

Home > Volume 91 Issue 25 > Science & Technology Concentrates > Nanotube Electrodes Spear Nerve Cells

Volume 91 Issue 25 | p. 31 | Concentrates  
Issue Date: June 24, 2013

## Nanotube Electrodes Spear Nerve Cells

Scientists use ultrafine electrodes made from carbon nanotubes to record nerve cell firing in mouse brains

By [Lauren K. Wolf](#)

|                   |                         |
|-------------------|-------------------------|
| 0                 | 0                       |
| <a href="#">f</a> | <a href="#">Twitter</a> |
| Email             | Print                   |

### MOST POPULAR

[Viewed](#) [Commented](#) [Shared](#)

[Crab Shells Help Researchers Make New Battery Materials](#)

[Ocean Plastics Host Surprising Microbial Array](#)

[Chemistry Tattoos](#)

[Pushing Cancer Over The Edge](#)

[Reversible Male Contraception With Gold Nanorods](#)

\*Most Viewed in the last 7 days

### RELATED ARTICLES

[Nanowire Arrays Map Neural Circuits](#)

[Mapping The Brain Onto The Mind](#)

[Tiny Electrodes Monitor Neurons](#)

Department: [Science & Technology](#)

News Channels: [Materials SCENE](#), [Analytical SCENE](#), [Biological SCENE](#), [Nano SCENE](#)

Keywords: [nerve cell recording](#), [carbon nanotubes](#), [neural recording](#), [electrodes](#), [intracellular](#)

### Science & Technology Concentrates

[A Stirring Advance Tweaked Protein Conducts Electrons Faster](#)

[Genetic Engineering Mates With Traditional Breeding To Create New Fibers](#)

[Clarifying Radioactive Cesium Binding To Soil](#)

[Supermarket Produce Tracks Time](#)

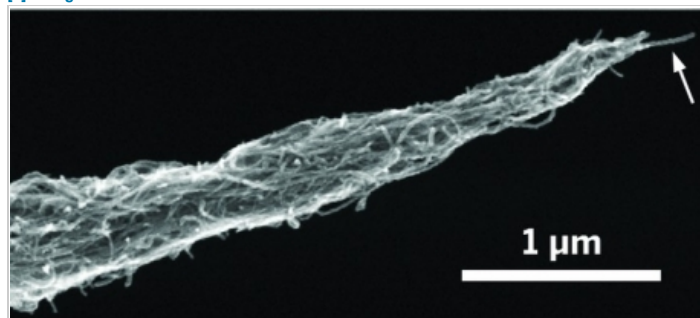
[Plastic Waste Hosts Microbial Array](#)

[Protein Disorder Flips Switch](#)

[Nanotube Electrodes Spear Nerve Cells](#)

[All Concentrates](#)

[+]Enlarge

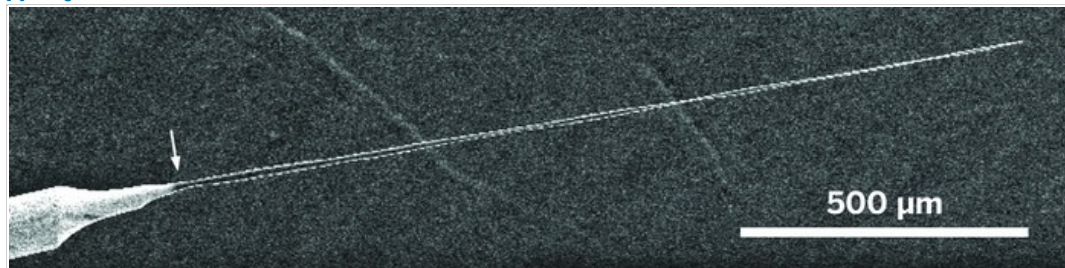


At the tip of an electrode made of carbon nanotubes, one tube (arrow) sticks out.

Credit: PLoS One

To better understand how the brain works, neuroscientists plunge fine-tipped electrodes inside nerve cells to measure the electrical signals they transmit. Oftentimes, researchers use glass-encased electrodes called micropipettes, but the probes can be brittle, making them difficult to work with. Metal electrodes have been tried, too, but it's difficult to sharpen their tips sufficiently to poke them into cells. For a more robust alternative, researchers at Duke University, led by Bruce R. Donald and Richard Mooney, have developed ultrafine electrodes made of carbon nanotubes for nerve cell recording (*PLoS One* 2013, DOI: [10.1371/journal.pone.0065715](#)). "With carbon nanotubes, we can make something very strong and conductive that is pointy like a harpoon," Donald says. To make the 1- to 2-mm-long spears, the Duke researchers used dielectrophoresis to draw nanotubes out from the end of a tungsten wire, and they stiffened the whole assembly by running current through it. Then they coated the electrode with an insulating compound and etched its tip with a focused ion beam. Using the new electrodes, the team successfully recorded signals from inside single nerve cells in slices of mouse brain and from outside nerve cells in the brains of live mice.

[+]Enlarge



Researchers have produced 1-mm-long electrodes made of carbon nanotubes by electrochemically depositing tubes onto the end of a tungsten wire (arrow).