



THE FIRST EPILEPSY BRAIN BANK IN CANADA

What is an epilepsy brain bank?

An epilepsy brain bank is a storage source for pieces of brain tissue from epilepsy surgery resections. The tissues are donated by the patients undergoing brain resection for the treatment of their medication refractory seizures. The tissues are kept in Flash frozen in liquid nitrogen and stored at -80°C . As per current standard of care in most epilepsy centers, the brain tissue obtained from temporal lobectomies or other types of temporal resections is fixed in formaldehyde to undergo routine pathological screening. Therefore, no further research studies are performed on the specimen as the formaldehyde-fixed tissue is not suitable for most advanced research methods. It is extremely crucial to perform further studies on brain samples using advanced methods such as v molecular biology, proteomics and genomics to answer important questions about mechanism of seizures to find new treatment targets.

Background of the project

In December of 2011, DR. Tellez and Dr. Moien approached the college of medicine in order to establish the first Epilepsy Brain Bank in Canada. On November 13, 2012 the college of medicine approved the project and provided seed funding to develop the bank (\$250,000). An application to the Research Ethics Board (REB) of the U of S to develop the first Epilepsy Brain Bank in Canada was approved on Oct 29, 2013.

Core group who developed preservation of the first samples



Our group has created a methodology to preserve samples. The following group has provided equal intellectual ideas and work to preserve the first four samples; from left to right, Jose Tellez-Zenteno (neurologist-epileptologist), Adam Wu (neurosurgeon), Mark Hiken (Neuropathologist), Farzad Moien (neurologist-epileptologist), Lizbeth Hernandez (master of sciences student-U of S).

Need of a multidisciplinary team

In January of 2014, the Saskatchewan Health Research Foundation (SHRF) provided a team grant to establish the group (25,000 dollars). The mission of the Saskatchewan Epilepsy Research Initiative Team is to synergize clinical and basic science expertise at the University of Saskatchewan.

The following is the group that forms the epilepsy research initiative:



From left to right (lower part), Frank Cayabyab (Associate Professor-Department of Physiology), Huma Aftab (Psychiatrist-Saskatoon Health region), Mirna Vrbancic (Neuropsychologist-Saskatoon Health Region), Mark Hiken (Neuropathologist-Saskatoon Health region), Lisa Kalynchuk (scientist), Adam Wu (Clinical Assistant professor-College of Medicine), Lizbeth Hernandez Ronquillo (Master student-community health sciences and epidemiology), Marla Mickleborough (Assistant professor- College of Arts and Sciences). Not in the picture but part of the group, Dr. Richard Huntsman (Assistant professor-University of Saskatchewan).

Upper part, left to right, Gary Hunter (Clinical assistant professor- College of Medicine), Ron Borowsky (Professor-College of Arts and Sciences), Noel Lowry (Professor- College of Medicine), Farzad Moien (Assistant Professor-University of Saskatchewan), Jose Tellez Zenteno (Professor- College of Medicine), Changiz Taghibiglou (Assistant Professor- Department of Pharmacology)

How the samples will be used to help patients?

The basic research on tissues saved in the bank combined with clinical knowledge may provide vital information about some of the unanswered questions in epilepsy including finding new targets for antiepileptic drugs. A few of the potential uses are as follows: 1) To detect the chronic differences in regions of the brain prone to seizures using proteomics, immunohistochemistry, and molecular biology; 2) To identify biomarkers of refractory epileptic activity by identifying the common abnormal pathways shared by many patients with temporal epilepsy; 3) These biomarkers will be translated into therapeutic targets, which will be tested in animal models to determine efficacy prior to clinical trials; 4) Target binding of these compounds in humans at therapeutic doses will be assessed using the PET scan with specific molecules