



Current Laboratory Research Projects

Director Saud A. Sadiq, MD

Multiple Sclerosis Research Center of New York

Viral Studies

The viral cause of MS

Investigators: Nicola Donelan and Jacqueline Dinzey

MS is an autoimmune disease, yet researchers do not know precisely what the immune system attacks. Studies show that people with MS have high levels of antibodies to the Epstein Barr Virus (EBV). We are investigating whether patients with MS have an abnormal immune response to EBV.

Viral gene detection

Investigators: Qijang Yan and Mustapha Rammal

We are identifying cells with viral genes in both the CSF and the brains of patients with MS. Once these genes have been detected we are cloning their B-cells. If successful, this work will lead to a greater understanding of how MS could be caused by a virus.

Hormone Studies

Hormonal Metabolism and Disease Activity

Investigator: Ilir Topalli

There is a higher incidence of MS in women than in men. We are studying the hormonal differences between men and women and between MS patients and non-MS patients. We hope to use information about sex hormone differences to find hormone-based treatments for MS.

Disease amelioration in pregnancy

Investigators: Ilir Topalli and Mustapha Rammal

Doctors found a lower incidence of MS attacks in pregnant women during their third trimester. We are studying the effects of pregnancy hormones on MS in a mouse model of the disease with the hope of discovering a hormone that could prevent MS attacks.

CSF Studies

Analysis of CSF B-cell repertoire

Investigator: Jerry Lin

We are cloning single B-cells from CSF to create an unlimited supply of CSF antibodies. We hope that by studying the antibody-antigen combination that causes MS we can discover ways to prevent the disease.

Identification of novel antigen in Spinal Cord of MS patients

Investigators: Jerry Lin and Niamh O'Hara

Patients with Primary Progressive MS (PPMS) have more damage to their spinal cords than to their brains. We are investigating differences in spinal cord antigens between patients with PPMS and controls.

CSF Fetuin Studies

Investigators: Nicola Donelan and Jacqueline Dinzey

We have found elevated levels of the protein Fetuin A in the CSF of MS patients. We are studying these protein levels with the hope of being able to use Fetuin A as a mark of disease activity.

CSF Bri Studies

Investigators: Violaine Harris and Pamela Good

We have found lowered levels of the peptide Bri-CT in the CSF of MS patients who have cognitive dysfunction and coordination difficulty. We are studying these peptide levels with the hope of being able to use Bri-CT as a predictor of future cognitive decline.

Stem Cell Research

Differentiation of cord blood stem cells

Investigators: Soheli Chowdhury and Christina Poopatana

Researchers are studying the presence of neural stem cell markers in differentiating oligodendrocytes, neurons, and astrocytes. Oligodendrocytes are involved in repairing damage caused by MS to the brain by remyelinating axons in brain lesions.

Genetic manipulation of neural stem cells

Investigators: Violaine Harris and Nara Chhua

By overexpressing oligodendrocyte differentiation promoting genes we hope to find ways to promote oligodendrocyte formation. Increasing the number of oligodendrocytes in the brain could induce remyelination and repair of brain lesions.

Hormonal affects on stem cells

Investigators: Ilir Topalli and Lindsay Caspi

We are studying which hormonal factors affect spinal cord fetal stem cell differentiation. By discovering what hormones promote oligodendrocyte formation, we hope to find therapies that use hormones to increase the number of oligodendrocytes in the nervous system. This could repair the damage done to the brain by MS.

Study of bone marrow derived stem cells

Investigators: Violaine Harris and Nara Chhua

We are characterizing mesenchymal stem cells (MSCs) derived from marmoset and human bone marrow. We will differentiate these cells into neural progenitors and inject them into the brains of primates with an animal model of MS. We eventually hope to introduce human self stem cells into the nervous system of patients with MS. Introducing neural stem cells into the brain could promote the repair of areas of the brain damaged by MS.

Translational Studies

Intrathecal Methotrexate

Investigator: Soheli Chowdhury and Elena Simon

Reactive astrocytes damage the brain of patients with MS. Methotrexate (MTX) prevents proliferation of these harmful cells in tissue culture. Injecting MTX into the spinal cords of MS patients has slowed the progression of the disease.

ITRTX

Investigator: Nicola Donelan

ITRTX is an investigational medication that could be used to treat MS since it is a specific antidote for a cell found in the CSF of MS patients. We plan to study the safety and tolerability of ITRTX as a treatment for MS.

Cellular Mechanism Investigations

Remyelinating Transcription Factors

Investigator: Ilir Topalli

We are identifying the control regions for genes that code for oligodendrocytes. By overexpressing these genes we hope to increase the levels of oligodendrocytes in the brain and repair damage done to the brain during MS attacks.

Electron Transport Chain Deficiencies in Neuronal Degeneration

Investigator: Jerry Lin

We have found that damaged neurons have a decreased ability to produce energy because of electron transport chain abnormalities. We are exploring whether this failure to produce energy causes neurons to die. We hope to use this data to discover novel therapies to prevent neuronal death.