Brain cells tied to consciousness reported found

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In a study billed as an exÂ-ploraÂ-tÂ-ion inÂ-to the realm of â€œconÂ-sciousÂ-ness,â€• reÂ-searchÂ-ers claim to have found brain cells that beÂ-come very busy only when someÂ-thing is conÂ-sciously noÂ-ticed.TryÂ-ing to unÂ-derÂ-stand what creÂ-ates conÂ-sciousnessâ€”the sense of beÂ-ing alive and awareâ€”is one of the all-time most exÂ-asÂ-perÂ-atÂ-ing probÂ-lems in sciÂ-ence. The key stumÂ-bling block: even if one knew every brain mechÂ-anÂ-ism unÂ-derÂ-lyÂ-ing conÂ-sciousÂ-ness, there would still be no apÂ-parÂ-ent way to see or measÂ-ure the acÂ-tuÂ-al proÂ-ducÂ-tion of conÂ-sciouÂ-sness.

For now, many reÂ-searchÂ-ers figÂ-ure they may as well just do the best they can in unÂ-ravÂ-elÂ-ing those physÂ-iÂ-cal mechÂ-anÂ-isms. The new stuÂ-dy, led by QuiÂ-an QuiÂ-roga of the UniÂ-verÂ-sÂ-ity of LeicesÂ-ter, U.K., is among those deÂ-signed to atÂ-tack that quesÂ-tion. VolÂ-unÂ-teers were shown picÂ-tures on a comÂ-putÂ-er screen very briefly Â-â€”for a time just at the edge of beÂ-ing long enough to be noÂ-ticeÂ-aÂ-ble. The parÂ-tÂ-iciÂ-pants were asked each time whethÂ-er they saw the picÂ-ture or not. SomeÂ-times the exÂ-act same visÂ-uÂ-al inÂ-put was noÂ-ticeÂ-aÂ-ble on one triÂ-al and not on anÂ-othÂ-er, for the same perÂ-son, QuiÂ-an QuiÂ-roga said. The reÂ-searchÂ-ers exÂ-amÂ-ined what was hapÂ-penÂ-ing in the brain durÂ-ing this. CerÂ-tain neuÂ-rons, or brain cells, â€œreÂ-sponded to the conÂ-scious perÂ-cepÂ-tion in an â€˜all-or-noneâ€™ way,â€• QuiÂ-an QuiÂ-roga said: they draÂ-matÂ-icÂ-ally changed their rate of firÂ-ing sigÂ-nals, only when picÂ-tures were recÂ-ogÂ-nized. These neuÂ-rons were in the meÂ-diÂ-al temÂ-poÂ-ral lobe, a reÂ-gion deep inÂ-side the brain ofÂ-ten asÂ-soÂ-ciÂ-atÂ-ed with memÂ-oÂ-ry.For exÂ-amÂ-ple, in one paÂ-tient, a neuÂ-ron in the hipÂ-pocamÂ-pusâ€”a strucÂ-ture alÂ-so in that areaâ€”â€œfired very strongly to a picÂ-ture of the paÂ-tientâ€™s brothÂ-er when recÂ-ogÂ-nized and reÂ-mained comÂ-pletely siÂ-lent when it was not,â€• QuiÂ-an QuiÂ-roga said. â€œAnÂ-other neuÂ-ron beÂ-haved in the same manÂ-ner with picÂ-tures of the World Trade CenÂ-tre.â€• The volÂ-unÂ-teers were paÂ-tients who had to unÂ-dergo epÂ-iÂ-lepÂ-sy surÂ-gery.â€œBased on the firÂ-ing of these neuÂ-rons it was posÂ-siÂ-ble to preÂ-dict far above chance whethÂ-er a picÂ-ture was recÂ-ogÂ-nized or not,â€• Quian Quiroga said. AlÂ-so, â€œa picÂ-ture flashed very briefly genÂ-erÂ-atÂ-ed nearly the same reÂ-sponÂ-seâ€”if recÂ-ogÂ-nizedâ€”as when shown for much longÂ-er perÂ-iÂ-ods of time.â€•The findÂ-ings are to apÂ-pear this week in the early onÂ-line ediÂ-tion of the reÂ-search jourÂ-nal ProÂ-ceedÂ-ings of the NaÂ-tioÂ-nÂ-al AcaÂ-deÂ-my of SciÂ-enÂ-ces.PoÂ-tenÂ-tial apÂ-plicaÂ-tÂ-ions of the work inÂ-clude the deÂ-velÂ-opÂ-ment of â€œneuÂ-ral prosÂ-thetÂ-icâ€• deÂ-vices to be used by paralyzed paÂ-tients or amÂ-putees, Quian QuiÂ-roga said. A spiÂ-nal inÂ-juÂ-ry paÂ-tient, such as the late ChrisÂ-toÂ-pher Reeve, can think about reachÂ-ing a cup of tea, but the musÂ-cles donâ€™t get the orÂ-der. NeuÂ-ral prosÂ-theÂ-ses are deÂ-signed to read these comÂ-mands diÂ-rectly from the brain and transÂ-mit them to biÂ-onÂ-ic deÂ-vices such as a robotic arm. The findÂ-ings, Quian QuiÂ-roga said, could alÂ-so have imÂ-plicaÂ-tÂ-ions treatÂ-ment of paÂ-tients with patholoÂ-gies of the hipÂ-poÂ-camÂ-pal formaÂ-tÂ-ion, such as epÂ-iÂ-lepÂ-sy, Alzheimerâ€™s disÂ-ease and schizÂ-oÂ-phreÂ-nia.

Courtesy University of Leicester and World Science staff