

Brain cells tied to consciousness reported found

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In a study billed as an exploration into the realm of "consciousness," researchers claim to have found brain cells that become very busy only when something is consciously noticed. Trying to understand what creates consciousness "the sense of being alive and aware" is one of the all-time mostexasperating problems in science. The key stumbling block: even if one knew every brain mechanism underlying consciousness, there would still be no apparent way to see or measure the actual production of consciousness.

For now, many researchers figure they may as well just do the best they can in unraveling those physiological mechanisms. The new study, led by Qui-an Quiroga of the University of Leicester, U.K., is among those designed to attack that question. Volunteers were shown pictures on a computer screen very briefly "for a time just at the edge of being long enough to be noticeable. The participants were asked each time whether they saw the picture or not. Sometimes the exact same visual input was noticeable on one trial and not on another, for the same person, Qui-an Quiroga said. The researchers examined what was happening in the brain during this. Certain neurons, or brain cells, "responded to the conscious perception in an "all-or-none" way," Qui-an Quiroga said: they dramatically changed their rate of firing signals, only when pictures were recognized. These neurons were in the medial temporal lobe, a region deep inside the brain of ten as-so-called with memory. For example, in one patient, a neuron in the hippocampus "a structure also in that area" "fired very strongly to a picture of the patient's brother when recognized and remained completely silent when it was not," Qui-an Quiroga said. "Another neuron behaved in the same manner with pictures of the World Trade Center." The volunteers were patients who had to undergo epilepsy surgery. "Based on the firing of these neurons it was possible to predict far above chance whether a picture was recognized or not," Qui-an Quiroga said. Also, "a picture flashed very briefly generated nearly the same response" if recognized "as when shown for much longer periods of time." The findings are to appear this week in the early online edition of the research journal Proceedings of the National Academy of Sciences. Potential applications of the work include the development of "neural prosthetics" devices to be used by paralyzed patients or amputees, Qui-an Quiroga said. A spinal injury patient, such as the late Christopher Reeve, can think about reaching a cup of tea, but the muscles don't get the order. Neural prostheses are designed to read these commands directly from the brain and transmit them to bionic devices such as a robotic arm. The findings, Qui-an Quiroga said, could also have implications treatment of patients with pathologies of the hippocampus, such as epilepsy, Alzheimer's disease and schizophrenia.

Courtesy University of Leicester and World Science staff

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