You can control your Marilyn Monroe neuron

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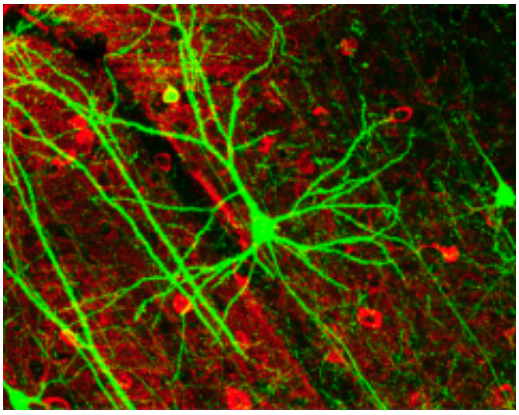

Image of pyramidal neurons in mouse cerebral cortex expressing green fluorescent protein. The red staining indicates GABAergic interneurons. (Source PLoS Biology). Image via Wikimedia Commons.

(PhysOrg.com) -- In a scientific first, researchers have been able to demonstrate the ability of humans to control the activity of individual brain cells.

Scientists examining single neurons in the human brain have successfully identified individual brain cells responding to particular stimuli such as pictures of individual people and objects. They have also found that people can control the firing of the neurons.

The research studied volunteers with epilepsy who had electrodes

implanted in their brains to track where their seizures originated. The electrodes were used by the researchers to "eavesdrop" on single cells in the medial temporal lobe, an area important for attention, perception and memory.

Dr. Moran Cerf of the California Institute of Technology in Pasadena and colleagues conducted their experiment by showing the subjects images of people, places or objects that were familiar to them, including pictures of celebrities such as Michael Jackson, Marilyn Monroe, and Bill Clinton. They then looked for the neurons that fired when the subject was shown each image.

In each of the subjects they found individual neurons fired when the person looked at a specific image. So there was a "Michael Jackson neuron", a "Marilyn Monroe neuron", and others that fired when the person was shown an image of the Eiffel tower, a spider, or other familiar objects or places.

When the neurons corresponding to particular images had been identified, the researchers hooked the electrodes up to a computer that displayed the image corresponding to the neuron that fired. The subject was then asked to think about one of the images. So, for example, a subject was asked to think about Marilyn Monroe. The Marilyn Monroe neuron in the subject's brain fired, and the information was relayed to the computer, which then displayed Monroe's image.

Another experiment designed to test how well the subjects could control the single neurons was a fade experiment in which the subject was shown a combined image of two faces: Josh Brolin (star of Goonies) and Marilyn Monroe, and told to think of Josh Brolin. The electrodes sent data on the Josh Brolin and Marilyn Monroe neurons to the computer, which brightened the image of the one causing most neuron firing. As the subject thought of Brolin, the image of Monroe faded out.

A total of ten patients took part in the fade experiment and were able to successfully control the fading 60-90 percent of the time, but they improved with practice.

The findings may help scientists understand the cognitive processes and how individual brain cells respond to particular stimuli. This information may find application in building machines that can be controlled by human thoughts, which could help people who cannot move, such as those suffering from quadriplegia.

Dr. Cerf presented the findings at the annual meeting of the Society for Neuroscience on 19 October.