



SCOTTISH RITE CHARITABLE FOUNDATION  
VALLEY LIAISON COMMITTEE  
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The Scottish Rite Charitable Foundation website ([www.srcf.ca](http://www.srcf.ca)) has several videos of some of the people who have been supported by the Foundation discussing their particular research. One of those videos is of Dr. Pushpal Desarkar, Assistant Professor of Psychiatry at the University of Toronto and the Lead Physician-Scientist of Adult Neurodevelopmental Services at the Centre for Addiction and Mental Health. His research is entitled “Assessing and Stabilizing Neuroplasticity in Autism Spectrum Disorder.”

Autism Spectrum Disorder is currently the most common neurodevelopmental disorder affecting approximately 1 in 68 children in Canada and approximately 70,000 adults in Ontario alone. The cause is still unknown and there is no identified cure.

The working definition of neuroplasticity is: “the ability of neurons to alter and re-organize their anatomical and functional connectivity in response to emotional inputs, learning, memory formation and injuries.” In other words, the brain is constantly altering and re-organizing its various connections. An example provided by Dr. Desarkar is that of memory. The fact that we are able to retain information after reading a book is an indication that the brain is able to modify itself to retain that detail even after the stimulus that caused it is removed. (He does not state, but one is left to wonder, if the increasing difficulty to memorize our ritual as we age is a function of decreasing plasticity.)

Neuroplasticity could be considered to follow a continuum, or the traditional bell curve, with the optimal levels in the middle. At one end the plasticity would be missing or greatly deficient, known as hypoplasticity while the other end, with excessive plasticity, would be hyperplasticity. An example of these extremes might be the child who is totally unaffected by pain on the one hand or who is so sensitive to touch that he or she cannot bear to be touched or cuddled.

Research in this field has included four main areas, the last two of which are Dr. Desarkar’s primary focus:

- genetic, which looks at things that may have gone wrong in gene development;
- structural neuroimaging, for example, early atypical brain enlargement;
- valproic acid model used with animals; and,
- transcranial magnetic stimulation (TMS).

Transcranial magnetic stimulation uses magnetic fields to stimulate or inhibit electrical impulses in specific areas of the brain, very select designated spots as opposed to drugs which impact all areas of the brain, including those that don’t need to be impacted and that result in side effects. TMS is seen to be effective, easily tolerated and safe.

The goal of this research is first, to show that the brain in Autism Spectrum Disorder has aberrant hyperplasticity and secondly, to determine if that hyperplasticity can be stabilized using TMS. The hope is that children born with aberrant hyperplasticity can be stabilized and the effects countered or reduced using TMS in order to attain the optimal level of plasticity. Preliminary results with a very small sample size are promising on both goals. If successful, this will pave the way for a reversal of the pathology and lead to a “robust improvement in autism”.

Be sure to check out this video and the other research summaries included on the Foundation’s website ([www.srcf.ca](http://www.srcf.ca)) and make your donation to the Foundation in support of Solving the Puzzles of the Mind.

Ron Findlater, 33°  
Valley Liaison Committee Chairman