HEALTH MATTERS

Brainwaves

Research device uses information gleaned from real-time EEGs to detect impending seizures in dogs with epilepsy.

“Emma,” a non-epileptic dog that aspires to be a supermodel, demonstrates the prototype device.

Turning Ideas into Action

University of Minnesota research helps predict and control seizures in epileptic dogs

People with epilepsy might also benefit from the device and preventative medicine.

Research conducted by the University of Minnesota’s College of Veterinary Medicine could help owners of severely epileptic dogs predict, control, and more effectively treat their pets’ seizures.

The research focuses on a small implanted device that continuously monitors brain activity using EEG, or electroencephalography, readings.

The likelihood of a seizure is then reported using a series of colored lights on a device worn outside of the patient’s body — for canine patients, on a small vest.

The device, which has already been proven to detect seizures in certain species, is now being developed for pre-emptive seizure treatment in not only dogs, but humans as well.

“What would be more important, which nobody’s done yet, is can you predict a seizure before it occurs, and then intervene with drugs,” said Ned Patterson, principal investigator of the study and co-founder of the Canine Epilepsy Network.

While the device is not currently implanted in any dogs in Patterson’s clinic, he predicts that the device will be “fully up and functional” in canine patients within the next six months.

Across the country, a reported 2.1 million dogs — between 1 and 5 percent of all dogs in the U.S. — suffer from some form of epilepsy or recurring seizures, including J.D., a Jack Russell terrier owned by third-year veterinary student Elizabeth Prescott.

J.D. began having seizures around age 5, Prescott said, and suffered from close to one a month before being treated at the University’s veterinary clinics.

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The seizures took a toll not only on J.D.'s behavior and health, but on his owner as well.

"He didn't want to go out as much; he didn't want to walk as long; he seemed kind of nervous," she said. "It's kind of scary when they do [have a seizure]. It's very stressful."

J.D. is just one of roughly 300 dogs that receive treatment at the University's veterinary clinics for epilepsy or recurring seizures each year.

Now 12 years old, J.D. only experiences about one seizure a year, an improvement Prescott credits to Patterson, who serves not only as her dog's doctor, but as one of her professors as well.

"It's been really great as a student to know that someone who is doing great research and is really an expert in the field is getting to teach us," Prescott said. "And it helps me feel really good about how we're treating my dog."

Patterson's research, including his current work with the implanted device, aims to help dog owners achieve peace of mind by knowing if and when their pet will have a seizure and how they can treat them using medication.

The device study, collaboration between several health researchers interested in both human and dog seizures, may also help give people with epilepsy the same peace of mind.

Funded through a grant from the National Institute of Neurological Disorders and Stroke, the research is a partnership between the University's veterinary school and College of Pharmacy, the Mayo Clinic, the University of Pennsylvania, and NeuroVista Corporation, the company behind the device.

One of the principal investigators of this research, Veterinarian Ned Patterson predicts that the device will be "fully up and functional" in canine patients within the next six months.

Preliminary tests of the device's effectiveness in humans are currently being carried out on 15 human patients in Australia, Patterson added.

With the device, a person with epilepsy would be warned when a seizure will occur and prevent it with fewer drugs than it takes to stop a seizure that's already occurring, said James Cloyd, a professor in the College of Pharmacy and an investigator in the study.

In the research, Cloyd focuses on using pre-existing drugs to effectively treat seizures predicted in patients wearing the implanted device.

"This study gives us this wonderful opportunity to determine how this system might work, and we can do it in dogs that have almost the same type of epilepsy as humans," Cloyd said.

While Patterson's research typically focuses on animals, he is excited about the potential benefits this study presents to human patients.

"I'm first and foremost a veterinarian, so I'll only do research if it's going to help dogs," he said. "But if it also helps humans, that's really cool."

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Meet the Researchers

The principal investigators of these studies are:

- ★ Greg Worrell, M.D., Ph.D., Mayo Clinic
- ★ Ned Patterson, D.V.M., Ph.D., University of Minnesota College of Veterinary Medicine
- ★ Jim Cloyd, Pharm.D., University of Minnesota College of Pharmacy
- ★ Charles Vite, D.V.M., Ph.D., University of Pennsylvania School of Veterinary Medicine
- ★ Brian Litt, M.D., Perelman School of Medicine at the University of Pennsylvania
- ★ Kent Leyde, chief technology officer of NeuroVista Corporation of Seattle, Washington

While the long-range goal of the studies is to find better ways to treat human patients, Charles Vite, assistant professor of veterinary neurology, says, "As I remind everyone, I am a veterinarian, and this technology will be of value to animals as well."

Vite, along with Patterson, an associate professor of veterinary medicine at the University of Minnesota, each treat hundreds of dogs with epilepsy at their respective university veterinary clinics.

For more information, visit http://www.eurekalert.org/pub_releases/2012-03/mc-mca030612.php

