New Neuroimaging Tool Helps Locate Depression Circuit

by James Cavuoto, editor

A team of researchers at Stanford University has developed a new form of neuroimaging to help their quest to uncover the faulty brain circuits involved in depression. The technique, called voltage-sensitive dye imaging, allows intact brain circuits to be viewed in real time, enabling researchers to watch living neurons in action, across entire brain networks.

Writing in the July 6 issue of Science Express, the advance online publication of the journal Science, Karl Deisseroth, assistant professor of bioengineering and of psychiatry and behavioral sciences, along with Raag Airan, an MD/PhD student in Deisseroth’s lab, described their effort to explain how a range of causes and treatments for depression converge.

They found that in rats the differing mechanisms of depression and its treatment in the end appear to funnel through a single brain circuit. Changes in how the electrical signals spread through the circuit appear to be the cause of depression-related behavior, according to their study.

“I think this will help us make sense of how there can be so many different causes and treatments of depression,” said Deisseroth. “It also helps us understand conceptually how something that seems as hard

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Task Force Addresses Access to New Neurotech Therapies

by James Cavuoto, editor

A newly organized task force representing clinicians, health service providers, payers, and neurotechnology vendors is seeking to expand the availability of neurotechnology devices for individuals with neurological and psychiatric disorders. The National Task Force on Consumer Access to Emerging Neurotechnologies held its inaugural meeting earlier this year and recently published a whitepaper specifically targeted to severe depression. Cyberonics, Inc., the Houston, TX manufacturer of vagus nerve stimulation systems, provided funding for the initial meeting but the group is currently seeking sponsorship from other neurotech device vendors.

The members of the new task force include several clinicians and academics involved with treatment-resistant depression, including Roger Haskett, a professor of psychiatry at University of Pittsburgh, Lawrence Cohen, a professor of pharmacotherapy at Washington State University, and Darin Dougherty from Massachusetts General Hos-
had served as vice president of research and development for the company Harry founded, then named Sensory Technologies, received assistance and funding from the Rhode Island state Department of Business and the Central Rhode Island Technology Alliance to raise $1 million from Pharos, LLC, an investment firm headed by James Hanspousou, founder of The Vision Electron Corp. and a former technology banker.

The initial goal was to develop shoes and possibly gloves or sleeves for patients with neuropathy, in diabetic patients, improving balance in the elderly. Then in 2001, Harry decided to switch to developing products that would accelerate healing of sports injuries in the hope that this market would attract investors. The name of the company was changed to Afferent Corp. to emphasize how its technology differs from other neurostimulation technologies. The sports medicine effort failed to gain the interest of investors, and Harry had to downsize his company to one employee and his first employee, James Niemi. The new focus was the development of products for rehabilitating stroke survivors and improving balance in elderly patients. Harry admitted that the firm had difficulty deciding which products to develop first because the technology could be applied to so many neurological dysfunctions.

At the beginning of 2003 the Slater Center, a medical research facility and hospital, gave the company $150,000 to continue operations until a Phase II SBIR grant from the National Institute of Child Health and Human Development was obtained. A final round of $750,000 from the National Institute of Neurological Disorders and Stroke to advance product development and clinical trials of the technology for stroke rehabilitation and for animal testing in 2007. By 2007 Afferent had received a total of $2.5 million in grants from the NIH. A Series A round led by New Science Ventures raised $4 million in 2004 from investors that included Judith Gapine, partner, Long River Ventures, Village Ventures, and Nitra Corp. of Japan, a developer of industrial robotic systems including pressure and temperature sensors. Investors in Afferent’s previous institutional investors also participated.

Several pilot clinical studies were conducted at the Spaulding Rehabilitation Center and Beth Israel Deaconess Medical Center, both Harvard affiliated, provided evidence that imperceptible electrical stimulations improved the balance in elderly adults, in patients with stroke/brain injury and in patients with diabetic neuropathy. Other pilot studies showed that applying mechanical vibrations to the soles of the feet improved sway balance in the elderly and in stroke and diabetic patients. Animal studies are being conducted at Brown University and the Canadian Centre for Behavioural Neuroscience at the University of Lethbridge, Alberta. The therapy for stroke rehabilitation clinical studies are underway at Northwestern University’s Feinberg School of Medicine and at the Rehabilitation Institute of Chicago. Afferent is negotiating additional post-stroke rehabilitation trials at other leading centers.

Afferent, the founding CEO of Afferent, stepped down in 2006 and brought in a seasoned medical device industry executive, David Hable, as CEO and president. Hable formerly was worldwide president of Codman & Shurtleff, a neurosurgery medical device division of Johnson & Johnson. Hable also served as CEO and president of Biagrande, Ltd., an Israeli neurotech firm developing a novel technology based on stimulating the sphenopalatine ganglion to induce cerebral vasodilation.

Harry moved to the position of executive vice president and chief technology officer. James Niemi, who previously had worked with Harry at NMT Medical, is now VP of research, and Scott Kellogg is VP of product development. The company has eight employees, and plans to add staff as the products under development approach commercialization.

Although Afferent is initially concentrating on diabetic, and elderly balance markets, the company sees its technology as a new class of devices for treating a variety of chronic neurological dysfunctions. In addition to the immediate benefit of improving the sensitivity of mecanoreceptors, the company is pursuing the possibility that subthreshold sensory stimulation might be used to treat Parkinson’s disease. One of the critical factors in successful recovery of function after stroke or brain injury is the flow of appropriate sensory information from the peripheral limbs. Increasing the sensitiv

by James Cavuto, editor

by David Pope, editorial director

Afferent Corp. Targets Sensory Signals as Novel Neurorehabilitation Strategy

Several hundred researchers and academics attended a recent meeting of the Association for the Scientific Study of Consciousness June 22-25 in Las Vegas, NV. While most of the sessions were devoted to Judith Gapine, partner, Long River Ventures, Village Ventures, and Nitra Corp. of Japan, a developer of industrial robotic systems including pressure and temperature sensors. The company, the previous institutional investors also participated.

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