New, improved brain implants can ‘talk’ to single neuron

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Brain implants have been around for decades—stimulating motor areas to alleviate Parkinson’s disease symptoms, for example—but until now they have all suffered from the same limitation: because brains move slightly during physical activity and as we breathe and our heart beats, rigid implants rub and damage tissue. This means that eventually, because of both movement and scar-tissue formation, they lose contact with the cells they were monitoring.

Now a group of researchers, led by chemist Charles Lieber of Harvard University, has overcome these problems using a fine, flexible mesh. In 2012 the team showed that cells could be grown around such a mesh, but that left the problem of how to get one inside a living brain. The solution the scientists devised was to draw the mesh—measuring a few millimeters wide—into a syringe, so it would roll up like a scroll inside the 100-micron-wide needle, and inject it through a hole in the skull.

In a study published in *Nature Nanotechnology*, the team injected meshes studded with 16 electrodes into two brain regions in mice. The mesh is composed of extremely thin, nanoscale polymer threads, sparsely distributed so that 95 percent of it is empty space. It has a level of flexibility similar to brain tissue. “You’re starting to make this nonliving system look like the biological system you’re trying to probe,” Lieber explains.

Once inside, the mesh unfurls—either enough to meet the sides of brain cavities called ventricles or very slightly if injected into solid tissue—to form a three-dimensional structure.

The researchers claim the mesh can be positioned with an accuracy approaching the scale of individual neurons.

Read full, original post: Injectable Brain Implants Talk to Single Neurons