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U of L researcher to investigate tinnitus through funding from Alberta Innovates Health Solutions

Dr. Michael Kyweriga, a postdoctoral fellow in Dr. Majid Mohajerani's lab at the University of Lethbridge, will be able to build understanding of tinnitus thanks to a postgraduate fellowship from Alberta Innovates Health Solutions.

Tinnitus, a condition in which a person hears constant ringing, buzzing or hissing noises, often occurs as a result of hearing loss or from prolonged exposure to loud noises such as gunfire, sirens or loud music. Approximately three per cent of the population has chronic tinnitus although that's expected to increase as more people listen to loud music and videos on their personal devices. Kyweriga became interested in tinnitus during his time in the United States Navy.

"One of my jobs as a hospital corpsman was to give marines hearing tests," he says. "I noticed a lot of them complained about ringing in their ears, or tinnitus, and hearing loss, especially those who were five or 10 years into their service."

Kyweriga, who was born in Winnipeg into a military family, joined the U.S. Navy a couple of years after finishing high school. At the time, his father, a member of the Canadian Air Force, decided to retire in Montana. Green card in hand, Kyweriga enlisted for five years beginning in 1997. He trained to become a hospital corpsman, a job that entails providing emergency treatment for combat injuries. In the process of his training, he became fascinated by the brain-body connection.

"Even before I was honourably discharged from the Navy, I knew I wanted to go to college and be a neuroscientist some day," he says.

Given the frequency with which military personnel were affected by tinnitus, Kyweriga thought it would be a fruitful topic of research. The American Tinnitus Association indicates tinnitus is the leading cause of disability of U.S. troops returning from Iraq and Afghanistan, with more than \$1 billion paid out in claims in 2009. Tinnitus is also one of the top reasons for disability pension claims by current and former male RCMP members.

“Hearing loss and tinnitus, especially, are major health issues and the costs are expected to keep increasing,” he says.

People with tinnitus can have difficulty concentrating to the point it interferes with their job and other daily activities. Playing other sounds to mask the ringing seems to be the only way to get a measure of relief.

“There’s no cure or effective treatment right now. Antidepressants, white noise, reduce your stress — those are really the only things you can do for tinnitus,” he says. “We don’t understand fully how it works and that’s where I want to go with my research.”

In tinnitus, the brain perceives a sound where none has been created. The brain’s auditory cortex is laid out much like a keyboard. When a particular frequency is damaged, the neighbouring regions remap the cortex, which is likely why, when the two-kilohertz (kHz) region is damaged for example, the three-kHz region remaps over it and one hears a sound at three kHz. Researchers suspect remapping is why the ringing sounds are a half-octave above the damaged frequency but Kyweriga plans to test this hypothesis.

After completing his doctorate at the University of Oregon, Kyweriga searched for a fellowship position. Impressed by scientists like Mohajerani, Drs. Bruce McNaughton and Bryan Kolb, the tools and techniques available at the U of L and the multicultural, collaborative working environment he’d be joining, Kyweriga came to the U of L last year. He was elated to learn he’d been granted an award from Alberta Innovates worth \$50,000 over three years, along with a \$5,000 stipend per year for equipment and travel to conferences.

Given researchers know exposure to loud noises causes changes in the auditory cortex of the brain, Kyweriga will be working with mice to see if the changes cause tinnitus and whether the changed areas can be manipulated to alleviate tinnitus.

“I really think this is going to lead to a better understanding of what’s going on in the mouse brain, and the results may translate to the general public,” he says, adding he hopes his research will ultimately lead to medical treatments and interventions that will alleviate tinnitus for people and especially those who go into harm’s way. “I really want to thank our men and women in uniform by helping to reduce their suffering.”

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