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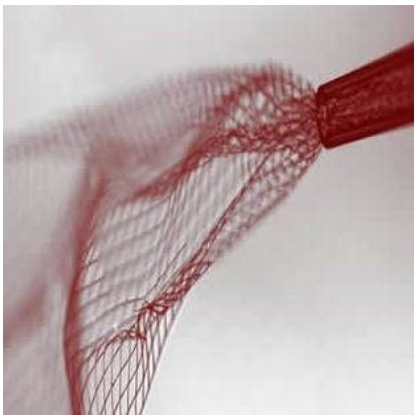
# Injectable Electronics Could Have Huge Impact on Neuroscience



A team of international researchers, led by Charles Lieber, the Mark Hyman, Jr. Professor of Chemistry have developed a method for fabricating nano-scale electronic scaffolds that can be injected via syringe. The scaffolds can monitor neural activity, stimulate tissues and promote regenerations of neurons. The study is published in *Nature Nanotechnology*.

The method holds great promise and has the potential to be revolutionary as pointed out by Lieber and can open up a new frontier that would allow a greater exploration of interface between electronic structures and biology. He says that this is the first time the issue of the electronics/cellular interface has been addressed.

In a previous study, scientists in Lieber's lab demonstrated that scaffolds could be used to create cyborg tissue but till now they had no idea how to insert that into a pre-existing tissue.

"Existing techniques are crude relative to the way the brain is wired," Lieber explained. "Whether it's a silicon probe or flexible polymers...they cause inflammation in the tissue that requires periodically changing the position or the stimulation. But with our injectable electronics, it's as if it's not there at all. They are one million times more flexible than any state-of-the-art flexible electronics and have subcellular feature sizes. They're what I call "neuro-philic" -- they actually like to interact with neurons."

The method is not only novel with enormous potential; it is also very easy and compatible with conventional manufacturing techniques. The scaffold is created by laying out a mesh of nanowires sandwiched in layers of organic polymer. The first layer is dissolved which leaves a flexible mesh that can be drawn into a syringe needle and simply administered like any other injection. Once it is injected, the input/output of the mesh is connected to standard measurement electronics so that the integrated devices can be addressed and neural activity can be stimulated or recorded.

Lieber is very excited about the new technique since it has never been done before and could have a lot of potential applications. He is hopeful that researchers will better understand how the brain and other tissues react to injectable electronics over longer periods. Harvard's Office of Technology Development has already filed for a provisional patent on the technology and is seeking commercialisation opportunities.

Lieber says that this is a very viable technology and the ability to precisely position and record from very specific areas could have a huge impact on neuroscience.

Source: Harvard University

Image Credit: Lieber Research Group, Harvard University

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