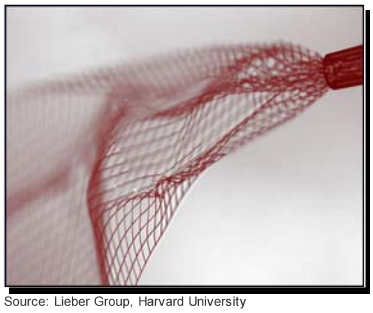
10/06/2015

Injectable electronics promise a better diagnosis and treatment of the brain and other tissues



Source: Lieber Group, Harvard University

The picture shows how the stitches electronics through a sub-100 micron glass needle is injected into an aqueous solution.

It sounds like a description of a science fiction novel: Smart electronics can be directly into the brain or other body parts syringes to treat diseases or paralysis. It is hard to imagine - unless you visited the lab of Professor Charles Lieber at Harvard University.

Under his leadership, an international research team developed the production a kind of nano-electronics easel that can be injected with a syringe.

Once this easel is connected to a terminal electronics to neural processes can be observed, stimulate tissue or even support the regeneration of nerve cells.

"I believe that this technology has a revolutionary potential," Liebert said. "It opens up so that an entirely new frontier, where we can explore the interface between electronic structure and biology."

"During the last 30 years was achieved incremental improvements in micro-fabrication technique by which we could reduce immovable probes. But no one has studied the electronics / cell interface, namely in the area where the biology works."

It is in this research is not the first attempt to implant electronics into the brain. Deep brain stimulation has been used for the treatment of diseases for decades, but the nanofabrication of electronic easel works in a completely different and new dimension.

"Existing techniques in relation to the wiring of the brain relatively primitive," said Lieber. "Whether it is a silicon sample or flexible polymer is - they cause tissue inflammation and forcing to periodic displacements of the simulation position."

"But with our injectable nano-easel, it is as if it were non-existent it is millions of times more flexible than current electronics and has subcellular structures we call it.." Neuro-philic "- interact in fact with the neurons. "

Despite the enormous potential the production of injectable nano easel is surprisingly simple, because it is compatible with conventional manufacturing methods.

The manufacturing process begins with a dissolvable layer on a substrate. For the easel, the researchers placed nanowire mesh between layers of organic

polymer. The first layer is then dissolved and there remains the flexible mesh structure which can be drawn into a syringe.

After injection, the mesh structure can connect with its inputs and outputs to a standardized measurement electronics.

In the future Dear wants to find out with its researchers, such as the brain and other tissues react to the injected electronics over a longer period of time (WR).

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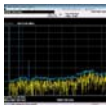

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