University of Lethbridge

NEWS RELEASE

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University of Lethbridge researchers receive grant for further exploration into the causes of Alzheimer's disease

Most of the research into Alzheimer's disease has focused on the familial type where the disease has a strong genetic component. What might come as a surprise is that 90 to 95 per cent of cases are late-onset or sporadic Alzheimer's disease (SAD), an area where researchers at the University of Lethbridge are focusing their efforts.

SAD is much more difficult to research because of the presumed interactions between genetics and lifestyle factors, which can vary from person to person. Regardless of how complicated it might be, Dr. Rob McDonald, a neuroscientist with the Canadian Centre for Behavioural Neuroscience, believes that's precisely the direction research needs to take. Now he and Dr. Igor Kovalchuk, a ULethbridge chemistry professor with expertise in cannabis extracts, have been awarded $250,000 through the federal government's New Frontiers in Research Fund. They'll be joined by Tony Montina, a ULethbridge expert in metabolomics, which is the study of metabolites in cells, fluids and tissues.

"Our theory is the following: If you take a large population of sporadic patients, they would fall into subgroups or subtypes," says McDonald. "The actual factors causing their Alzheimer's disease would be different for each subtype. The clinical outcome can be quite similar, but the co-factors causing it can be different. Depending on the co-factors people have, different mechanisms are going to be triggered and the pathology will be different, so you have to treat it differently."

The researchers will be using a model where mice have been specifically bred with gene polymorphisms, which are alterations in specific DNA sequences.

"The gene mutations we're using are of interest for their potential roles in inflammation and insulin regulation," says McDonald.

The researchers will assess brain and body changes in the mutant mice models alone and in combination with different lifestyle changes (stress and diet). In the second part of their project, they'll assess the effects of targeted cannabinoid treatments on the mutant mice with the lifestyle modifications by looking at brain pathology, body changes and cognitive impairments associated with SAD.

"Marijuana is made up of at least 400 chemical entities and 100 of those are phytocannabinoids," says McDonald. "They have these compelling properties and people are interested in how they may target some of the pathologies associated with different diseases."

Kovalchuk will create cannabinoid extracts with different combinations and strengths to try to target the mechanisms the researchers suspect are activated in these subtypes. The makeup of the extract will vary according to the type of gene polymorphism and lifestyle factor being targeted.

"It's really getting at a more personalized kind of medicine or treatment and that's very exciting," says McDonald.

A recent development in the field is the ability to conduct genome-wide association studies or GWAS. Researchers have identified 100 or more genes mutations that are associated with the sporadic version — inherited and random mutations that do not cause SAD by themselves.

"These mutations could make people more susceptible to other factors, like lifestyle factors, than a normal person," says McDonald. "One person may have a gene polymorphism and age nicely, but another person who has, for example, a poor diet or is often stressed, may descend into dementia faster."

McDonald has started working with researchers in Montreal who can easily determine the types of polymorphism that exist in a patient. From there, they hope to provide patients with advice on what to avoid in their lifestyles.

"We know that exercise and different kinds of cognitive experiences and training are beneficial to brain health," says McDonald. "Our study should help lay a foundation for further research to pinpoint the best treatments for the various subtypes of SAD we are hypothesizing."

This news release can be found online at sporadic Alzheimer's disease research.

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Our University's Blackfoot name is Iniskim, meaning Sacred Buffalo Stone. The University is located in traditional Blackfoot Confederacy territory. We honour the Blackfoot people and their traditional ways of knowing in caring for this land, as well as all Indigenous Peoples who have helped shape and continue to strengthen our University community.