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U of L researcher to examine if memory can trigger seizures

Thanks to a grant of more than \$530,000 from the Canadian Institutes of Health Research (CIHR), Dr. Artur Luczak, a neuroscientist with the Canadian Centre for Behavioural Neuroscience at the University of Lethbridge, will investigate whether seizures can be triggered by memory.



Epilepsy and seizures can develop at any age and seizures affect about one per cent of people. Worldwide, more than 65 million people are affected by epilepsy. For some people with epilepsy, certain stimuli, such as flickering lights, particular sounds, specific odors or activities, evoke seizures. However, for most people with epilepsy, seizures have no identifiable triggers.

“One of the problems with seizures is that they occur at unpredictable times,” says Luczak. “For example, a seizure can happen when you’re driving or doing some other important activity, so this unpredictability is one of the most difficult aspects of epilepsy.”

Two years ago, Luczak, in collaboration with the U of L’s Dr. Bruce McNaughton and researchers at Stanford University, published a study that found certain neuronal activity in the brains of rats with epilepsy was associated with seizures. This new research will follow up on those results.

“It gave us the idea that, maybe recalling a memory of a specific event may create a pattern of brain activity that can trigger a seizure,” says Luczak.

To test this hypothesis in rats, seizures will be induced through electrical stimulation in a very specific location in the environment, such as a particular cage. At the same time, the researchers will be recording the ongoing activity of many neurons in the brain. When the rat has a spontaneous seizure in another location, the researchers will be able to compare the brain activity pattern before the spontaneous seizure with the brain activity pattern that occurred when the seizure was induced.

“Our speculation is that those seizures that occurred spontaneously at a completely different location are triggered because the rat was ‘thinking’ about the particular location when the seizure was induced,” Luczak says. “If this theory that we are proposing is true,

then it will give us a much better understanding of what triggers seizures. If we better understand that seizures can be triggered by some specific patterns, then later we can design some therapies to prevent this.”

More than 20 per cent of patients with epilepsy do not respond to any treatment and researchers don’t know why drugs help some patients and not others. Having a better idea of how patterns of brain activity can trigger a seizure could help pave the way to new possibilities for treatment, such as memory-erasing drugs used to treat post-traumatic stress disorder.

In addition to the funding for his epilepsy research, the CIHR gave Luczak \$100,000 to accelerate development of new data analysis tools to better understand how millions of brain cells work together.

“I’m very grateful to the federal government for these funds,” says Luczak. “At the U of L, we have many bright neuroscientists and the collaborative atmosphere here was crucial for me to develop those ideas and do the research. Even though I was awarded this grant, I have to give a lot of credit to other professors in our department and our trainees who did a lot of the important work leading to the grant and who gave me a lot of important insights and ideas.”

This news release can be found online at [memories and seizures](#).

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