and forwards you would go nowhere, so you need a corkscrew."

The mini-robot is built from fine layers of indium, gallium, arsenic and chrome, with its "head" made of chrome, nickel and gold. As nickel is slightly magnetic, the robot can be moved in low magnetic fields up to a speed of 20 micrometres per second.

Powering tiny medical robots is a big issue at this scale. Research is currently focusing on how devices gather and store energy.

Nelson and his team believe the corkscrew shape offers many advantages.

"By mimicking the way bacteria propel themselves, we can guide and control similar-sized structures with very low fields so that we can control them from the distance of several centimetres," he said.

The tiny device is still at the stage of fundamental research. But in the future the minute machines could be used to travel to otherwise inaccessible regions to precisely deliver drugs or to manipulate cells or molecules.

The team is currently testing new materials and control mechanisms, and examining how best to track the device.

Tests in humans are not foreseeable right now. "But I don't think there is any fundamental science that limits us," Nelson said. "It'll take people with a grand vision, a lot of energy and the resources. The stronger each of those are, the quicker it will come." *from swissinfo*

Das Glück ist nur für bescheidene Menschen bestimmt; darum warten die Unverschämten auch ihr ganzes Leben darauf.

Wilhelm Weber-Brauns