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Splintered Channels

« Advertising: Innovate or Die. Vol. 1 | Main | US 12-24 yr olds spend 20% longer online than a year ago »

Nanowires To Monitor Neurons

by: Roger Dooley

Neuroscientists are constantly looking for better ways to measure brain activity, and Harvard researchers have achieved a breakthrough that should significantly advance the state of the art. MIT's Technology Review, in Nanowires Listen In on Neurons, describes the development of silicon nanowires that are so small that they can be used to measure activity at many places on the same neuron:

> The research group, led by Charles Lieber, professor of chemistry at Harvard University, has developed techniques for synthesizing large arrays of silicon nanowires, which act as transistors, amplifying very small electrical signals from as many as 50 places on a single neuron. In contrast, the most precise existing methods can pick up only one or two signals from a neuron. By detecting electrical activity in many places along a neuron, the researchers can watch how it processes and acts on incoming signals from other cells.
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> The nanowires are about the same size as the branches that neurons use to communicate with one another. William Ditto, professor of biomedical engineering at the University of Florida, says neurons probably send the same kinds of signals to the nanowires as they do to other neurons. As a result, the nanowires could provide a realistic view of a neuron's complex firing patterns.

There are high hopes for this new nanotechnology application. Eventually, nanowires could provide an means of interfacing the brain with external electronics or mechanisms, e.g., prosthetic limbs, that would be far more sophisticated than today's comparatively large electrodes. Even before that, though, neuroscientists will be able to employ nanowires to investigate neuronal activity with a level of precision and detail impossible previously. This will allow researchers to begin to unlock the secrets of how memories are formed, how a response to a stimulus is processed at the level of individual neurons, and much more.

It's unlikely that any immediate neuromarketing applications will emerge from this breakthrough; it's impossible to imagine nanowire implants being used to measure ad response, for example, or even that such information would be useful. Nevertheless, fields like neuromarketing and neuroeconomics will surely benefit as the overall base of neuroscience knowledge increases and the brain becomes less of a "black box." The brain's decision-making process that is so central to neuroeconomics will certainly be illuminated by future work at the level of individual neurons.

Original Post: http://www.neurosciencemarketing.com/blog/articles/nanowires-to-monitor-neurons.htm

Posted by Futurelab on August 25, 2006 10:21 AM | Email this article | Permalink