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GENERATIONS

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Please direct correspondence to:

National Ataxia Foundation
Connecting Ataxia families, researchers, clinicians and the community

National Ataxia Foundation
600 Hwy 169 S., Ste. 1725
Minneapolis, MN 55426
Phone: (763) 553-0020
Fax: (763) 553-0167
Website: *www.ataxia.org*
E-mail: *naf@ataxia.org*
CFC #10752

Generations Staff:

Andrew Rosen, Executive Director
Nick Gullickson, Finance Assistant
Sue Hagen, Patient and Research Services Director
Stephanie Lucas, Communications Manager
Lori Shogren, Community Program and Service Director
Mollie Utting, Support, Engagement & Advocacy Coordinator
Jon Wegman, Development Assistant
Leader Printing – Printing and Production
Jessica Johannes – Design

Generations Schedule:

Issue	Spring	Summer	Fall	Winter
Mail Date	April	July	October	January

NAF Update:
Andrew Rosen Announced as Executive Director

Andrew Rosen,
Executive Director

We are happy to announce new leadership at NAF! The Board of Directors conducted a nationwide search which included several competitive candidates. Andrew Rosen, who emerged as the standout applicant, was selected to be NAF's Executive Director.

Andrew has built a reputation as a collaborative and trusted executive with a passion for social service and helping organizations build capacity. He will lead NAF's efforts in improving the lives of persons affected by Ataxia through support, education, and research.

NAF is now navigating an exciting new environment as research accelerates towards potential treatments for Ataxia," said Bill Sweeney, President of the NAF Board of Directors. "NAF needs a leader who can help us meet the challenges and identify the opportunities presented in this new environment. Our board is confident that Andrew Rosen will effectively direct NAF to take advantage of these opportunities to benefit all who are affected by Ataxia."

Andrew was previously President of Angel Foundation, a Twin Cities-based agency providing emergency financial assistance, education and support for local adults with cancer and their families. He has also served as President of HousingLink, an innovative web-based non-profit that provides affordable housing information for the State of Minnesota, and as Interim Executive Director for Social Venture Partners (SVP) Minnesota.

Andrew has significant non-profit consulting experience with clients such as The Network for Better Futures, Twin Cities RISE!, and the International School of Lausanne, Switzerland where he spent four years living as an expatriate with his family. His for-profit career included marketing leadership positions with Boston Scientific and business development roles in the first Internet boom in San Francisco. He holds an MBA in Marketing from the Wharton School of the University of Pennsylvania, and an MA in International Studies from U Penn. His undergraduate degree is from Tufts University in Boston.

Andrew is very involved in his community, currently serving on the board of the Trust for Public Land, and previously the International School of Lausanne, and the City of Lakes Waldorf School. He has volunteered for Project for Pride in Living, Habitat for Humanity, and Nechama - Jewish Response to Disaster. He is an avid cyclist and Minnesota sports fan, and enjoys international travel and spending time with his wife and three children.

REMEMBERING NAF IN YOUR WILL

Throughout the years, individuals have named the National Ataxia Foundation as a beneficiary in their wills. Their thoughtfulness and foresight has enabled NAF to provide more research studies, more services to patients and families and more education and Ataxia awareness to the public. We are grateful for the impact that has been made by these compassionate acts. If this is something you would like to consider, please contact Joel Sutherland at *joel@ataxia.org* or call (763) 231-2748.

THE ATAXIA COMMUNITY IS INTERESTED IN YOUR GREAT IDEAS.

If you have Ataxia Tips or a personal story you would like to share in a future issue of *Generations*, please submit it to naf@ataxia.org. Those submitting a personal story are asked to please include a photo or two and a brief author bio (1-2 sentences).

A Look at NAF Funded Research

Thank you to everyone who participated in the 2018 Annual Ataxia Research Drive. We are excited to announce that, with your hard work and generosity, the $200,000 matching goal was surpassed! You donated $319,000, which is combined with the matching funds from our group of benefactors, for an incredible total of $519,000! That is over half a million dollars going directly to fund Ataxia research.

With the support of our generous donors, NAF is able to fund Ataxia research projects world-wide each year. In February, the NAF Board of Directors approved $1,144,500 of research support to fund the very best ataxia research projects. In late 2018, researchers submitted their grant applications to NAF, which were then put through a rigorous review process by our Medical Research Advisory Board facilitated by Dr. Harry Orr, NAF's Research Director. The highest scored and most promising Ataxia research projects were awarded funding. All of these projects are deeply scientific, and the lay summaries of these projects may be difficult to understand by a lay audience. However, it is important to provide NAF supporters with insight into the projects that were funded for this year. The following lay summaries were submitted directly from the principal investigator for each Ataxia research project funded by NAF for 2019 to 2020.

These ataxia investigators will be able to study the complexity of ataxia because of the donations you provided, moving us that much closer to treatments and a cure. Thank you to those who donated to the 2018 Annual Ataxia Research Drive and we're looking forward to a successful 2019 of ataxia research accomplishments!

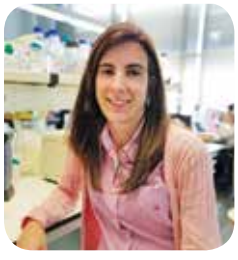
RESEARCH SEED MONEY GRANTS

François Berthod, Ph.D.
Université Laval Quebec
Québec, Canada

Reprogramming hiPSCs from ARSACS patients into neural cells in order to recreate a model of the disease in vitro

Background. Autosomal recessive spastic ataxia of Charlevoix-Saguenay (ARSACS) is a condition characterized by symptoms such as spasticity, ataxia and peripheral neuropathy. The occurrence of neuropathy with demyelinating features is one the hallmarks of the disease, showing the involvement of various populations in addition to altering the deposition of myelin by Schwann cells and oligodendrocytes. Studying ARSACS pathophysiology directly with sick neural cells of patients is challenging because of the difficulty to access the cells without harming the patients. We and others have shown that it is possible to reprogram patients' cells into induced pluripotent stem cells (hiPSC) and then to differentiate the hiPSC into sensory and motor neurons. The next step in a pipeline aiming to study ARSACS in vitro with human neurons and glial cells would be to culture the differentiated cells in a physiological 3D environment. Three-dimensional culture of neurons in tissue-engineered models would allow those neural cells to behave in a similar way than in vivo. Hypothesis and Aims We hypothesize that the development of a human tissue-engineered model made of ARSACS patient's cells will mimic the ARSACS phenotype in vitro and will help to elucidate the cellular physiology of the disease. Our objective is to determine whether the ARSACS phenotype can be recreated with patient's neural cells in vitro. Through the current proposal, we will gain access to neural cell lines (motor neurons and Schwann cells) derived from ARSACS patients using the induced pluripotent stem cells technology. The neural cells obtained will be compared to others bearing different mutation in order to describe an in vitro phenotype of the disease. We will use a 3D in vitro human model of the disease that is constituted of fibroblasts, motor neurons, Schwann cells and myoblasts

to further study ARSACS. This model will recapitulate the ARSACS phenotype at the motor neuron scale in a physiological microenvironment. Significance and Outcome of the Proposed Research The major innovation that we propose is the combination of tissue engineering and induced pluripotent stem cell technology. It will allow us to study ARSACS using neural cells derived from a blood sample or skin biopsy from ARSACS patients with a preclinical model. Following the completion of our proposal, human neural cells bearing ARSACS mutations will be available to screen drug candidates, opening interesting opportunities to establish collaboration with biotechs and academic consortiums within a 5 years' timeline. Having human ARSACS motor neurons available for research is a promising means of humanizing the development of therapeutics for preclinical drug efficacy and safety assessments in a cost-efficient manner. Furthermore, our approach is compatible with testing of most potential therapeutics. Experimental Design to Develop a Human Tissue-Engineered Model (HTEM) of ARSACS We have an existing research ethics board certificate allowing us to collect tissues and blood samples through our collaboration with Dr. Nicolas Dupré, Neurologist in our research center. Dr. Dupré selects the patients, obtains their informed consent and collects the tissues. We have an ongoing collaboration with the hiPSC Québec platform (http://www.ipscquebec.com/). The platform reprograms the fibroblast into hiPSC and then our group differentiates them. Differentiated cells will seed in a human tissue-engineered model. Several HTEM iterations will be produced from the combination of ARSACS and healthy motor neurons (MN), Schwann cells (SC), fibroblasts (F) and myoblasts (MY). Myoblasts will be added in order to include the natural innervation target of motor neurons and also to assess eventual defects in the formation of neuromuscular junctions. Only normal myoblasts will be involved in all experimental conditions. In order to determine the ARSACS phenotype in vitro, we will assess in conventional culture on plastic cell survival, mitochondrial fission/fusion as well as morphology, neurofilament organization and glutamate uptake. Using the HTEM variations, we will investigate their differences in terms of MN survival, MN apoptosis, axonal migration, myelination, mitochondrial survival and morphology, quantification of glutamate uptake, sascin protein expression plus its localization. We will investigate whether we can observe the formation of myelin sheaths around axons. When an ARSACS phenotype is clearly defined compared with the controls, we will be able to determine the precise role of glial cells and MN in ARSACS. These experiments will allow us to determine if the ARSACS phenotype is homogeneous between different patients. Research Outcome Once established, the development of the ARSACS HTEMs will advantageously support basic research and molecule screening. their neurologist to try this drug.



Marta Daniela Costa, Ph.D.
University of Minho
Braga, Portugal

Genetic screening for identification of novel therapeutic targets in SCA3

In Machado Joseph disease (MJD) a CAG expansion in the ATXN-3 gene is translated as a toxic polyglutamine (polyQ) tail in the corresponding protein, ataxin-3. Apart from the CAG expansion size, which explains about half of the disease heterogeneity, additional modifier loci can contribute to the remaining phenotypic variability in MJD, mainly at the age at onset (AO) and clinical presentation and severity levels. The knowledge of MJD modifier pathways amenable to manipulation is crucial to design effective therapeutic strategies for this disease.
To achieve this, we will perform a genome-wide screen of genetic modifiers in a C. elegans model of MJD, expressing a mutant human ATXN3 (AT3Q130). These animals exhibit mutant protein aggregation in specific neurons and reduced motor ability, key features of MJD in humans. Through a RNAi-based approach, the genetic factors influencing primarily the models' motor phenotype will be characterized and will reveal novel therapeutic targets for this disease.

Marija Cvetanovic, Ph.D.
University of Minnesota
Minneapolis, MN
In partnership with BAARC

Understanding cell specificity of Ataxin-1 toxicity in human neurons

Spinocerebellar ataxia type 1 (SCA1) is a dominantly inherited and fatal neurodegenerative disease for which there is no treatment. SCA1 is caused by the abnormal expansion of CAG repeats in the Ataxin-1 (ATXN1) gene. While mutant ATXN1 protein is expressed throughout the brain, not all neurons are equally affected in SCA1. For example, there is a significant loss of cerebellar Purkinje neurons, cortical neurons, in contrast, are relatively spared. The reasons for this selective vulnerability of Purkinje neurons in SCA1 remain little understood. Mouse models of SCA1 were instrumental in understanding the cellular and molecular mechanisms by which mutant ATXN1 causes neurodegeneration. However, extent to which data from mouse SCA1 models correlates with the ATXN1 toxicity in human Purkinje neurons remain unknown. Thus we propose to create two different human induced pluripotent stem cells (iPSCs)-derived models of SCA1, human Purkinje and cortical neurons. Our hypothesis is that mutant ATXN1 expression will be pathogenic in human Purkinje neurons, while cortical neurons will be much less affected by mutant ATXN1. Successful completion of this proposal will provide insight into the molecular mechanism by which mutant ATXN1 affects human neurons. Ultimately, these SCA1 human neurons will be a valuable resource that we will freely share with SCA community to help with the discovery of new therapeutic approaches.

Mirella Dottori, Ph.D.
University of Wollongong
Wollongong, Australia

Developing therapies for Friedreich's Ataxia using nanoparticles

Friedreich ataxia (FRDA) is a progressive neurodegenerative disease that is caused by insufficiency of a protein called, Frataxin. A major component towards treating FRDA is to identify the most optimal approach for delivering therapeutic molecules, such as DNA encoding Frataxin, into the human nervous system. Advances in bioengineering have developed assembled chemical compounds, called 'nanoparticles', that have the capability of encapsulating protein or DNA molecules and penetrate into cells. Once inside the cell, nanoparticles release their contents, thereby essentially serving a specialized carrier system for delivering therapeutic agents. There are many different nanoparticle types that differ in their physical and chemical properties that influences which cells they can or cannot penetrate into. Our major aim is to determine the optimal nanoparticle type that can penetrate human neurons and deliver DNA that will induce higher Frataxin protein levels. Until recently, this has been a challenge because of access to human brain tissue. With stem cell technologies, we now have the capability of growing human neurons in 3D aggregates, such that they resemble neural-like tissue. We propose to use this system to test different nanoparticle types in a high-throughput manner. The outcome of these studies will fast-track the development of nanoparticle materials for their use in treating FRDA.

Cherie Marvel, PhD
Johns Hopkins University-School of Medicine
Baltimore, MD

Cerebellum and basal ganglia interactions in spinocerebellar ataxia

Recent data suggest that the basal ganglia and cerebellum brain regions work together during cognition. Moreover, when one region loses function, due to injury or disease, the other region may help compensate for that loss of function. Our goal in this project will be to use state-of-the-art brain imaging methods to measure regional brain activity during cognition in people with spinocerebellar ataxia (SCA) who suffer from cerebellar degeneration. Reports indicate that neurons in the basal ganglia begin to die off in SCA 3 and SCA 6. Likewise, neurons in the cerebellum begin to die off in people with Parkinson's Disease (which heavily involves the basal ganglia). If we knew how the cerebellum

and basal ganglia worked together normally, and how one region responded to functional loss in the other, we could better identify early markers of cognitive decline, monitor disease progression, and develop targeted interventions in SCA. In this study, we will examine brain function in patients with SCA 3, SCA 6, Parkinson's Disease (PD), and healthy controls. We will characterize typical cerebellum-basal ganglia functional interactions in the control group, which will help clarify atypical cerebellar-basal ganglia interactions, and whether they are compensatory or adverse, in the PD and SCA groups. Understanding the basal ganglia-cerebellar relationship in SCA will be the overarching aim of this project.

Carlos Adriano Albuquerque Andrade Matos, Ph.D.
Center for Neuroscience and Cell Biology
Coimbra, Portugal

Silencing the SCA3-causing gene ATXN3 through CRISPR interference

Spinocerebellar ataxia type 3 (SCA3) is a disorder of the nervous systems that leads to progressive impairments of body movements, vision and speech. Although the disease was firstly described in families descending from Portuguese immigrants in America, SCA3 is nowadays recognized to affect people in many countries around the world, not only the United States, but also Germany, Brazil and Japan, among many others. SCA3 is hereditary, which means that a parent carrying the disease has a chance of passing it to their offspring, with symptoms arising at around 40 years of age. Unfortunately, no treatment capable of curing the disease or stalling its progression is available to patients. In order to change this situation, many groups of scientific researchers are currently dedicated to studying SCA3 and developing possible therapies. The hereditary factor – the gene – responsible for SCA3 has been identified for more than 30 years. Our group in Portugal, and others around the world, have demonstrated that it is possible to revert SCA3 symptoms in animal models of the disease by inactivating the SCA3-causing gene. Recently, innovative and promising new scientific tools for manipulating gene function have been discovered and have been made available to the scientific community. One such tools is CRISPR, an unprecedented technology that allows precise gene modification to be performed. In our lab, we have adapted a variant of this technology to inactivate the SCA3-causing gene. Promisingly, our current results indicate that our strategy is capable of inactivating the disease-related gene in cell cultures, in vitro, with a high degree of success. We believe that this gene inactivation strategy is an advantageous alternative to the previously-available ones, so we are now interested in testing it in a mouse model of SCA3. We are confident that our CRISPR-based inactivation strategy of the SCA3-causing gene will be able to revert the symptoms of the model mice and protect against the neuronal loss it normally experiments. Success of this strategy will pave the way for the transition of this type of technology to the clinic.

Jeremy Schmahmann, M.D.
Massachusetts General Hospital (The General Hospital Corp.)
Boston, MA

Development and Validation of a Patient Reported Outcome Measure for Ataxia

Many hereditary and acquired neurodegenerative disorders affect the cerebellum and are associated with relentlessly progressive cerebellar motor and neurocognitive symptoms. The spinocerebellar ataxias, Friedreich's ataxia and related disorders are rare diseases that affect about 150,000 patients in the US. Symptoms include impaired balance, gait, speech, and limb and oculomotor control, with autonomic symptoms that together degrade quality of life and shorten life span. Recognition of cognitive and psychosocial decline in the patient population adds to the disease burden on affected individuals and their families. In the last few years the field of cerebellar ataxia clinical and basic science research has been advanced by the development of promising new therapies such as antisense oligonucleotide, RNA interference, and symptom-based therapies including those currently in clinical trials, such as troriluzole. Assessment of ataxia has largely been confined to clinical rating scales and measures, such as

the Scale for Assessment and Rating of Ataxia (SARA) and the Brief Ataxia Rating Scale (BARS), that have been used to date in clinical trials of emerging therapeutic interventions. However, there is increasing recognition of the importance of including patient reported outcome measures (PROMs) to clinical trial design to determine the efficacy and disease relevance of the novel or proposed intervention. Patient reported scales most commonly used for monitoring ataxia in research and clinical settings are either specific to other diseases, or focus on general health and well-being, which are not sensitive enough to measure changes in progression of ataxia. The Functional Assessment of the Unified Huntington's Disease Rating Scale (UHDRS), and the EuroQol-5 Dimension (EQ-5D) health status scale are both examples of measures used to assess the status of ataxia patients, despite their specificity for other patient populations. The objective of this study is to develop a PROM for individuals with cerebellar ataxia (PROM-Ataxia) that can accurately assess patients' experience of their disease and track outcomes in response to therapeutic intervention. Through gathering input from ataxia patient surveys, literature reviews, and experts in the field, we previously identified several disease-specific domains and incorporated these into a conceptual model that has formed a preliminary patient reported outcome measure for patients with cerebellar ataxia. These cerebellar ataxia-specific domains capture the experience, well-being, daily functions and symptoms of patients, and provide valuable information on patient health and quality of life in relation to disease progression and therapeutic intervention. In order to further improve the items explored in each domain, we plan to host focus groups of patients with cerebellar ataxia to review and complete the scale and assess its readability and relevance. Feedback from these focus groups of people with ataxia of different degrees of severity will provide insights into the applicability, clarity, and comprehensibility of the items, while also determining the relevance of the items to a patient's disease. Edits will be made to the PROM-Ataxia preliminary measure after the focus group data are analyzed, ensuring all areas of importance to cerebellar ataxia patients are emphasized and incorporated in the PROM. In addition, we will assess potential respondent fatigue and burden in completing the questions that comprise the PROM-Ataxia. The final step of this study is the validation of the PROM-Ataxia which will be administered to a larger population of ataxia patients. This will ensure that the PROM-Ataxia is readable, understandable, relevant to ataxia, and sensitive enough to detect changes over time or in response to interventions. The introduction of a PROM-Ataxia into patient care and clinical trial design has the potential to empower the ataxia patient community, improve patient care, and facilitate the development of new ataxia treatments.

Vikram Shakkottai, M.D., Ph.D.
University of Michigan
Ann Arbor, MI

Understanding brainstem dysfunction in SCA1

Cerebellar ataxias, a group of disabling and untreatable neurodegenerative disorders affecting up to 150,000 people in the United States, result in uncoordinated movements and falls, frequently leading to wheelchair confinement, and often premature death. Spinocerebellar ataxia type 1 (SCA1), an inherited form of cerebellar ataxia causes cerebellar and brainstem neuron degeneration. Although the molecular events resulting in cerebellar dysfunction are an area of active investigation, the basis for and the impact of brainstem dysfunction, the likely cause of death in SCA1, remains poorly studied. This proposal explores the basis for brainstem neuronal dysfunction and degeneration in SCA1. In a series of recent publications, we identified alterations in potassium (K^+) channels as a key feature of cerebellar dysfunction in SCA1 mice. We previously showed that restoring K^+ channel function improved motor dysfunction and reduced cerebellar degeneration in SCA1 mice. It is now important to examine whether similar ion channel dysfunction exists in the brainstem in SCA1. The overall hypothesis of this proposal is that disrupted ion channel function results in altered brainstem function contributes to motor dysfunction and premature death in SCA1. The goal of these studies is to establish that rescuing potassium channel function is a therapeutic strategy to improve brainstem dysfunction and to prevent premature death in SCA1.

Carlo Wilke
Hertie-Institute for Clinical Brain Research
Tuebingen, Germany

Neurofilaments as blood biomarkers of SCA3 progression in humans and mice

Background and rationale Spinocerebellar ataxia type 3 (SCA3) is a fatal genetic neurodegenerative disease marked by irreversible decline of motor control, affecting patients and their families already in mid-life. Recent advances in the understanding of the genetic cause of SCA3 and its disease mechanisms have opened a window for targeted molecular therapies. Such targeted treatments might even allow preventing neuronal degeneration before clinical symptoms appear. However, to pave the way for upcoming treatment trials in patients, objective measures are urgently needed to track disease progression, both in the presymptomatic and symptomatic stage of SCA3, which might then be used to precisely capture the treatment response. This project aims to establish biomarkers for precisely tracking disease progression in SCA3, which will be useable in both the presymptomatic and symptomatic stage of the disease. Goal and key outcome We here propose an innovative SCA3 biomarker project aiming to demonstrate that blood levels of neurofilaments (NFs) – specific neuronal proteins – serve as easily accessible, sensitive and reliable biomarkers of SCA3 disease progression in human disease and in mouse models, including even the presymptomatic stage. Our study fully serves the objective of the National Ataxia Foundation to promote research to find a cure for ataxia, as it will result in biomarkers paving the way for future treatment trials in SCA3. Preparatory work by the applicants We have broad experience in measuring blood levels of two particularly promising biomarkers, Neurofilament Light (NfL) and phosphorylated Neurofilament Heavy (pNfH). Our previous studies have shown that blood levels of both NfL and pNfH are closely linked to their levels in the cerebrospinal fluid of neurodegenerative patients, thus providing easily accessible biomarkers for degeneration of the brain. In a small piloting series, we have found strongly increased blood levels of NfL in SCA3 patients, indicating that NFs are promising biomarkers in SCA3. Moreover, we have developed a mouse model of SCA3 disease (a knock-in mouse model containing a 223-CAG repeat expansion in the SCA3 gene) and examined its molecular, pathological and behavioural features. Project plan a. Human and mouse SCA3 biomaterial Our SCA3 biomarker study will combine two unique resources of human and mouse SCA3 biomaterial. We have obtained blood samples of 120 SCA3 mutation carriers at both the presymptomatic and symptomatic stage from two international SCA3 registers (European SCA3/Machado-Joseph Disease Initiative (ESMI); Prospective study of individuals at risk for spinocerebellar ataxia (RISCA)). Additionally, we have samples available from 144 animals of our SCA3 mouse model, from multiple time points during both the presymptomatic and symptomatic phase of the disease. b. Neurofilaments as progression biomarker in human SCA3 We will measure blood NF concentrations using the novel ultra-sensitive single molecule array (Simoa) technique, which allows to capture and exactly quantify even minimal amounts of NFs as present in blood or small sample volumes of mouse samples. We expect blood NF levels in SCA3 disease to increase already before the first clinical symptoms, with levels rising with proximity to symptom onset. We will measure NF levels in blood samples of presymptomatic SCA3 mutation carriers (n=20) and compare their levels to those of age-matched control subjects (n=60) and symptomatic SCA3 patients (n=100). In a subset of symptomatic SCA3 carriers (n=20), we will measure NF levels also at a second time point, thus capturing biomarker changes over time. c. Neurofilaments as progression biomarker in the SCA3 mouse model In parallel, we will measure NF levels in our SCA3 mouse model at both the presymptomatic and symptomatic stage. Blood NfL and pNfH levels will be measured in 144 animals which were examined at four different time points, before and after the onset of motor deficits. Like in human disease, we expect NF levels to increase already before the onset of motor deficits, thus mirroring the onset of SCA3 pathology in the brain. We will study the associations of NF levels with pathological brain changes and disease severity. Significance beyond the project Our project will demonstrate that blood levels of NfL and pNfH are easily accessible, reliable and sensitive blood biomarkers of disease progression in SCA3, both in human disease and

mouse models. It will uncover the association between NF blood levels and the underlying brain pathology, not only in the symptomatic stage, but already in the presymptomatic stage. Our findings will help prepare treatment trials in SCA3, by providing blood biomarkers which are suited for multicentre trials. If proved successful by our project, NFs will also hold great promise as disease progression and therapy outcome measures in other SCAs (e.g. SCA2) where treatment trials are on the horizon.

PIONEER SCA TRANSLATIONAL AWARD

Beverly Davidson, PhD
The Children's Hospital of Philadelphia
Philadelphia, PA

Gene editing for SCA2 therapy

There are currently no therapies that delay onset or progression of spinocerebellar ataxia. In previous work, we showed that gene silencing approaches had a profound positive impact on disease readouts in two animal models of spinocerebellar ataxia type 1 (SCA1). Additionally, our gene silencing therapies in SCA1 mice reversed behavioral deficits and neuropathology, even when delivered after onset. We have also shown that gene editing resulted in significant allele-specific silencing of mutant human huntingtin in a Huntington's disease mouse model. Here, we propose to silence mutant human ataxin-2 in a spinocerebellar ataxia type 2 (SCA2) mouse model using gene editing. We will optimize and test the utility of two different approaches. We will assess efficacy and test for behavioral rescue, neuropathological improvement, and safety. If our tests in mice are successful, we will seek additional funding to move this forward to SCA2 patients.

Puneet Opal M.D., PhD
Northwestern University - Chicago Campus
Chicago, IL, United States

Using VEGF-mimetic nanoparticles to treat SCA

Our laboratory studies spinocerebellar ataxia type 1 (SCA1), which is a neurogenerative disorder where patients first present with symptoms in their third or fourth decade of life. Early symptoms include motor incoordination that becomes progressively worse with patients succumbing to the disease about fifteen years after onset when the airway can no longer be cleared. SCA1 is a polyglu-tamine disorder, where there is a repeat expansion of the amino acid glutamine in the protein ataxin-1 (ATXN1) causes the protein to have abnormal functions. We found that mutant ATXN1 causes repression of vascular endothelial growth factor (VEGF) that is crucial for maintaining the microvasculature in the brain and also supports neuronal health. We have found that restoring VEGF levels helps ameliorate the disease in SCA1 mice. We now seek to test a novel nanoparticle, VEGF-PA, as a possible treatment. We will treat SCA1 mice with VEGF-PA and test the efficacy of the treatment by studying both the motor behavior of the mice and tissue samples. Results from this study have the potential to pave the way for a novel treatment for a currently incurable, devastating disease.

Sokol Todi, PhD
Wayne State University
Detroit, MI

Mechanisms of aggregation and toxicity in SCA3

The most common dominantly inherited ataxia in the world is Spinocerebellar Ataxia Type 3, also known as Machado-Joseph Disease (SCA3/MJD). The precise reasons for this disease and therapeutic options for it remain elusive. Here, we propose to investigate how the protein that causes SCA3/MJD behaves in an animal model, with special focus on a specific protein-protein interaction that could be targeted in the clinic. The protein at the root of SCA3/MJD is ataxin-3. We showed recently that neuronal

toxicity from disease-causing ataxin-3 is regulated by one of its binding partners. The objectives of this proposal are to: 1) understand how this partner regulates the aggregation and toxicity of ataxin-3, and 2) determine if inhibiting this interaction is of therapeutic benefit.

YOUNG INVESTIGATOR – SCA AWARD

James Orengo, MD, PhD
Baylor College of Medicine
Houston, TX

Investigating muscle wasting in Spinocerebellar Ataxia, type1

Spinocerebellar ataxia type 1 (SCA1) is a devastating neurodegenerative disease characterized by progressive loss of coordination of movements and clumsiness. Individuals affected by this disease typically pass away prematurely in their thirties to sixties. While the majority of scientist's study loss of coordination or ataxia in SCA1, at the end stages of disease individuals with SCA1 die from complications related to weak muscles and not ataxia. In particular what leads to death in these individuals is the dysfunction of muscles needed to breath properly. We have developed a new mouse model for SCA1 that allows for targeted study of what cell types are important for premature death. The goals of my project are to examine the molecular changes in these mice that lead to muscle weakness, breathing problems and early death, so that new treatments can be developed.

Sarah Perry, Ph.D.
Columbia University
New York, NY

Investigating the Effects of Dual Tasking on Cough Reflex Sensitivity

Study Rationale: Aspiration pneumonia is a leading cause of death in people with neurodegenerative disease, including ataxia. One of the main reasons that people with ataxia can develop aspiration pneumonia is that they have cough dysfunction (dystussia) – meaning that if food or liquid enters the airway, they may not be able to sense it, or cough to clear it (aspiration). It is then possible for the material to enter the lungs and develop into an infection called aspiration pneumonia. When it comes to cough dysfunction, very little is known about the exact nature of the problem in ataxia. We know from related diseases, such as Parkinson's disease, that when a person is distracted, their reflexive cough may become less effective. If the same is true for people with ataxia, healthcare professionals could use this information to perform more accurate assessments of cough, and to design effective treatments to rehabilitate cough in this population. Aims: The goal of this study is to describe patterns of reflex cough function in ataxia and determine how reflex cough is influenced by being distracted in people with ataxia. Study Design: We will measure 28 people with ataxia in terms of their attention, memory, cognition, and reflex cough function. We will see how reflex cough function may change when these people are distracted. Cough testing is completed non-invasively, by asking people to breathe in a mist through a facemask. We will measure both cough sensitivity (i.e. can people detect when an airway irritant is presented) and cough effectiveness (i.e. how strong was the cough, how many coughs were produced, etc). Clinical Impact: Results from this study will help us better understand what types of impairment people with ataxia have in terms of their cough function. This will ultimately lead to the development of more sensitive assessments of reflex cough, and treatments that can rehabilitate cough dysfunction in this population. Ultimately, results should lead to reductions in aspiration pneumonia and improved quality of life.

Magda Santana,PhD
Center for Neuroscience and Cell Biology
Coimbra, Portugal

A system approach to find a blood-based biomarker for Machado-Joseph Disease

Machado-Joseph disease (MJD), or spinocerebellar ataxia type 3, is the most common of inherited ataxias worldwide. MJD has an adult onset, is progressive, leads to severe disability and so there is an unmet need for a therapy. Advances in understanding underlying pathological mechanisms of this disease encouraged the

development of promising therapeutic approaches and potential candidates for therapy are now ready to enter clinical stages. To evaluate disease stages and progression clinicians are limited to the use of clinical scales that have some subjectivity and have low sensibility. This makes identification of a drug therapeutic effect more difficult and has contributed to failure of previous trials. Blood tests are usually more reliable than clinical scales as they can objectively measure a biological characteristic that is as an indicator of normal biological or pathological processes, or a response to a therapeutic intervention (the so called "biomarker"). Unfortunately, no biomarkers were discovered yet and so there are no blood tests available to evaluate disease progression in MJD. The discovery of a biomarker test that could rapidly translate into clinical use is urgent and critical for the success of emerging clinical trials. In this project, we aim at identifying and developing a blood-based disease progression biomarker for MJD, by combining data obtained from analysis of proteins and RNA in biological fluids and patient's neuronal cells derived from induced pluripotent stem cells, with brain imaging and clinical data of a large longitudinal cohort of MJD patients. The development of a biomarker for MJD will allow the development of a clinical trial using a biomarker as an endpoint. So, this project will have a remarkable impact in the field contributing to accelerate the discovery of an effective therapy for MJD. This project will also have a direct impact on health care as the biomarker can be used by clinicians in the monitoring and clinical management of patients.

Yalan Zhang, M.D./Ph.D.
Yale University
New Haven, CT

Investigating the molecular mechanism of neurodegeneration in spinocerebellar

Spinocerebellar Ataxia type 13 (SCA13) is a human autosomal dominant disease that results in degeneration of the cerebellum, and effects multiple other parts of the nervous system. There is currently no effective treatment for this disease. It is caused by mutations in the gene encoding Kv3.3, a channel protein required for the normal electrical excitability of neurons in the cerebellum. Our recent work has revealed that Kv3.3 has two biochemical properties that are very unusual for such proteins. First, it directly binds Hax-1, a cell survival protein that is required for the survival of the cerebellum. Second, Kv3.3 activity directly stimulates a biochemical pathway that is linked to Tank Binding Kinase (TBK1), an enzyme that plays a key role in the removal and eventual destruction of cellular components through events termed autophagy and mitophagy. We have generated a strain of mice bearing a SCA13 mutant Kv3.3 channel and found that both these biochemical properties of the normal channel are markedly altered. Specifically, Hax-1 binds more strongly to the mutant channel and TBK1 activity in the cerebellum is significantly enhanced by the mutation. The work in this proposal will test the hypothesis that channels bearing SCA13 mutations result in death of cerebellar neurons by triggering the destruction of the Hax-1 cell survival protein through a TBK1-dependent pathway. We plan to use pharmacological agents that target the channels, TBK1 and Hax-1 to reverse the effects of channel mutations. The proposed work will lead us to a better understanding of how channel mutations can trigger the death of neurons and will identify potential therapeutic avenues for the treatment of SCA13 and potentially other forms of ataxia.

POST DOC FELLOWSHIP AWARDS

Jack Godfrey, PhD
The University of Chicago
Chicago, IL

In search of novel disease targets: Identification and characterization of RNA binding proteins involved in the internal translation of CACNA1a

Spinocerebellar ataxia type 6 (SCA6) is an autosomal, dominantly-inherited neurodegenerative disease, falling under the umbrella of trinucleotide repeat disorders. In healthy individuals the mRNA encoded by the CACNA1A gene has a repeat of the trinucleotide CAG fewer than 19. In individuals who suffer

from SCA6, this trinucleotide sequence may be repeated more than 19 repeats. The trinucleotide encodes for the amino acid glutamine (Q), meaning that when the CACNA1A mRNA is used as a template to make a protein, individuals with SCA6 have a much longer repeat of glutamine than in healthy individuals. The CACNA1A gene encodes the Calcium Voltage-Gated Channel Subunit Alpha1 A (a1A) which is the major calcium channel in Purkinje cells, that provide the major inhibitory output from the cerebellum. It was thought that the glutamine expansion in a1A were interfering with a1A's normal function, however; studies showed no change in channel function even with large glutamine expansions. Further studies found that the CACNA1A mRNA produces a second protein, one made using a non-canonical method called internal ribosome entry. A region of the CACNA1A mRNA has been shown to contain a specific sequence called an internal ribosome entry site (IRES) which allows this to occur. This second protein (a1ACT) also contains the region of glutamine expansion and has been shown to be the major effector in ataxia brought about by the glutamine expansion. Given that a1A is the major calcium channel in the cerebellum and that the glutamine expansion does not negatively affect its function, it is of clear importance to maintain its expression while inhibiting the function of the disease-causing protein. IRES elements typically function through recruitment of proteins called IRES transacting factors (ITAFs). This study proposes to identify ITAFs which bind to the CACNA1A IRES and which affect the expression of a1ACT whilst not affecting that of a1A. A previous study found that a short RNA molecule, called a microRNA, is able to inhibit the production of a1ACT while not having an effect on a1A. While this presents an exciting opportunity for therapeutic interaction it is currently very difficult to allow RNA based therapeutics to cross the blood-brain barrier. In addition, microRNAs typically have a large number of target genes, and affecting their expression could have the unwanted result of downregulating other target genes, which could result in unwanted side effects. Identification of proteins which are required for a1A expression would allow the use of small molecule chemical inhibitor dug candidates which may be more specific and may more readily cross the blood-brain barrier.

Armen Moughamian, MD, PhD
University of California, San Francisco
San Francisco, CA

Dysregulation Of Ion Channel Homeostasis Underlies The Pathophysiology Of Spinocerebellar Ataxia 19/22

Neurons are the primary building blocks of the brain. The communication between neurons is fundamental to the function of the nervous system, including how humans move, think and feel. Neurons communicate with each other by sending electrochemical signals. A stimulated neuron generates an electrical potential which travels down the cell. Once the electrical potential arrives at the end of the neuron it causes the release of a chemical signal to stimulate the next neuron. The focus of my research proposal is on understanding how electrical signals in neurons are disrupted in ataxia. This is important since changes in electrical signals precede the death of neurons and ac-counts for early symptoms. Mutations in different ion channels which help produce the electrical signals cause hereditary forms of ataxia. Specifically, my proposal focuses on mutations in a potassium channel (Kv4.3) which causes spinocerebellar ataxia 19 and 22 (SCA 19/22). This potassium channel is important for the generation of the electrical signals as well as the propagation of electrical signals throughout the neuron. Interestingly, although the mutation is present from birth, patients with SCA 19/22 develop symptoms in mid-life. Neurons highly regulate the channels which produce the electrical signals and disruptions in a channel result in a rebalancing of other ion channels to compensate. This compensation is homeostatic because the neurons sense the disrupted channel and the rebalancing results in unchanged electrical properties of the neuron. I hypothesize that early in life, patients with SCA 19/22 are able to homeostatically compensate for the disrupted channel but that this compensation becomes dysregulated with age. As the homeostatic compensation becomes dysregulated, this results in aberrant electrical signals and the clinical symptoms of the disease. I will address this hypothesis using the model organism, Drosophila melanogaster. I will create

animals with SCA 19/22-associated mutations and assess how the electrical signals are altered by the mutations and how this changes with age. I will also examine how the disease-causing mutations alter the homeostatic rebalancing of other ion channels and the mechanisms regulating this process. Lastly, I will perform a forward genetic screen to discover new modifiers of the ion channel rebalancing process. This proposal seeks to understand how mutations in an ion channel cause ataxia. Understanding the relationship between dysfunctional electrical signals and ataxia are importance since the electrical dysfunction occur prior to neuronal death. Treating the aberrant electrical signals may prevent the progression of ataxic disorders.

Geena Skariah, Ph.D
University of Michigan
Ann Arbor, MI

Endogenous tagging of RAN peptides in Fragile X-associated Tremor Ataxia Syndrome

Fragile X associated Tremor Ataxia Syndrome (FXTAS) is an inherited neurodegenerative disorder seen predominantly in older males with an estimated lifetime risk of disease of 1 in 5000 men worldwide. FXTAS patients develop ataxia, action tremor, and dementia and the condition is currently without any effective therapies. FXTAS is caused by the expansion of CGG repeats to an intermediate range within the beginning half of the fragile X gene, FMR1. The expanded CGG repeat gets translated into a toxic protein known as FMRpolyG through an unusual protein translational process known as RAN translation. While we can readily observe the accumulation of this toxic protein into large ubiquitinated neuronal inclusions in the brains of patients, currently available anti-bodies and other approaches do not allow us to track the endogenous protein from the Fragile X locus in patient derived cells. This limitation also precludes accurate quantitation of RAN translation for the purposes of identifying and validating chemical and genetic modifiers that could be advanced into late preclinical studies. This proposal aims to address these issues by using two complementary approaches wherein I will employ CRISPR-Cas9 technology to introduce novel, highly sensitive and quantitative tags at the endogenous FMR1 locus in FXTAS patient cells to monitor CGG RAN translation. Preliminary data suggests that these approaches are viable in human cells. Once we have these tags incorporated into patient neurons, we will use the tool to validate specific chemical and genetic modifiers of RAN translation established in reporter systems. This new tool will provide key proof of principle evidence for effects on endogenous RAN translation while serving as the basis for future novel and targetable drug-development mechanisms with broad applicability to other repeat associated ataxias.

Qiong Song, PhD
University of California San Diego
San Diego, CA

Unveiling molecular machinery of primary cilia in a congenital cerebellar ataxia (Joubert Syndrome)

Primary cilia are antenna-like organelles that protrude from cells to help establish cellular orientation and extracellular signaling. The dysfunction of primary cilia and mutation of cilia-associated genes has been reported as causative factors lead to congenital ataxia, yet their exact role and functional mechanism is unknown. Interesting, many of those genes are located in transition zone of cilia, which is a 9-fold symmetric structure regulate the proteins in and out cilia. It is named ciliary gate. My research is to understand how the ciliary gate function. My research plan is to generate ciliary-related knockouts via CRISPR/Cas9 genome editing tool, and capture mutated cililary transition zones by electron microscopy. The target mutations are 6 single knockouts of the most conserved Joubert Syndrome (a congenital ataxia) causing genes. By comparing the mutated transition zone and the wildtype, I hope that we could generate a model of how the ciliary gate functions and provide insight on how to interfere with the progression of this congenital ataxia.

YOUNG INVESTIGATOR AWARDS

Susana Maria D. A. Garcia, PhD
University of Helsinki
Helsinki, Finland

Uncovering the (dys) regulation of RNA toxicity in SCA neurodegeneration

Spinocerebellar ataxias (SCAs) comprise more than 40 autosomal dominant neurodegenerative diseases that predominantly affect the cerebellum and brainstem. Among these, the SCAs caused by CAG repeat expansions located in coding regions of specific genes are the most common and comprise SCAs 1-3, 6, 7, 17 and dentatorubral-pallidoluysian atrophy (DRPLA). The CAG repeats in SCAs encode for a polyglutamine (polyQ) tract and expansions result in the formation of an abnormally long polyQ chain whose altered conformation leads to protein aggregation and plays a key role in disease pathogenesis. However, these are complex disorders and different toxic mechanisms have been identified as contributing to disease pathogenesis. Although protein aggregation by the mutant protein is a key driver of SCA dysfunction, RNA toxicity has also been identified as a central contributor to SCA neurodegeneration. Expression of RNAs bearing long CAG repeats is known to cause a number of cellular disruptions such as transcriptional changes, yet the mechanism of dysfunction or how these RNAs contribute to SCA toxicity is not well understood. We have used the nematode Caenorhabditis elegans to generate a set of model systems that recapitulate the SCA RNA toxicity phenotypes separately from the polyQ protein phenotypes. We will characterize these animals for their RNA toxicity-associated phenotypes and use them to identify the factors responsible for regulating RNA toxicity in SCA neuronal dysfunction. We will further focus on dissecting the mechanism of regulation of SCA3 neurodegeneration by MBNL1. MBNL1 is a splicing factor previously implicated in SCA3 and that is known to also have functions in neuronal morphology and development. We will investigate how MBNL1 contributes to SCA3.

Minggang Fang, Ph.D
University of Massachusetts Medical School
Worcester, MA

Identification of factors and small molecules to treat Friedreich Ataxia

Friedreich ataxia (FA) is an inherited disease characterized by progressive damage to the nervous system and serious heart problems, which result in a greatly shortened life expectancy. The disease is caused by a peculiar defect in the FXN gene in which a short tract of DNA is repeated hundreds of times, the result of which is to effectively turn down the FXN gene to a very low level. The FXN gene normally encodes a protein called frataxin that is present in a specific organelle inside cells called the mitochondria, the so-called "energy powerhouse" of the cell. In individuals with FA, the turning down of the FXN gene leads to reduced levels of frataxin, and the resulting damage to the mitochondria causes injury to the nervous and cardiac systems. Currently there are no effective treatments for FA. Importantly, even though the defective FXN gene leads to reduced frataxin levels, the frataxin protein that is produced is completely normal. Therefore, one potential strategy for treating FA is to turn up the defective FXN gene to normal levels, and studies suggest that even a modest increase is likely to have therapeutic benefit. This strategy is particularly attractive because it attacks the root cause of the disease by restoring normal levels of frataxin. As an initial step toward developing drugs that can turn up the defective FXN gene, we first identified a number of proteins that are involved in turning down the defective FXN gene (called FXN-Repressing Factors or FXN-RFs). We then identified drugs that could bind to the FXN-RFs and block their function, enabling the defective FXN gene to be turned up. Our current efforts are aimed at testing if FXN-RFs inhibitors, including some drugs in clinical use, can relieve the symptoms of this disease in FA mouse model and evaluate their potential to treat FA.

Parthiv Haldipur, Ph.D
Seattle Children's Hospital
Seattle, WA

Characterization of Purkinje cell development in humans

Spinocerebellar ataxia (SCA) is a group of hereditary incurable ataxias that primarily affect a part of the brain called the cerebellum. The cerebellum is located at the back of the head and responsible for control of movement and motor coordination. Degeneration of neurons within the cerebellum often lead to devastating symptoms including difficulties with balance, motor coordination, speech, vision and learning and memory. Recent studies have shown that a neuronal subtype within the cerebellum called Purkinje cells, is especially vulnerable to ataxias. These cells are among the largest neurons in the human brain and are conspicuous by their characteristic branching of dendrites. They form an integral part of the brain circuitry that controls motor coordination. It is hence not surprising that degeneration of this important cell type results in ataxia. Our understanding of the development of Purkinje cells and ataxias is largely based on studies carried out in animal models, including the mouse. It is assumed that a significant portion of brain development is conserved between the mouse and human. In other words, development patterns are likely similar between the two species. Our recent preliminary analysis of the developing human cerebellum suggests that there are striking differences in developmental patterns between the mouse and human, including in a region called the ventricular zone, where Purkinje cells are born. Additionally, the migratory patterns of Purkinje cells also differ between the mouse and human. We also see the presence of a new stem cell niche not found in the mouse. A common problem with mouse models of disease is that they do not recapitulate the human condition. This is true even of mouse models of ataxia. We believe the reason for this could very well be due to the existence of differences in cerebellar and Purkinje cell developmental patterns between the mouse and human. We are therefore proposing to do a thorough characterization of early human cerebellar development. Our approach will be multimodal and begin with comprehensive histo-pathological analyses. We will study when and where Purkinje cells are born. We will also undertake a study to identify genes critical to the development of Purkinje cells, as well as the timing of expression of genes implicated in ataxias. Lastly, using the latest microscopic techniques, we will study the migration of Purkinje cells in real time. This study is important because it will enable us to identify human-specific features in Purkinje cell developmental programs. Our data will also represent an important resource to benchmark developmental stage-, cell type-, and molecular-specificity of existing ataxia model systems.

Jarmon Gerald Lees, Ph.D
St Vincent's Institute of Medical Research
Fitzroy, Australia

Investigating vascular disease in Friedreich's ataxia with human stem cells

Friedreich's ataxia (FRDA) is the most common inherited ataxia, caused by a GAA repeat mutation in the Frataxin gene resulting in degeneration of neurons and heart disease. Heart failure is the leading cause of death in FRDA, brought on by the enlargement (hypertrophy) and death of cardiomyocytes, as well as stiffening (fibrosis) of the heart tissue. Interestingly, the cardiac pathologies observed in FRDA patients also show involvement of diseased blood vessels in the heart, yet this has never been examined in detail. Clinical reports have documented abnormalities in the blood vessels of the heart in FRDA patients, in which the cells that make up the blood vessels (endothelial cells and smooth muscle cells) proliferate and migrate uncontrollably until they block the small blood vessels, reducing blood flow and nutrient supply, and likely contributing to heart failure. The aim of this study is to examine the mechanisms underlying the vascular disease of the heart in FRDA and potentially identify new therapies for FRDA-induced heart disease. Our laboratory is uniquely positioned to study cardiovascular disease in FRDA as we have two human FRDA induced pluripotent stem cell (iPSC) lines that are generated from FRDA patients by genetically reprogramming the skin or hair cells to an embryonic (or pluripotent) state from which they can be transformed into any type of cell in

the body, including the cells that make up the blood vessels. Importantly, these iPSCs carry the same genetic makeup as the original cell source including the inherited mutations. Furthermore, for both iPSC lines we have isogenic controls where the GAA repeat mutation has been deleted in the Frataxin gene using the state-of-the-art genome editing technique (CRISPR-cas9), resulting in healthy iPSC lines that are otherwise genetically identical. To examine vascular disease in FRDA, we will transform the iPSCs into the endothelial and smooth muscle cells that make up the blood vessels of the heart. We will then use physiologically relevant bioassays which include cell survival, growth, migration, hypertrophy and fibrosis, to examine the clinical phenotypes of FRDA. From this project, we hope to gain insights into a completely novel aspect of the heart disease in FRDA, ultimately establishing new disease models for drug discovery and gene therapies for effective treatment of FRDA.

Isaac Marin-Valencia, MD
The Rockefeller University
New York, NY

Molecular and Developmental Mechanisms of Cerebellar Ataxia in Pyruvate Dehydrogenase Deficiency

Human PDH deficiency (PDHD) represents one of the most common mitochondrial disorders involving the developing cerebellum, presenting clinically from severe structural defects of the cerebellum and other parts of the brain at birth, to intermittent, progressive ataxia starting in childhood. Despite the fact that the first individuals affected with this condition were reported more than 40 years ago, it is still unknown how PDHD might lead to clinical signs referable to the cerebellum specifically. The overall objective of this proposal is to identify the molecular mechanisms that underlie cerebellar ataxia in PDHD and to design novel therapeutic strategies accordingly. Longterm, I aim to contribute to a paradigm shift in the understanding of how this condition disrupts cerebellar formation and function, where the application of the knowledge gained will translate into meaningful patient benefits.

Martine Tetreault, PhD
Centre Hospitalier de l'Université de Montréal
Montreal, Québec, Canada

Defining the genetic etiology of late-onset episodic ataxias

The identification of the genetic causes and mechanisms associated with rare Mendelian diseases has always been an important challenge for the medical field. The identification of mutations and/or genes associated with a disease has forever been driven by technological progress. High-throughput DNA-sequencing technology has led to the identification of a large number of disease-causing variants or genes. Although, this technology succeeded in improving the diagnosis of rare diseases, there is a significant number of patients that remain without a molecular diagnosis. For most patients, a diagnostic test will be inconclusive since many candidate variants with no clear functional impact are identified. Clinical tests are usually targeting a single gene or a panel of genes and thus are not able to identify variants in potential novel-disease genes. Moreover, our current knowledge and tools available limit our capacity to interpret these variants. For these reasons, the diagnostic yield is reported to be 25-30% in several large studies. The integration of functional genomic data, such as RNA-sequencing, is gaining in popularity to improve variants interpretation and increase our knowledge of molecular mechanisms associated with diseases. In addition to the technical limitations, neurological diseases complexity is increased by the high variability in clinical presentation and genes involved. This variability is not only observed between unrelated patients but also within a single family. The study of late-onset diseases is even more challenging since the familial history is often unclear preventing the identification of additional affected cases that could confirm the genetic nature of the disease as well as the mode of transmission. Episodic ataxias are a group of neurodegenerative diseases characterized by recurrent attacks of ataxia in which high variability is observed. To date, eight forms have been described but there are still patients who remain without a known genetic cause. In this project, we propose to combine genomic and transcriptomic

data to identify the genetic cause in a cohort of unresolved late-onset episodic ataxia patients. Using this approach, we will be able to detect a large spectrum of possible aberrations. Our results will have a direct impact on patients by increasing the diagnostic yield of episodic ataxia as well as contributing to our understanding of the biological mechanisms leading to the disease. The identification of genetic causes as well as deregulated pathways will ultimately lead to the development of novel therapeutic strategies.

SPECIAL PROJECT

Brent Fogel, MD, PhD
University of California – Los Angeles
Los Angeles, CA

Centralized Ataxia Genomics Core

As the first-ever treatments for patients suffering from cerebellar ataxia are being developed, it is becoming more and more critical to identify the underlying genetic cause of as many patients as possible to enable rapid access to treatments as they become available in the future.

Although genomic methods of diagnosis are improving rapidly and hundreds of genes which cause ataxia have been identified, as many as 50% of patients persistently remain undiagnosed, suggesting additional as-yet-undiscovered genes, mutations, or other genetic factors that need to be identified. Many of the recently discovered genetic ataxias are extremely rare, sometimes only seen in single families. A barrier to finding these genes is a lack of additional patients or families to confirm the new disease. Although there are many resources being developed to assist patients with other forms of undiagnosed genetic diseases obtaining a diagnosis, none of these are specific to ataxia. Furthermore, a great deal of the data for genomic sequencing of ataxic patients remains within commercial sequencing facilities or individual research laboratories, unavailable to the broader ataxia research community. There is a dire need for a resource for collecting, storing, and sharing this genomic data, both clinical and research, for novel gene and mutation discovery.

To address these challenges and further improve knowledge of ataxia genetics and the diagnosis of patients with rare ataxias, the National Ataxia Foundation has sponsored the creation of a Centralized Ataxia Genomics Core (CAGC) facility, to provide a single-site repository for genomic sequencing data to foster and promote collaborative research investigating ataxic disorders. The mission of the CAGC will comprise two major goals. First and foremost, to create an ataxia-specific data repository to enable researchers around the world to collaborate to confirm and validate rare genetic variants and identify novel genes important in ataxia to improve patient diagnosis and facilitate access to research and clinical trials. Second, the CAGC will provide a resource for innovative projects investigating ataxia genetics and genomics.

Led by Dr. Brent Fogel, an expert in ataxia genetics, the CAGC will be based at the University of California, Los Angeles (UCLA). The CAGC will accept any genomic sequencing data on patients with ataxia, regardless of whether it was collected for research or clinical purposes. All genomic sequencing provided will be re-analyzed on submission by CAGC staff to confirm previous findings and/or to potentially achieve a diagnosis if one was not previously obtained. Importantly, the collective sequencing data housed in the CAGC will be made available to the ataxia community through an online web-portal to query for the presence of variation in specific genes to validate mutations and help identify novel causes of rare ataxias. Scientists around the country, even around the world, will be able to collaborate and study these genes and mutations more effectively than ever before. The NAF is proud to be a part of this exciting new opportunity to advance research into ataxia genetics to benefit ataxia patients worldwide.

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Please email your contact information to *naf@ataxia.org* so you don't miss out on important news.

Researcher Spotlight: **Wei-Ling Tsou, Ph.D.**
Wayne State University School of Medicine

It was a great honor to receive the Young Investigator (YI-SCA) Award for SCA Research in 2016. I have been involved in Spinocerebellar Ataxia research since 2004 when I pursued my PhD degree. My mentor, Dr. Bing-Wen Soong is a neurologist, who specializes in neurodegenerative disorders. Because of Dr. Soong, I learned a lot about Spinocerebellar Ataxias and had a chance to meet many SCA patients and their family. They are such nice people, however, in a twist of fate, they have struggled in life. Sadly, there is no known cure for spinocerebellar ataxias. To be able to overcome these devastating diseases, research is the only way to find the cure, and it is my mission in life. After getting my PhD in Taiwan, I was eager to get better training for the SCA research. I wanted myself to have more contribution on the pathway finding a cure for SCA, so I came to America to pursue my aspiration. Unlike cancer research, there isn't a lot of support for SCA research. Also, because I was not a citizen of the United States, I wasn't allowed to apply for any grant from NIH for my research. When I knew that I received a research grant from National Ataxia Foundation, it meant so much to me. This award encourages me to keep going, work hard for the SCA research. By using the grant from National Ataxia Foundation, I feel every dollar is a hope for the patients. Finding the treatment is a very long process. I truly appreciate the research support from National Ataxia Foundation and the Donors. I will continue work hard and accomplish my mission for SCA research. Hope every day, we are closer to find the cures for patients.

"The continuous and steadfast support that the National Ataxia Foundation provides for scientific research is of paramount importance to ongoing ataxia investigations in the US and elsewhere in the world. With research funds becoming increasingly harder to come by--especially for ataxias--the money that the NAF is able to award to scientists at nearly every stage of their careers not only helps to advance the careers of new investigators, like Dr. Tsou, but also of established ones who are eager to try new ideas and avenues towards cures for these diseases. Dr. Tsou, as a recipient of the Young Investigators in SCAs award, utilized this coveted prize judiciously to generate new models of SCA6 to gain new insight into the cellular and pathogenic properties of the protein that causes it. Her work in SCA6, some of which has been published, will soon be compiled into additional manuscripts and grant applications, with the primary goal being a therapeutic option for this presently incurable ataxia. This YI-SCA award to Dr. Tsou also helped her secure a faculty position at Wayne State University School of Medicine in Detroit, Michigan, where she is also working on SCA3. The YI-SCA award, in short, was of great help to Dr. Tsou, her research, SCA6 and future options for this disease in the clinic." - Dr. Sokol Todi, Dr. Tusou's mentor

FINAL LAY SUMMARY OF PIONEER SCA TRANSLATIONAL AWARD FROM FY 2017

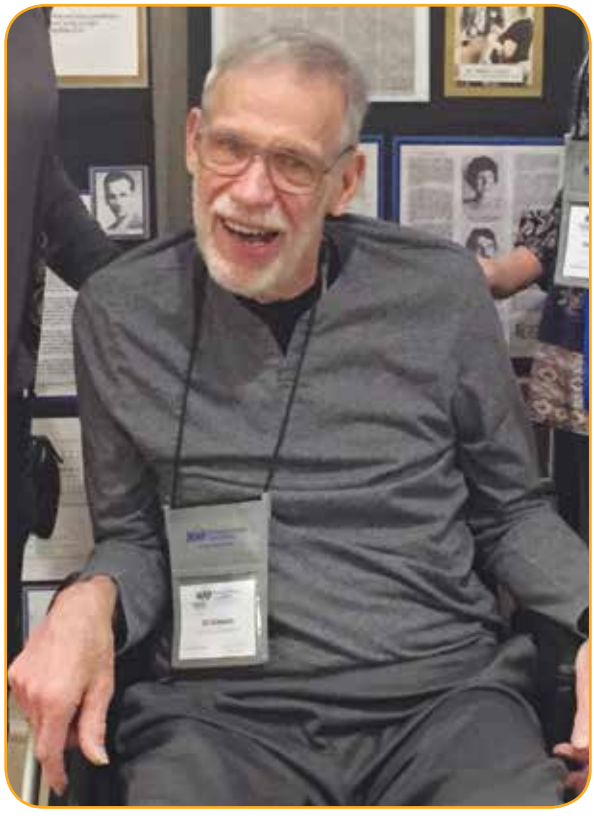
Patrícia Maciel, PhD
Associate Professor
Life and Health Sciences Research Institute
School of Medicine
University of Minho
Portugal

Testing the therapeutic potential of Mesenchymal Stem Cells and their secretome in an animal model of spinocerebellar ataxia type 3

Regenerative therapies using cells are becoming well known by the public and by clinicians, and their potential as a treatment for neurodegenerative diseases is raising much interest. Nevertheless, some issues regarding the use of cell therapies in humans may arise, namely the rejection by the receiver. In order to overcome this problem, scientists begun to use mesenchymal stem cells, which are known to be safe to humans and easy to manipulate within the laboratory environment. Considering the advantages of this type of cells and their therapeutic potential, we asked the following question: does the transplantation of mesenchymal stem cells or administration of their chemical products (known as secretome) have beneficial therapeutic effects in a mouse model of spinocerebellar ataxia type 3 (SCA3)? This disease, also known as Machado-Joseph disease, is a late onset neurodegenerative disease that causes loss of balance and of movement coordination and a variety of other symptoms, affecting the capacity to walk, grasp, eat, speak and see properly. This disorder is inherited and the symptoms in the patients start in late adulthood and progress slowly but inexorably over time. So far, unfortunately, there is no treatment able to delay or cure this disease, causing suffering to both patients and their relatives/caretakers. In the studies that we have conducted in the last year and an half, we tried to evaluate if the administration of mesenchymal stem cells and their secretome could be helpful to improve the motor symptoms in a mouse model of this disease. The mouse model (despite being a model) mimics to a good extent the human disease, showing similar symptoms. We performed several different treatments, by applying the cells and their secretome in different regions of the brain know to be affected in SCA3. We started this treatment a few weeks before the symptoms appeared, in order to get the best effect possible. After, we followed the animals for some months and tested them using different behavioral tests (to measure their motor problems and the effects of the treatments), until the mice reached an age at which all the symptoms were present. We found that the treatment with the mesenchymal stem cells or their secretome in the cerebellum had a beneficial effect, delaying the disease progression and improving the observed motor symptoms. In the future it will be important to test the effect of secretome administration by a systemic route (intravenously), which would be more easily translated to humans, and would allow for a repeated administration of the treatment in order to prolong its positive effects. This work provides relevant proof-of-concept information for future clinical studies of mesenchymal stem cells in patients with SCA3.

In Memory of Ed Schwartz *Linda Schwartz*

As I reflect on Ed's life, there is an awe of all he accomplished in his 75 years. He grew up in a time that poverty could have kept him from accomplishing all that he was meant to do, but he found a way. Ed was an example to his younger brothers and a support system to his mom in tough times, after their dad left them. He showed his family that you could go to college and start a life if hard work led the way. We raised two wonderful children and have two beautiful Granddaughters who absolutely adored him.



He started to notice in the early 2000's that he was falling in the night, then struggling with balance and sleep. He didn't understand what was happening to his body, but he went about trying to put his symptoms together. They continued to compile over the next decade and his ability to do so many of the things he loved started to fade away.

In, 2010 he was finally diagnosed with an illness called Ataxia. What is this illness and why do I have it? How do you get it? Can my kids get? Ed asked all these questions less out of self-pity but more out of learning and attacking. This was a very devasting diagnosis, but Ed finally had the answer to what he was searching for and why his body was slowly failing him.

Ed and I found a support group in our area, The Western PA Ataxia Support Group (WPA Support Group), he decided not to let this illness slow him down, he started working tirelessly to get the awareness out about Ataxia. The WPA Support Group worked hard to plan their first annual Walk n' Roll in 2015. It was a great success. The WPA Support Group continued to grow with Ed's leadership and a Walk n' Roll was planned for each year after that.

The fund raising didn't stop there as the Gottschalk family with the help of The WPA hosted a Golf Fund Raiser in 2018. The awareness for Ataxia was really starting to get out in our region. Ed was interviewed for three videos, on local TV, in Peters Township that can be viewed on YouTube plus an article in Total Health in the Observer-Reporter. Many smaller fund raisers were hosted around the area to continue the messaging: Pampered Chef, Paint & Sip at Paint the Burgh, Max & Erma's and the Trolley Stop Inn.

Ed never let Ataxia stop him and he was not embarrassed about how it affected his body, he started each day with a purpose. He was strong to the very end wanting to do more to help fight this devasting condition. Ed was loved by everyone and he will be missed.

Moving toward therapy for dominantly inherited Ataxia: Why success of the READISCA study is important

Dr. Henry Paulson

Dr. Henry Paulson, University of Michigan

As an "ataxiologist" who has been in the field for several decades, I am thrilled that we are entering a new era for the dominantly inherited ataxias, also known as spinocerebellar ataxias (SCAs): We now know enough about the specific causes of SCA that we can design therapeutic approaches to slow or halt disease. Those of us who study ataxia are not the only ones seeing this exciting trend. Pharmaceutical and Biotech companies view the ataxias as a compelling group of diseases for the development of novel treatments. They too have ideas about how to treat the disease and are eager to move them to the clinic.

There is a challenge, however. For most SCAs, we simply do not know enough about the natural history of disease or about associated biomarkers that might serve as a "readout" of successful therapy. To tackle this challenge, the NIH-funded clinical trial readiness grant known as READISCA launched last year.

READISCA seeks to learn more about the earliest manifestations of two of the most common forms of SCA, SCA1 and SCA3, so that we are ready to test these promising potential therapies as they arrive. Led by Dr. Tetsuo Ashizawa of the Houston Methodist Medical Center, READISCA links 17 sites across the United States as well as leading sites in Europe in an ambitious study. READISCA seeks to establish the world's largest cohorts of people at the earliest disease stages of SCA1 and SCA3, from whom we will learn critically important information about disease onset, disease progression and associated imaging and biofluid markers of disease. Success in READISCA will ensure the field is ready to begin trials of potential disease modifying therapies. While success will pertain to SCA1 and SCA3, the knowledge we learn may well benefit other forms of SCA.

Who is eligible to participate in this longitudinal natural history study? Persons diagnosed with SCA1 or SCA3 in the early stages of disease, persons known to carry the SCA1 or SCA3 gene mutation but not yet showing signs of ataxia, and persons 50% at risk for developing SCA1 or SCA3 because they have an affected family member who tested positive for the gene mutation. In addition, persons with SCA1 or SCA3 who participated in the earlier CRC-SCA study that ran from 2009 to 2012, as well as persons followed in several parallel European studies, are eligible to enroll.

One year into the study, how are we doing? As of February we had enrolled 45 individuals, about 40% SCA1 and 60% SCA3. As a READISCA team member, I speak for all of us in saying that we are so grateful for those who have agreed to participate. We also thank those who have volunteered but may not have met eligibility requirements. It is important to know that persons with SCA1 or SCA3 who are not eligible for READISCA are guaranteed to be eligible for the parallel CRC-SCA natural history study taking place at the same US sites and funded by the National Ataxia Foundation with a matching grant from the Gordon and Marilyn Macklin Foundation. While we are pleased with the enrollment to date, we have a ways to go to meet our ambitious goal of 200 participants. To be "trial ready" we need to redouble our efforts. If you or someone you know would like to learn more about the study, check out the NAF link: https://ataxia.org/news/readisca-is-recruiting-for-sca-research/. More information about the study itself is available at the NIH clinical trials site: https://clinicaltrials.gov/ct2/show/NCT03487367.

One group of participants we are eager to recruit

are persons 50% at risk for SCA 1 or SCA3. I had an opportunity to interview one such person, Nancy Carvara, whose family is affected by SCA3 and is at risk for the disease. Nancy joined the READISCA study in Boston under Dr. Jeremy Schmahmann's expert evaluation. When asked why she chose to participate, Nancy said, "I'm willing to do anything that can help my family situation at this point or at some time in the future. Watching my sister and father struggle daily makes me want to help find treatments for this disease." She reports that participating in the study has been "quite easy" although one does need to set aside some time for the evaluation and optional biomarker studies. She was actually surprised and pleased to learn things about how her brain and body worked through participation in this study. Thank you, Nancy!

Nancy asked that I convey another important piece of advice: If you are at risk for SCA1 or SCA3 and do not wish to know your gene status, you will not learn it through this study. Strict guidelines are in place to ensure that this genetic information will not be divulged to those who wish not to know it. Nothing is more important to READISCA investigators than honoring the wishes of our participants as they work with us to pave the way for therapeutic trials.

Two additional important facts about READISCA: Participating in the study does not preclude participating in interventional clinical trials, and all costs are covered (including air travel, if needed). Finally, an optional, but very important part of the study is brain imaging and lumbar puncture (also known as spinal tap). Through brain imaging and spinal fluid analysis, we hope to confirm valuable disease biomarkers that will facilitate testing of new therapeutic strategies in SCA1 and SCA3.

If you are interested and would like to have further information about participating, please contact:

Lead Investigator: Tetsuo Ashizawa, MD
Research Study Coordinators: Titilayo Olubajo and Chantel Potvin
Houston Methodist Hospital 6560 Fannin St., Suite 1002, Houston, TX 77030
Phone: 346.238.5021 • **Email:** U01SCA1&3@houstonmethodist.org

SPINOCEREBELLAR ATAXIA TYPE 3 (SCA3)

UNIVERSITY OF MICHIGAN RESEARCH OPPORTUNITY

Do you or a family member suffer from SCA3?

The Neurology Department of the Medical School is currently conducting a research study for the purpose of identifying new biomarkers useful for SCA3, and your help is needed!

We are looking for:

- Healthy individuals and individuals with known SCA3 over 18 yrs. of age
- Approximately 1 hour of your time
- Involves a single lumbar puncture and blood draw
- Paid incentive for participation

Some exclusions apply - contact us at
(734) 232-6247

MICHIGAN MEDICINE
UNIVERSITY OF MICHIGAN

WALK N'ROLL TO CURE ATAXIA

National Ataxia Foundation

What is Walk N' Roll?

It is NAF's largest grassroots fundraising event! Walk N' Roll to Cure Ataxia currently takes place in cities across the U.S. Since its inception in 2007, Walk N' Roll has raised over $3,000,000 thanks to support and tireless commitment from walkers, rollers, runners, volunteers, donors, and sponsors.

Why Walk N' Roll?

Thousands of families, friends, coworkers, neighbors, and communities come together each year to support NAF's fight to improve the lives of people affected by Ataxia and their families.

How Can I Participate?

For more information, or to start a Walk N' Roll in your community, please contact Jon Wegman, Development Associate at **763-231-2747** or **jon@ataxia.org**.

For more info and to find Ataxia events visit **ataxia.org/events**

Biohaven: Proud supporter of the National Ataxia Foundation

Biohaven is initiating a new Phase III clinical trial that will assess Biohaven's investigational medication, Troriluzole, for the potential treatment of Spinocerebellar Ataxia. Troriluzole is currently being evaluated in Phase 2-3 studies as a treatment for several neurologic disorders. The new Phase III Ataxia study will examine the effectiveness of troriluzole, as compared to placebo, in improving ataxia symptoms in patients with Spinocerebellar Ataxia over the course of one year. For patients who complete this study, there will be another phase of the trial in which all eligible patients will be offered the opportunity to participate in an additional, one year, open-label phase of the study in which all patients will receive troriluzole.

TWENTY TO TWENTY-FIVE SITES ARE ANTICIPATED TO PARTICIPATE IN THIS STUDY ACROSS THE UNITED STATES.

Participants must meet the following criteria:

- Be between the ages of 18 to 75
- Have a known or suspected diagnosis of SCA1, SCA2, SCA3, SCA6, SCA7, SCA8 or SCA10
- Have the ability to walk 8 meters without human assistance (canes, walkers, and other devices allowed)

For information on additional study criteria and research site locations, you can review the clinicaltrials.gov posting at:
https://bit.ly/2TjBeur

biohaven pharmaceuticals

Natural History Study needs SCA Research Participants

The Clinical Research Consortium for the Study of Cerebellar Ataxia (CRC-SCA) continues to recruit research participants who have a confirmed diagnosis of SCA 1, 2, 3, 6, 7, 8 or 10. This is an opportunity for anyone in the United States with those forms of SCA at any stage of the disease to participate. Contact the research coordinator at a site near you to learn more about how you might be able to help in Ataxia research efforts to discover a treatment.

The National Ataxia Foundation encourages anyone with SCAs 1, 2, 3, 6, 7, 8 and 10 to participate.

Columbia University
Darya Tomishon
dvt2101@cumc.columbia.edu

Emory University
Carole Seeley
carole.seeley@emory.edu

Mass General/Harvard
Jason MacMore
jmacmore@partners.org

Houston Methodist
Titilayo Olubajo
tolubajo@houstonmethodist.org

Johns Hopkins University
Ann Fishman
ann.fishman@jhu.edu

Northwestern University
ZsaZsa Brown
zsazsa.brown@northwestern.edu

University of California Los Angeles
Aaron Fisher
ADFisher@mednet.ucla.edu

University of Florida
Stephen Gullett
Stephen.Gullett@neurology.ufl.edu

University of Chicago
Hannah Casey
hannahcasey@uchicago.edu

University of Michigan
Tasha Kaiser
kaisert@med.umich.edu

University of Minnesota
Diane Hutter
hutte019@umn.edu

University of South Florida
Daniel Ekberg
danielekberg@health.usf.edu

University of California San Francisco
Nancy Cai
nancy.cai@ucsf.edu

This research is generously supported by the Gordon and Marilyn Macklin Foundation and the National Ataxia Foundation.

Thank you to Dr. Henry Paulson, University of Michigan, who has provided hours of counsel and leadership to make this a successful research endeavor. And, thank you to each of the sites clinical researchers and research coordinators who perform the research necessary to move the field closer to treatments and a cure.

For more information on the study, you may contact Sue Hagen at susan@ataxia.org or 763-231-2742

Disappointed that you don't qualify for this research study?

There is an important step you can take so that in future studies for which you might qualify, you will be notified. And that step is to enroll in the CoRDS Ataxia Patient Registry.

If you are affected with any type of SCA or any other form of ataxia, enroll in the registry by going to the website: https://cordsconnect.sanfordresearch.org/BayaPES/sf/screeningForm?id=SFSFL. If you have questions about enrollment in the registry, contact the CoRDS staff at 877-658-9192.

There's No Peace in Quiet

Dana Creighton

I could have found enough in my mother's suicide alone to write a book, but that is not what prompted me to need to write this now. My mom and I were both affected by an inherited cerebellar degeneration generally referred to under the umbrella term "Ataxia"- loss of control over body movements. But our life experiences surrounding Ataxia could not have been more disparate. Despite this, I would discover while writing this book how connected we are. This is my story which happens to delve into the effects of Ataxia, but it is ultimately a story about hope, faith and the power of human connection.

My own experience, and my observations of my mother and two brothers, taught me that Ataxia steadily steals more and more of the control you once had over most every aspect of life. The cerebellum is the part of the brain that controls important body functions. Ataxia causes gradual degeneration of this control center. Fine motor skills, coordination and balance will get progressively worse, until eventually swallowing and breathing will become impossible. I knew there was something unusual surrounding the lives and deaths of those on my mom's side. Something scary and secret.

"By sharing my story, I want to encourage others to seek their own truth"

However, I learned in researching for this book that each one of my mom's four siblings shared this affliction too, all inheriting it from their father. I also learned so much more about the disease itself. Here is just the basic information of her immediate family: the average age of onset for my mom's siblings was twenty-five. The average age of death for all four of my mom's siblings was forty-two. My mom's disease was just rearing its ugly head around age forty.

She and my dad already had four children by the time she was diagnosed. Which to her meant we were all now at risk, just as she had been. I spent my childhood and adolescence witnessing what my mom's disease and confirmed diagnosis did to her emotionally. For the first five years or so I was simply watching my mom go about her life in the best way she could. She had symptoms, but I didn't notice. I also didn't know at that time how her diagnosis devastated and challenged her will to live her life as she had so far.

By the time I was a teenager, that shifted to thoughts of how I would deal with the diagnosis if I needed to. So, I spent my years between thirteen and thirty-four not focused on if I would be diagnosed someday, but if I was, how would I react and live the rest of my life? One time in these years stands out. I remember walking across a parking lot of Carr Mill Mall in Carrboro on my way to work. By now my older brothers Todd and Scott were both symptomatic with Ataxia. So, I'm walking across the parking lot, and I tell myself "I'll show them how to get this disease!" This was in 2005, over one year before I was even tested. Somewhere inside I knew something was amiss.

Telling my own story began in 2017 as an extension of an expressive writing research project at Duke Integrative Medicine where I was a volunteer participant the year before. Writing about my inner most feelings about my trauma was a way for me to heal, mostly from what I had gone through emotionally but also spiritually. In that kind of writing, I had no intention of my audience being anyone other than myself. The class felt safe, I could place my writing journal in a box until the next class or take it with me. I was writing for my own healing and not with the intent to explain things that needed to be understood by someone else.

Almost a year after completing the project, I came

to understand that my entire life experience had aligned itself, such that there was no other way than for me to tell my story. I reached a point in my life that I needed to share a seemingly tragic set of circumstances that have been reframed. Maya Angelou said and now I completely understand why, "There is no greater sorrow than bearing an untold story inside you." My story reframed, has given me a sense of calm and clarity about my past. A clarity that I never imagined existed as well as a renewed hope for the future. And by sharing my story, I want to encourage others to seek their own truth by recognizing what their own experiences can reveal about what is present but may not be apparent.

I also realized how important it may be for others in similar circumstances to know what we share. I needed to tell this story for others who have undergone trauma but were not capable of expressing their pain or of making sense of the remnants that remained. I had successfully lived over four decades without being able to articulate exactly what my life had been like living in a family affected by cerebellar degeneration or Ataxia. Not to myself and surely not to anyone else.

To acknowledge the pain I was feeling, and to attempt to understand where it was coming from was an unsurmountable task to me. I was so afraid of giving into powerful emotions that threatened to sink my ship that I had painstakingly and slowly built over the past thirty years. I tried desperately to portray myself to others as if nothing was wrong. I was focused on not letting my circumstances affect me, and practice makes perfect, right? I was hiding a secret, playing a role I wished for. But most importantly, I was trying to keep the mystery from others in the same way my mother had done.

Throughout my entire life, my mom's story was a mystery to me. And for the life of me I couldn't even make one up that might help me make sense of hers. I was not fully aware of what my mom had endured within her own family until recently, in late 2016. It became a personal mission to find out how it happened that my mom, who had proven to be resilient for the first half of her life, succumbed to giving up completely and made the choice to end her suffering once and for all. Giving up to the waves of constant beating that a type of inherited cerebellar degeneration (Ataxia) was repeatedly inflicting on her entire family, which inevitably was not done yet.

Something inside told me that until I knew my mom's story, I could never make sense of my own. September 20, 1993 was the last day of her life, but my quest to discover her story had already begun. My mom's story is as much a part of my own as mine is to hers. Many stories have been told demonstrating the effect illness has on families. My story is about an inherited neurological disease hovering over our family like a storm for over one hundred years.

Spinocerebellar Ataxia (SCA), like a tornado destroys, injures, and maims everyone in its path. Even if they themselves are not afflicted, they will most certainly help care for those who are. Mothers, fathers, daughters and sons are not immune, and illness is woven into the fabric of each person's being. Illness cannot change who you are, but if you allow it, it can take from you everything you thought you had - including your health and happiness.

Never stop dancing!

Dana has worked in health research for fifteen years as a project coordinator. She now enjoys writing and being a mom.

Watch our videos on the NAF Facebook page!
www.facebook.com/Ataxiafoundation.

Living Life to the Max

Sherry McLaughlin

We all hear about the stand out members of NAF, who have been the subjects of movies or other newsworthy accomplishments. Most of us don't fall into that category. Instead, I want to focus on Ataxians who can inspire us with their special "zest for life". We all know them. They amaze and inspire us every day.

Please meet Sterling Yarborough. Sterling is 18 years old and lives in Lakewood, Washington. Sterling had signs of onset somewhere around 4 years old, when he couldn't throw a ball straight. Shortly after, his handwriting was considered very poor. It wasn't until he was 16 years old when hand tremors precipitated medical testing that revealed SCA 2.

"Live life one day at a time."

Sterling, now 18 years old and has begun studies with an engineering major at Pacific Lutheran University in Washington State. He is adjusting to the heavier work load and finding less time to hang out with his friends, which is his favorite past time. Just prior to commencing his studies, Sterling celebrated his 18th birthday by skydiving. Yes, I mean jumping out of an airplane.

I asked Sterling where he thinks his positive attitude comes from and he replied that it definitely comes from his parents. Sterling says his attitude is very optimistic most every day unless something sad happens in the family.

I also asked if Sterling thought CoRDS registry was important and he had this to say, "Joining CoRDS allows a person with Ataxia to participate in various surveys and studies that try to find a cure for Ataxia". He added this great message of wisdom, "Don't live your life worrying about the future. Instead, live life one day at a time. Take advantage of the support you receive from everyone around you."

Sherry was the support group leader in Los Angeles, then moved to Washington State where she established the Western Washington Support group. Freidreich's Ataxia runs in her family.

Memorials and In Your Honor

The National Ataxia Foundation is grateful to those who have made contributions in memory of or in honor of their friends and families whose names are listed below.
This list reflects contributions made in January 2019 – March 2019.

Theresa Covington
Anne Teicher
Marlene Frayer
Wilma Peebles
Krista Humes
Carrie Corney
Kenneth R. White
Keith Stout
Mark Knutson
Charlene Hughes
Brenda Vines
Sharon Baggett
Kye Hayes
Velia G. Leoni
Marilyn Tasch
Joe Perrone
Chicago Ataxia Support Group
Donna Willard
Ed Schwartz
Russell Crystal
Cynthia Fondulis
Bernard Overmiller
Gary Hayden
Carmelita Kwaiser
Denise W. Ellis
Ann Viernes
Lisa Langmuik
Edward E. Noel
Bob Tucci

My Life Living with Ataxia

Mark Jarvis

It's hard for me
to stand up
and reach for
something
It's hard for
me to bend
over to pick up
something
Something that is so
easy to do
Is now something that is very hard to do
When I walk in the mall
People are staring and laughing
Look at that drunk
It is only 10:30 in the morning
When I go to the casinos
I know the cameras are watching
Waiting for me to stumble
So security can say "we can't let you in, you have been drinking"
How can the simplest things in life
Be so hard for me to do
When this happens in front of family and friends
I get so ashamed, makes me feel that I have to go
I am half Japanese, but I slur my words
Some words are also difficult to say
So I know people are thinking
This guy is really drunk everyday
Only if I would use a cane or walker
People would know that I am not drunk
But my pride is too damn high
So bruises and broken bones keeps me in a funk
I hate this life with a passion
What a life I have been given
I have terrible balance bouncing off walls
This is not the way I planned on livin'
But, with close family and friends near by
I adjust my life in a different way
Doing things differently yet staying safe
This I do each and every day.

Mark Jarvis, is an active member of the St Louis Ataxia Support Group, retired Air Force of 24 years, married with 3 children and 2 grandchildren and living with SCA6.

BRAIN TISSUE DONATION PROGRAM

Ataxia researchers have made many discoveries because of donations of brain tissue from those affected with Ataxia. One researcher said the following about brain donation, "This tissue is very precious." The National Ataxia Foundation's Brain Donation Program was established to allow those who desire to donate their brain upon death so that researchers can find more answers.

If you are interested in learning more about brain donation, you may contact Mary Ann Peterson, NAF Research Assistant, at ***mary_peterson@ataxia.org*** or **763-231-2750**.

Tissue donations for research in Friedreich Ataxia

If you have been diagnosed with Friedreich Ataxia and wish to contribute to its eradication by helping research, please consider donating your tissues after death. To do so, contact Dr. Arnulf H. Koeppen for detailed information. Tissues affected by Friedreich Ataxia are brain, eyes, spinal cord, dorsal root ganglia, sensory peripheral nerves, heart, and the insulin-producing beta-cells of the pancreas.

Arnulf H. Koeppen, MD
Professor of Neurology and Pathology Research Service (151)
VA Medical Center | 113 Holland Ave, Albany, NY 12208
Tel. 518-626-6377 • FAX 518-626-5628
E-mail: arnulf.koeppen@va.gov or koeppea@amc.edu

Ataxia Tips

for Ataxians... from Ataxians

For many with Ataxia, everyday tasks can become increasingly difficult. One person's shared tip might just be the help someone else needs. See what advice Ataxians are giving to make everyday tasks easier...

1. Constant endeavor otherwise muscles become weak, daily physiotherapy for 40 min plus walking, keep away from stress. (Submitted by Alka Gupta)

2. Doing chair yoga helps keep your muscles moving. (Submitted by Molly St. James)

3. Ataxia Awareness 365 days a year! I wear 4-6 of the Ataxia gel bracelets. When someone asks about them, I just give them one, has the web site on them. Also wear any of the Ataxia T-shirts (even all the past convention T's) to the gym, store, any place--people will ask. (Submitted by Mary Fuchs)

4. Always be careful in performing any motor activity. (Submitted by Jened Ahmad)

5. Sitting up straight when eating is a must! Especially when you are drinking water. It has helped my daughter prevent chocking! (Submitted by Maggie Padula)

6. Install handles in all your doorways leading in/out of your house. These handles have been extremely helpful to me in stepping up/down a step or just crossing a threshold. (Submitted by Cheri Bearman)

Ataxia Tips must be submitted by 05/06/19 to be eligible for inclusion in the next issue of *Generations*. Submit them via email to naf@ataxia.org.

ATAXIA ADVOCACY IN ACTION

The National Ataxia Foundation is taking a more active role in advocacy activities and you can too. NAF is planning to engage with our nation's legislative leaders to raise more awareness for ataxia and increase our partnerships in the fight to end Ataxia. If you have a personal relationship or regular communication with a national or state legislator, then we want to hear from you.

Please contact Lori Shogren, Community Program and Services Director at *lori@ataxia.org* or **763-231-2741**.

JOHNS HOPKINS
MEDICINE

Ataxia RESEARCH STUDY

Patients diagnosed with cerebellar Ataxia, age 18-75, are needed for a study of short-term memory.

Participation involves 1 visit lasting 1-4 hours. Tests include computerized games and eye tracking.

Receive $20/hour for your time.
Call (410) 502-4664 to learn more and see if you quality. Confidential.

GeneDx Validation for Repeat Expansion Disorders Assay

GeneDx, Inc., a CAP/CLIA-accredited genetic testing laboratory, frequently develops new testing for genes and disorders for which there are limited testing options available. Part of the assay development process relies on the evaluation of DNA samples from individuals with a known genetic disorder and/or specific type of genetic change to validate the effectiveness of the assay. GeneDx is currently developing assays for a subset of repeat expansion disorders and is looking for samples from patients with a known diagnosis and positive genetic test results for any one of the following genes/disorders:

Disorder	**Gene**
SCA10	*ATXN10*
SCA12	*PPP2R2B*
SCA17	*TBP*
SCA31	*BEAN*
SCA36	*NOP56*
SCA37	*DAB1*

If you choose to participate in these studies you will be financially compensated $100 for a blood sample and $25 for a buccal (cheek swab) sample. Blood samples are preferred and a home blood draw can be arranged at a time that is convenient for you. We request that you provide a copy of the original lab report confirming your diagnosis, but we can work with your physician to acquire these documents. All required paperwork for participation in the study and compensation for your time will be discussed at enrollment.

GeneDx
an OPKO Health Company

Support Group and Community Events News

Alabama Ataxia Support Group

Submitted by: Becky Donnelly

The Alabama Ataxia Support Group met on January 26th at our host church, Covenant Presbyterian, in Homewood, AL, with 29 members in attendance, including three new couples. After our "meet and greet" time, the meeting opened with the leader giving this quote: "Sometimes you have to let go of the picture of what you thought life would be like and learn to find joy in the story you are living."

The group thanked Chandler and Susan for making our Christmas social so spectacular. A report was given on the craft sale held at the social which netted $550.00 for NAF research on the ataxias. December 2019's social will again be held at B&A Warehouse in Birmingham. Chandler will repeat this activity and stated she will spend more time of men's products this year.

New Cell Group leaders were announced and planning for the year commenced covering two more meetings with speakers and an Ataxia Awareness event at the Galleria in Hoover, AL. Elaine Brooks and Stephanie Culbreth will plan our summer social.

The group enjoyed a great lunch from Mama Goldberg's, coordinated by Sandee. This was followed by Break-Out Sessions; those with ataxia were led by Juanita and the caregiver's group was led by Becky. This is always a popular part of our meetings because it allows everyone to express themselves and share helpful methods of dealing with ataxia.

In a joyful moment, Elaine surprised those with ataxia by presenting them with large teddy bears representing 2018 hugs. She also gave gifts to our new caregivers and our three recent widowers, as well as other members.

It was a cold day outside, but inside it was warm with friendship, hugs, and well wishes, and overall, a very good day!

Arizona Ataxia Support Group

Submitted by: Mary Fuchs

The Arizona Support Group meeting on Saturday February 16th at Ability360. We brought snacks to share. Rita opened the meeting and welcomed all. Mary had a short meeting. We talked about ideas for future speakers. Talked about the upcoming conference in Vegas.

Mary introduced Elizabeth from ASU Speech and Hearing. They are conducting a study and looking for people with neurological issues. If you weren't at the meeting contact Mary for more info.

Our guest speaker was Steve Norton, a dedicated advocate in the disability community and Living Well Coordinator at Ability360. He explained the details about his Living Well with a Disability class. It is a free 10-week course, he facilitates discussions on challenges and ideas for living with a disability. The next class Starts April 12th contact Mary for more info.

Elizabeth from ASU Speech and Hearing, Steve with Ability360

Northern California Ataxia Support Group Meeting

Submitted by: Shirley Hanks

Nancy Cai, Clinical Research Coordinator at UCSF and Dr. Armen Moughamian, Researcher at UCSF attended our meeting to inform us about the clinical trial for SCA1 and SCA3 starting on January 31, 2019. They had

handouts that explained what the criteria for the clinical trial is and the time frame. They informed us about other clinical trials that may be taking place in the future. Dr. Armen Moughamian will be giving a presentation at our October 12, 2019 meeting

Jeremy Crowell of Midwest Orthotic & Technology Center from Indiana gave a very informative presentation on the Surestep brace which helps provide balance and stability in walking. With the carbon fiber insert on the posterior strut, the balance brace helps bring the foot up as the leg swings across and helps to assist with deceleration of the foot after the heel strikes. (1) It helps with a more normal gait. (2) It provides more flexibility so the you can feel the ground. (3) It transfers pressure throughout the leg. (4) It is customs designed for your foot. (5) It helps with ankle support and circumference pressure around the foot and ankle. (6) It is easy to wear with a tennis shoe and other shoes, is lightweight and easy to put on. (5) It is covered by insurance and an Orthotist should know what code to use for it to be covered by insurance.

Orange County Ataxia Holiday Luncheon

Submitted by: Cindy DeMint

Orange County Support group had a wonderful holiday lunch in December at the Marie Callender's in Fountain Valley. We had a gift exchange and lots of laughs topped off with a delicious piece of pie.

Los Angeles Abilities Expo 2019

Submitted by: Cindy DeMint

LA Abilities Expo 2019. We happened to have extra T-shirts and sweatshirts from past years and gave them away to people interested in learning about Ataxia. It was a big hit along with the other FREE giveaways. NAF chapstick and pens. Met several new families struggling with the Ataxia and was able to give them some resources for local support groups and info on CoRDS registry. It was a great weekend.

Northern Colorado Ataxia Support Group

Submitted by: Gregg Seebohm

The Northern Colorado Ataxia Support Group held our inaugural support group on February 09, 2019. We had 12 people attend, double what we were hoping for at our first meeting. 3 came down from Laramie, WY; 2 from Longmont, CO; 4 from Loveland, CO and 3 from here in Fort Collins. Seven other folks contacted us with regrets, excitement and a commitment to attend in May. It was a great time had by all and we really bonded quickly as a group. The group decided that at our next meeting in May, they would like to have a potluck and then split up into a Survivor Group and a Caregiver and Friends Group for some sharing of experience, strength and hope. We all agreed, this group couldn't have been possible without the awesome help of Charlotte DePew from the Denver Support Group. She was voted as an Honorary FOCO/WYO founding member.

Central Florida Ataxia Support Group

Submitted by: Dennis Hill

The Central Florida Ataxia Support group met for their second meeting at the Deland Library on February 9,2019. We hope you can join us for our next meeting.

Treasure Coast Ataxia Support Group Meeting

Submitted by: Lisa Cole

The Treasure Coast Ataxia Support Group Meeting was on Saturday, December 8th which was our Christmas meeting. We had 10 people and one of them was a 2-month-old. We had the pleasure of having Debbie Hill talk about the benefits of essential oils plus we had Dr. Subramony Facetime. This meeting was also a gift exchange. If you brought a wrapped gift, you took one when you left. By having the meeting at a member's house, the atmosphere was so pleasant, we shared our concerns and experiences. This was a great end of year meeting!

Treasure Coast Ataxia Support Group Meeting

Submitted by: Lisa Cole and Jackie Hernandez

The Florida Treasure Coast Ataxia Support Group met on Saturday, February 2 from 11am-2:30pm. We held our meeting in Palm Beach Gardens, FL at the Florida Movement Therapy Center. Our special guest speaker was Ed Gray from Florida Movement Therapy Center. Ed spoke about some of the wonderful things their facilities do for movement and speech disorders. Ed is very knowledgeable and had a lot of wonderful information for all of us. We had great conversation and shared our personal stories with new members of our group.

The Tampa Bay 2nd Annual Walk n' Roll

Submitted by: Jan Colon and Darlene Harries

We had our 2nd Annual Walk n' Roll on Saturday February 9th, 2019. We are so excited because we exceed our goal of $1,000. We raised $1,085.31. Kudos go out to everyone that helped to make this Walk a huge success. We had over a hundred people that came out to help us celebrate our 2nd annual Walk 'n Roll Walk! And we had sponsorship from; Publix, Vitamin Shoppe, Jason Deli, Hooters, Starbucks, Einstein Bros bagels, SISTUHS, Delta Sigma Theta sorority, Inc, JT the dancing DJ & Jan Ataxia Rocks, JT Public Shirts, D.T. Publisher's Printing Company and My Miami Crew (Kathy, Carolyn & Byrd). And a special shout out goes to my SISTUHS who showed up and showed out!

It was a nice sunny day, perfect for The Walk n' Roll. We had a DJ and after the Walk people started dancing. The children were so happy painting Ataxia Rocks to Raise Ataxia Awareness. There was a Silent Auction and Raffles.

Thank you to Dr. Zesiewicz, Alvin Lacdao, Sharon Farley, Gaynor Howard, Rev Dee Graham, Karin Otero, Jon Wegman NAF, Dr. Stephenson and her students and for the volunteers that without their help we couldn't have done this Walk. We are looking forward to our 3rd Walk n' Roll next year.

Atlanta Ataxia Support Group

Submitted by: Greg Rooks

The Greater Atlanta Ataxia Support Group held its first meeting of 2019 on February 9th at the Emory Brain Health Center at 1pm. The meeting was attended by 22 individuals.

The meeting started with introductions and welcomes. Then our guest speaker, Pat Sabatelle, from Friends of Disabled Adults and Children (FODAC) gave her informative presentation. She presented an overview of the services provided by FODAC. Basically FODAC takes donated medical equipment, refurbishes that equipment, and redistributes to individuals for free. All types of medical equipment and assistive devices are available. FODAC also has a program for repairing medical equipment. Then we discussed the upcoming Annual Ataxia Conference and current ongoing studies and clinical trials.

After the meeting everyone enjoyed refreshments and socializing until they were ready to head home.

Central Indiana Ataxia Support Group Meeting

Submitted by: Amy Draves

First of all, a huge welcome to Ellen and her beautiful two-year-old daughter Kinsley. Ellen has Fredricks Ataxia and is just learning all about it. Her husband is deployed until June, so she is handling everything by herself. We are so happy that you have joined our group Ellen and will try to be as helpful as we can to you.

We started our meeting off with Caras wonderful presentation which I am going to attach to this email. She was so good when we interrupted her with many questions.

A lot of discussion was about swallowing issues that most of us seem to struggle with at times. On the presentation there are two short videos that show the many parts of swallowing that a body goes through each and overtime we swallow. There are 31 pairs of muscles involved in swallowing taking about 800 milliseconds to swallow. When swallowing (eating and drinking) we should be at a 90-degree angle taking small bites alternating drinking and eating. Distractions can also cause choking issues - so she said avoid talking, tv etc while eating all of which are hard. Eating the same food allows you to get used to texture...ie eating each type of food on your plate completely before going onto the next food type.

We talked about things like the chin tuck when swallowing We discussed the use of straws when drinking. Some say that you have less control over swallowing with the use of a straw while other have been told to use them. it must be something you personally talk with your doctor about.

Oral Hygiene was also talked about since we can even choke on our spit. When good hygiene is not present - you swallow a lot of bacteria and can be a contributing factor of pneumonia. When good oral hygiene is present - it lessens the chance of bacteria getting into our lungs. Also, when flossing we remove any chance of food partials being swallowed in the wrong way.

Discussion about living in our new norms and how we cannot do many things that we used to do. (like how our hands may not handle the floss

like before.) Our new normal and how we adapt in doing things.

Speech was our next discussion When speaking multiple brain areas are involved in producing speech which include lip, tongue, jaw, and voice box. If anything is out of sync our speech is problematic.

Slowing down is imperative when speaking with the use of good articulation. Be sure to breathe before and during speaking. Reduce the noise (distractions) Looking at the person with whom you are speaking, have good posture and use short phrases. If you know you're going to be having a long conversation be sure to adequately rest beforehand. Fatigue can and does affect our speech. Many of us concurred that when we are tired the slurring of our speech is much more prominent.

There are wonderful apps that one can download to your device to help with speech as the ability to communicate may diminish for us. The proper name for this is "Alternative Augment Communication" One such app is Small Talk which is free. There are many others that run in the hundreds of dollars - but still are less expensive than other devices that are available.

If you personally are experiencing swallowing or speech issues, you need to discuss these issues with you doctor. You may be an ideal candidate for help from a speech and language pathologist. They are the ones that deal with swallowing issues too. Be sure to inform you doctor if you choke with any regularity as this can be dangerous to your health.

NEWS:
We are going to move our meetings from bi-monthly to quarterly. With this move - the hope is that more of us will make it a priority. The idea is also that those of us who live within the same areas can possibly connect at other times. We will continue to meet on the 2nd Saturday of the month but there is a time change - from 10-1 with everyone bringing their own lunch and drink.

Much discussion about location of the meeting. The decision has been made to hold two of the meetings either in Marion or the southern part of Fort Wayne which will hopefully help others who have previously had a difficult time with attending.

Cara Woodruff (back row, 2nd from left), Speech and Language Pathologist, was our featured guest speaker

Fort Wayne Walk n'Roll

Submitted by: Amy Draves

The Fort Wayne Walk n'Roll was held on October 6, 2018 and over $7,000 was raise for the National Ataxia Foundation

New Jersey Ataxia Support Group Meeting

Submitted by: Priya Mansukhani

Our New Jersey Support Group has been holding quarterly meetings for almost five years now! Members of the support group include those diagnosed with the disease, as well as family members and friends. We usually keep the meetings open and flexible in order to discuss topics that seem most relevant to the members at that time. For our first meeting of 2019, we had some new members which was exciting, so we spent some time introducing ourselves by explaining our association to Ataxia and a fun fact, to make reiterate the concept that the disease does not define the individual. During the remainder of the meeting, we primarily talked about various new treatments that members had found beneficial

or not helpful, including diets, herbal remedies and medications. In previous years, we have held "Bowling for Ataxia" fundraisers that have raised about 2,000 dollars for NAF, so we are aiming to get one set up for this summer. We think it will be a great change of environment and a way for friends and family of the members to get to know each other, have fun and spread awareness! If you are in the New Jersey area, we hope that you will join us for our next meeting this summer.

St. Louis Ataxia Support Group Meeting

Submitted by: Shannon Dunphy Lazo

We are small but mighty

Portland Ataxia Support Group Meeting

Submitted by: Tyler Kalina

This past December we had our Holiday Pizza Meeting. We did a Yankee Swap, and ate pizza. A good time was had by all. The main take away, is we need to have more social events.

Wilson County Mid - TN Ataxia Support Group Meeting

Submitted by: Lori Davis

The second meeting was held Thursday, December 6, 2018, at 6:00 p.m. at the Tennova (UMC) Medical Center. Ondie Mitchell (elementary school principal whose husband has ataxia and sponsored the NAF Walk n' Roll event in September 2018.) Ondie gave a presentation of vacationing with ataxia. She explained how to plan a trip ahead of time and make use of hotel/cruise staff for planning special needs and make use of ADA assistance for equipment such as wheelchairs that roll in the sand, etc., She also emphasized that when going out to be aware of areas where businesses need to improve and reconsider their building and property to make it more conducive for accessibility needs, and to write a letter to the management listing your findings. After a questions and answer time relating to Ondie's presentation a general discussion was held where some people shared information and helpful hints with the entire group pertaining to questions and ideas others were interested in hearing.

Greater Houston Ataxia Support Group Meeting

Submitted by: Dave Cantrell

WOW; another great Houston Area Ataxia support group meeting on Saturday the 17th of December at Woodlands Methodist Hospital. We had 19 people show up to share the experiences and provide insight and support to the group. We had 8 new friends show up and they all contributed to the meeting. We were made aware of the many different types of Ataxia and the many different symptoms of the many types of Ataxia. Eddie told us all about a new type of wheel chair that uses "arm power" to propel it across all types of terrain. One of the members with Friedreich's Ataxia is attending college to get his business degree and another just moved here from out of state to be close to family and is living on his own and related those challenges to all of us. We all learned of the new Apple 4 watch that has a fall alert which will contact 911 if a fall is detected. Andrea told us about her workout accomplishments where she has gone from .5 of a mile in 30 minutes to 1.5 miles in 30 minutes, what a wonderful accomplishment. Bonnie shared her experiences at the national conferences and encouraged all to attend if possible. A member from College Station told us about his experiences in Minnesota as part of one of the studies he has joined, what a great service he is providing to our community by participating in the study and we encourage everyone to register with CoRDS and get involved.

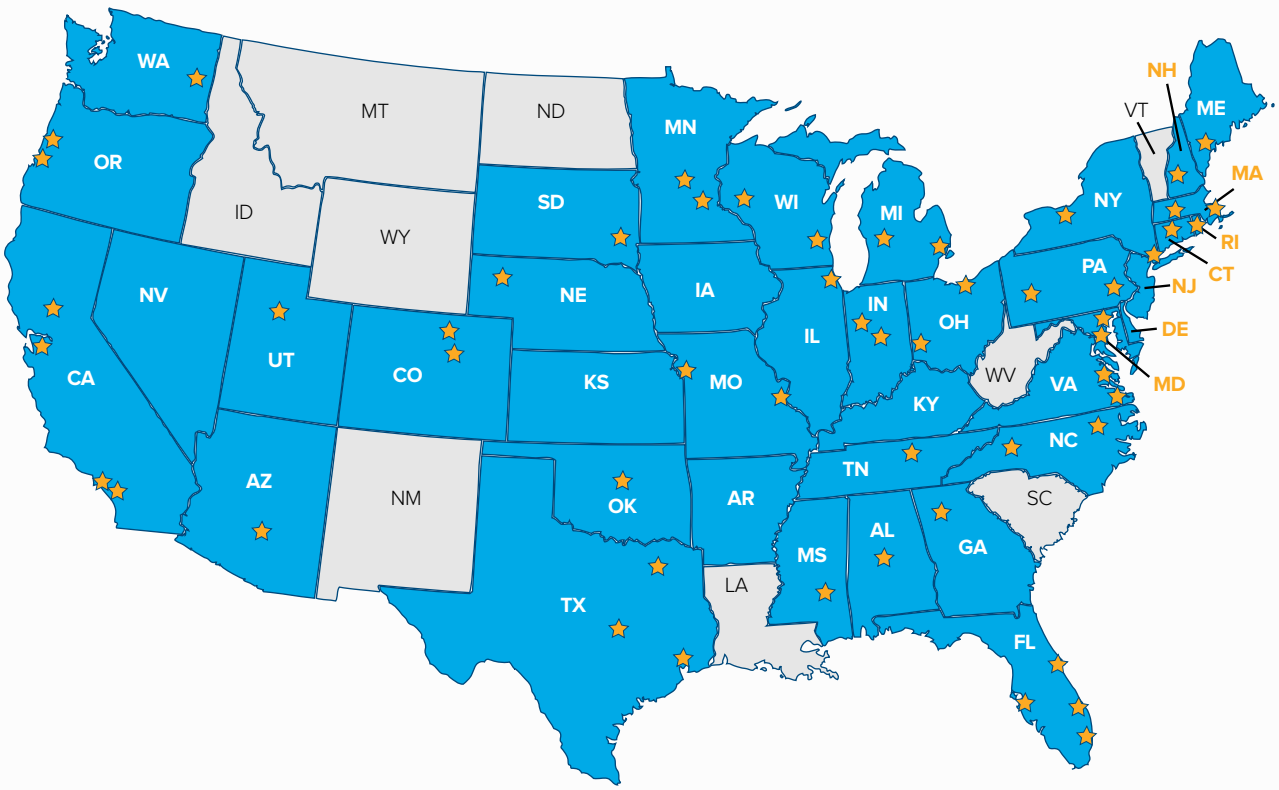
Greater Houston Ataxia Support Group Meeting

Submitted by: Dave Cantrell

What a great way to start off the New Year for the Greater Houston Area Ataxia Support Group. We had 18 people show up and Wendy Jones, our featured speaker from Guardian Health, delivered in a huge way. Wendy is an Occupational Therapist and was able to enlighten us on the differences between Occupational and Physical therapy. Occupational relates to your actual living environment and they work with you in adapting your environment to assisting you and then training you how to live in that setting as independently as possible. In regard to Ataxians because of the degenerative nature of the disease it is an ongoing and life-long process. Wendy explained how to approach our physicians regarding our disease with facts that describe the difficulties encountered on a daily basis so that a "prescription" for treatment can be obtained. Lots of questions were posed, answered and everyone left with a better understanding of the difference between PT and OT. The meeting ran a little long and we greatly appreciate Methodist Sugar Land Hospital for hosting our meeting. Thanks to those that travelled to the meeting from Austin which is 150 miles away, College Station, 90 miles away, Pasadena many traffic miles away and all points in-between. We again had a new couple attend and we hope we were able to provide some support and answers. Board member Dave Brunnert was there and as always reminded us of the good work being done by NAF he along with Bonnie Sills and Doug Brunnert will be representing us at the Annual

Support Groups & Events

The most current support group and event information is available on the NAF website, www.ataxia.org.



Conference. We have a couple of members that ride-share and we thank them for taking that extra step to make the meetings, a true definition of SUPPORT.

Sioux Empire Support Group Meeting

Submitted by: Mary Beth Farley

The Sioux Empire Support group met in December 8 for their holiday meeting.

Why Attend an Ataxia Support/Social Group?

Support groups can remind us that we are not alone and that while each individual may experience Ataxia in a different way, together we have many things in common. A benefit of attending a support group is simply to have a chance to talk with others and learn how different people deal with the same disease.

The National Ataxia Foundation has a large network of volunteers who serve as support group leaders, chapter presidents, and ambassadors for our organization. These volunteers help identify important local resources and professional care for people with Ataxia and their families.

If you or a loved one has been newly diagnosed with Ataxia, please contact the NAF leader nearest you. If there is not a group in your area, we encourage you to visit our online social networks. You may also consider starting a support group in your area or becoming an NAF ambassador. If you are interested in these volunteer positions please contact Lori Shogren of the NAF staff at lori@ataxia.org or (763) 231-2743.

Attending a support group meeting can leave you with a sense of hope and inspiration.

Come. Learn. Share. But most of all, know that you are NOT alone.

Friday, May 3- Sunday, May 5, 2019

New York Metro Abilities Expo

New Jersey Convention and Exposition Center

97 SunField Avenue
Edison, NJ 08837

For nearly 40 years, Abilities Expo has been the go-to source for the Community of people with disabilities, their families, seniors, veterans and healthcare professionals. Every event opens your eyes to new technologies, new possibilities, new solutions and new opportunities to change your life.

https://www.abilities.com/newyork/

Saturday, May 11, 2019

The Annual Great Plains Rare Disease Summit

Sanford Center

8:00am - 5:00pm
2301 East 60th St N
Sioux Falls, SD 57104

People living with a rare disease and/or their caregivers will be able to: Meet with scientists researching rare disease. Attend speaker panels with presentations followed by question and answer sessions. Visit with local organizations and vendors that support the rare disease community. Join us for a day of learning, networking and most importantly, connecting.

Friday, June 21- Sunday, June 23, 2019

Chicago Abilities Expo

Renaissance Schaumburg Convention Center

1551 North Thoreau Drive
Schaumburg, IL 60173

For nearly 40 years, Abilities Expo has been the go-to source for the Community of people with disabilities, their families, seniors, veterans and healthcare professionals. Every event opens your eyes to new technologies, new possibilities, new solutions and new opportunities to change your life.

https://www.abilities.com/chicago/

NAF Staff Directory and Social Networks

The use of these names and contact information for any purpose other than requesting information regarding the NAF or joining a support group without NAF's written permission is strictly prohibited.

NAF Staff Directory:

Andrew Rosen, Executive Director	(763) 231-2745 • *andrew@ataxia.org*
Joel Sutherland, Development Director	(763) 231-2748 • *joel@ataxia.org*
Sue Hagen, Patient and Research Services Director	(763) 231-2742 • *susan@ataxia.org*
Lori Shogren, Community Program and Service Director	(763) 231-2743 • *lori@ataxia.org*
Stephanie Lucas, Communications Manager	(763) 231-2744 • *stephanie@ataxia.org*
Mollie Utting, Support, Engagement & Advocacy Coordinator	(763) 231-2741 • *mollie@ataxia.org*
Nick Gullickson, Finance Assistant	**Nick Gullickson,** Finance Assistant
Jon Wegman, Development Associate	(763) 231-2750 • *jon@ataxia.org*
Mary Ann Peterson, Office Assistant	(763)231-2747 • *mary.peterson@ataxia.org*

Social Networks

NAF Facebook Page	*www.facebook.com/ataxiafoundation/*
NAF Support Group	*www.facebook.com/groups/NAFmail*
Under 30 with Ataxia	*www.facebook.com/groups/under30withataxia*
NAF YouTube Channel	*www.youtube.com/user/NatlAtaxiaFound*
NAF Twitter	*www.twitter.com/NAF_Ataxia*
NAF LinkedIn	*www.linkedin.com/company/nationalataxiafoundation*

SUMMER MATCH ANNOUNCEMENT

The National Ataxia Foundation is happy to report that we have secured funds for the Summer Match event! The Summer Match is a campaign that goes towards fulfilling NAF's mission to improve the lives of persons affected by Ataxia through support, education, and research. You can join the campaign by creating a fundraising team of your own or by making a contribution. More details to follow so stay tuned!

THE DEADLINE FOR SUBMITTING MATERIALS

for the Summer issue of *Generations* is May 6, 2019. Please send articles, your personal story, recaps of Ataxia-related events, photos and reports to *naf@ataxia.org*. Thank you.

JOIN US IN DENVER NEXT YEAR!

63RD ANNUAL ATAXIA CONFERENCE

MARCH 6-7, 2020
SHERATON DENVER DOWNTOWN HOTEL

The **2019 Annual Ataxia Conference** is made possible, in part, with financial and in-kind support from our sponsors.

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(763) 553-0020

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