Waterloo chemist to develop revolutionary new probe to study the brain

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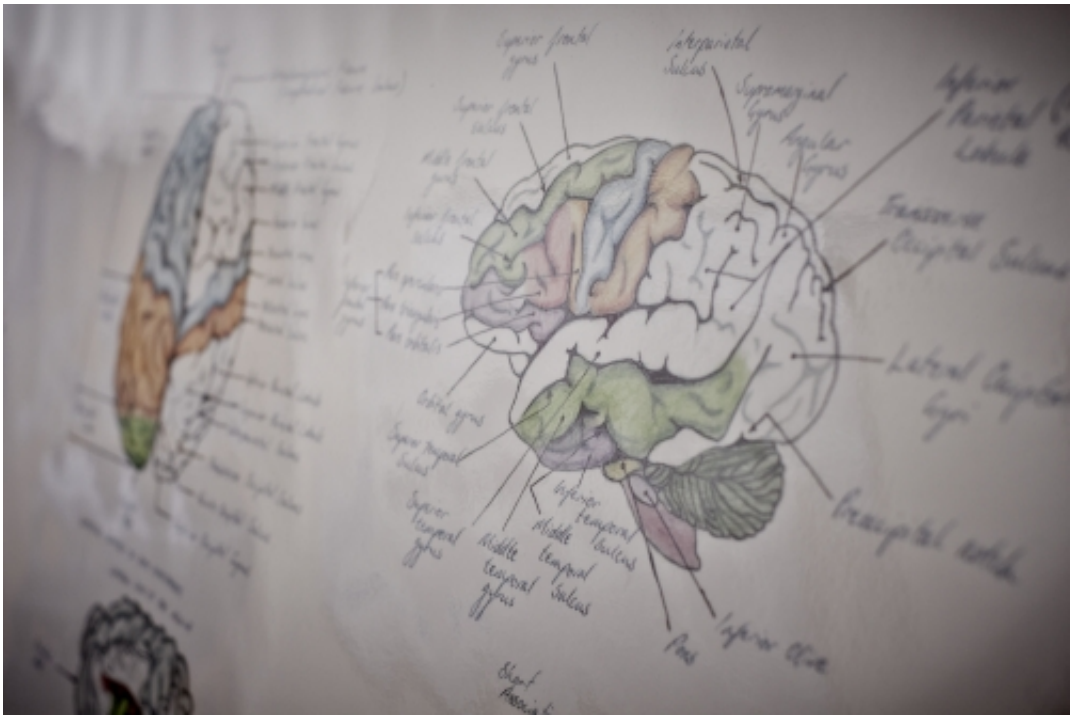

Researchers are developing a tiny wire that will speed up the discovery of new drugs and could one day unlock the mysteries of illnesses such as Alzheimer's or Lou Gehrig's disease.

Professor Janusz Pawliszyn, a chemistry professor from the University of Waterloo, along with researchers from Concordia University and the

Centre for Addiction and Mental Health are teaming up to develop a new brain probe that can be used on live subjects.

The new probe is expected to reduce the time, costs and risks related to drug development, as well as help neuroscientists better understand what causes degenerative brain diseases and how to treat them.

At 0.1 mm wide, the probe wire is less than the width of a human hair and can be inserted directly into a brain at multiple depths. Scientists can then analyze the probe's coating on-site using commonly available analytical tools to obtain a full chemical profile of the brain, including neurotransmitters, lipid concentrations, drug levels and their metabolites.

"Chemistry is extremely important when it comes to the brain," said Pawliszyn, a Canada Research Chair in New Analytical Methods and Technologies and a member of Waterloo's Faculty of Science. "While MRIs can track physical changes in the brain and tissues, it can't track the chemistry largely responsible for brain functioning and behaviour. If we can build a solid chemical profile of the brain it will allow us to better understand which drugs are working the way we expect and which aren't when attempting to find treatments for ALS or Alzheimer's."

The method is based on solid-phase microextraction (SPME), a technique originally developed by Professor Pawliszyn in the 1990s that uses a solid coating on a sampling probe to selectively extract specific chemical substances.

Professor Pawliszyn is a 2001 Thomson Reuters Highly Cited Researcher for his work on SPME. He has successfully developed other health-related SPME sampling methods in recent years, including a method to detect melanoma and other skin disorders from volatile compounds emitted from the skin surface and improved methods to detect athletic doping drugs in blood, urine and saliva.

One of the major challenges currently faced by the pharmaceutical industry is the development of methods that can decrease the number of animals used in the drug discovery process. Comprehensive investigations of new drugs require extensive multiple determinations, and consequently, a large number of animals used in the testing process. The new technique will result in fewer laboratory animals used in the drug discovery process because no tissue or fluids are withdrawn. Researchers believe this may eventually lead to the development of a technique safe enough for use on live human patients.

The three largest brain research funding agencies in Ontario, CQDM, Brain Canada and the Ontario Brain Institute (OBI), announced they are contributing nearly $1 million over three years to the project as part of their $8.5 million Focus on Brain strategic initiative to address unmet needs in neuroscience.

Provided by University of Waterloo