

## Scottish Rite Charitable Foundation - Major Grants

Photo credit: Doug Nicholson



Dr. Isabelle Aubert, Scientist,  
Sunnybrook Research Institute

Dr. Gareth Taylor, Chairman of the Grants and Awards Committee, had an opportunity to meet with Dr. Isabelle Aubert in her laboratory at Sunnybrook Health Sciences Centre (SHSC) in Toronto to discuss the work funded by the Scottish Rite Charitable Foundation.

Dr. Aubert's project was entitled *The Impact of Amyloid-beta and Hyperphosphorylation Tau on Cholinergic Neurons and Cognitive Function* and was funded from October 2004 to September 2007.

Dr. Aubert worked with Dr. Rémi Quirion in Montreal for her PhD. Her studies focused on events leading to degeneration in the brain. Her postdoctoral studies took her to the lab for Dr. Fred Gage at the Salk Institute in California. "It is fine to understand why there is degeneration in the brain that leads to disease" says Dr. Aubert but "I wanted to study the regeneration of neurons. I like to fix things." In Dr. Gage's lab she studied how to restore function to neurons, as she describes it – "Putting the pieces of the puzzle back together".

When Dr. Aubert initially set up her lab at SHSC, she found it difficult to get funding for her studies on neural regeneration. The SRCF was the first agency to accept her hypothesis and provide the necessary seed funding to get her started on this concept. Aubert said that it was an ambitious project but they were able to accomplish most of the work that was outlined in the application. The funding from this grant got her over the initial hurdle and validation of the concept and allowed her to be successful with other granting agencies.

The initial studies used a novel mouse model of neurodegeneration associated with Alzheimer's disease (AD). This was important as to be able to regenerate neurons they needed to have a model which first suffered degeneration of neurons. Dr. Aubert's lab has found a novel part of the brain involved in a novel pathology (build up of plaque) in the mouse model of AD.

This work is now being extended to a repair strategy using non-invasive gene therapy technology utilizing MRI guided focused ultrasound to deliver potential therapeutic agents. Dr. Aubert is working with Dr.

Kullervo Hynynen to deliver microbubbles containing the immunotherapies into the blood stream. Then, using focused ultrasound technologies, they open the blood/brain barrier allowing the microbubbles to easily cross at the site of choice. Preliminary results using antibodies to the plaque showed a reduction in the amount of plaque in the brain of mice showing neuro-degeneration. This is important as the plaque is thought to be a causative factor in Alzheimer's disease.

How did all of this come around? "My scientific passion has always been to understand how the brain works" says Dr. Aubert. Why study the diseases of the aged? Dr. Aubert greatly admires her grandmother and hopes that everyone could age as well as she has.

Early on Aubert worked in a retirement home and felt an immediate connection with the elderly. Although this may sound self-serving, Dr. Aubert hopes that one outcome of this research may lead to allowing us all to age "gracefully" and not suffer the problems associated with Alzheimer's disease and other age-related neurodegenerative diseases.

Dr. Aubert has also given back to the Scottish Rite Charitable Foundation by serving as a panel member on the Grants Review Committee for the last three years.

Dr. Aubert includes the following quote from Dr. Santiago Ramón y Cajal a noted histologist who was awarded the Nobel Prize in Medicine 1906 in her presentations: *The brain is a world consisting of a number of unexplored continents and great stretches of unknown territory.*

Over a century later scientists like Dr. Aubert are still exploring the brain to help Solve the Puzzles the Mind. ■



### On the Cover

Grandson Carter a Grade 8 Grad and one of the first graduates of the Learning Centre Valley of London gives his Grandfather John Hornell

Valley of Chatham a rose as a special appreciation for driving him to his tutorial classes. The other pictures are captioned within the Clarion.

