

# Generations

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*The Official Publication of the National Ataxia Foundation*

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*Volume 34, Number 3*

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*Fall 2006*

## Sporadic Ataxia

*Presented by Susan L. Perlman, MD*

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*The following was presented at the 2006 NAF Annual Membership Meeting in Boston, MA.*

What is Sporadic Ataxia? The definition of sporadic from the dictionary is "having no pattern or order, appearing singularly, isolated or unique." When referring to patients with sporadic ataxia, there is no history in the family and the gene tests have been negative. Therefore, the doctor tells the patient it is sporadic. At UCLA the sporadic ataxias are not so isolated or unique in that over 60% of our patients in our database have non-genetic ataxia.

What questions concern patients with sporadic ataxia? What do I have? Is there a cause that can be found? Are my children going to have this? Can it be cured and will it get worse? Is research being done? These are questions that we have answers for as they relate to the genetic ataxias but I think the answers to research in sporadic ataxias are lagging behind. This is a concern I share with Dr. Schamahmann. I had a long talk with him about the need to really "ramp up" our

research focus in the sporadic ataxias. That is a good thing about these conventions, you all can get together and network and the doctors as well and hopefully some great things will come out of this.

We often use sporadic and non-genetic equivalently but is anything really non-genetic? There is a quote from an article written a couple of years ago indicating that our genes determine how tall we are, what our eye color is, what our personalities are going to be like ... probably influence everything, including our susceptibility to cerebellar ataxia, even if we don't have one of the known ataxia genes. Looking at neurologic diseases for genetic susceptibility, there are two groups. The first group is the one gene one disease group where the SCA's/FA ataxia belong. Usually there is a family history that gives you some clue you are

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dealing with a primary genetic disease.

On the other side we have an interesting group of susceptibility genes where one or more genes acting together with other factors in the environment and your lifestyle. This means you could develop neurologic problems like Multiple Sclerosis, Parkinson disease and possibly some of the ataxias like the ones we call sporadic and possibly MSA. Why is there no family history? Dr. Pulst reviewed this. You may think you have sporadic ataxia if you don't have anyone else in your family that has had ataxia, perhaps you didn't ask or the doctor didn't explore that. Maybe the information is lost. Maybe the gene that is in your family is hidden, it "pops up and down," and it skips generations. There are actually molecular genetic mechanisms that explain the type of genes that do that. It is possible that you do not have enough history and you could carry an ataxia gene.

On the other hand, maybe it is non-genetic. Typical scenario: a patient has ataxia for five years, the doctor had already sent gene testing and it came back normal, now what can you do? We have 17 ataxia gene tests that are available (most of them available through Athena Diagnostics) and three tests for Hereditary FSP. Even when people with familial ataxia, come up negative on all of the gene tests, there will probably be other gene tests that come out within the next six months to a year that will describe their ataxia.

I had a very interesting conversation with Dr. Ranum and Dr. Schmahmann about people with familial ataxia. Maybe we go back three generations and we find 12 people who had it but there are only two still living, how can we do genetic research on them with only two people available? We saw Dr. Ranum's work with the Lincoln pedigree where hundreds of people were seen and dozens of

people were studied to find that gene. How are we going to find a new ataxia gene with someone who has two living family members with ataxia? Drs. Schmahmann and Ranum have ideas to speed up gene research. However, 95% of patients without family history will probably have non-genetic or sporadic ataxia and will have negative gene tests no matter how many gene tests we do. On the other hand, 5% of people without a family history actually have genetic ataxia.

In Friedreich's ataxia and other recessive ataxias there will be a family history because they are recessive. It requires two genes to come together, one from each side of the family. It may also be the first generation. Mitochondrial syndromes, because of their unusual inheritance, may not have any prior history and will appear to be sporadic. There are diseases that look like MSA, with Parkinson symptoms, and sleep disturbances. We see those coming together and think MSA. There are some genetic disorders that can look like SCA 3/MJD but more often than not that picture is non-genetic.

Does this person have MSA? This is one of the big questions when I am seeing someone with sporadic ataxia for the first time. This is a very important question because in MSA there are many more things to manage systematically than "regular" ataxia and it tends to get worse on a fast time course. Therefore you really need to keep up with it. There are study groups for MSA. I think, in the past year, the combined groups had about six articles that were published from the research that they are doing; natural history research, observational research, and they are also doing some basic research into a protein that can build up in the cells of people with MSA and it could be part of the problem and it might be a target for treatment. They have made some progress and they are working together in a very good collaboration.

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MSA starts like ataxia in about 20% of the cases. In 8% of cases it starts like Parkinson disease and evolves into MSA. Usually it will follow all three components: ataxia, Parkinsonism and the autonomic instability. How can you sort it out for someone you are seeing for the first time with ataxia, in the right age group (usually someone about 40 or 45)? Is this going to turn into MSA or is it going to stay cerebellar or cerebellar syndrome. Twenty-five percent of patients with sporadic cerebellar ataxia will go on to develop MSA, usually within five years, especially if they are over the age of 50. Therefore, when I see somebody over the age of 50 with pure cerebellar sporadic ataxia there is a 25% chance that person will start to look like MSA.

Erectile dysfunction can precede the ataxia by five to 10 years. Sleep disturbance can also precede the onset of ataxia by a number of years. Once the ataxia or the Parkinsonism begins, significant motor disability is rarely seen by the third year. If I have someone with pure cerebellar syndrome, with no family history and they make it to the third year still on their feet it is probably not MSA. I feel comfortable counseling them and saying it will not be turning into MSA. There are diagnostic studies which help differentiate MSA from the regular spinocerebellar ataxias. If you see somebody with dementia, paralyzed eye movements or other types of involuntary movements, besides ataxia and tremor, it is usually not MSA. Those are things that are not commonly seen. However, they are seen in the other ataxias, especially the inherited ones.

On MRI scans we may see changes in the white areas or black areas. There is something called the "hot cross buns" side. If you have OPCA or certain other cerebellar syndromes the pons gets smaller. You can see something in the middle of the pons, something that looks

like a cross, and shaped like a hot cross bun. This could be an early indicator of someone with cerebellar ataxia that will probably evolve into MSA. I will do test scans to see if they would be an early indicator before the full syndrome developed. As Dr. Schmahmann shared with me, the simplest thing your doctor can do is take your blood pressure standing up and sitting down. If there is a significant change and you are feeling dizzy every time you stand up, this could be an early indicator of MSA.

Dr. Harding classified the non-genetic ataxias into three basic categories: Type A with associated dementia, Type B with associated tremor and Type C which looked like what we used to call OPCA. In Type A there are notable memory problems which are less commonly seen in the genetic ataxias. There are a number of conditions that fall into that category. There is Combined Cerebral Cortical Atrophy where you get ataxia and memory problems, Wimples disease, which is an interesting infectious disease and prion diseases. There are people with sporadic cerebellar ataxia where tremor is a big issue. I think many of these individuals have recently been found to have Fragile X associated tremor ataxia syndrome which is really a genetic syndrome but because of its unusual inheritance wasn't known as such until research was done in the last couple of years. Type C is the larger group in the non-genetic ataxias and many people still carry a diagnosis of OPCA. Part of that group will develop MSA or other Parkinsonism syndromes, and ataxia.

There are treatable causes of non-genetic ataxia or these causes can be identified and explained. People can be reassured you have a disease that you acquired in your environment that caused your ataxia. We can't cure it but you don't have to worry about passing it along to your kids. Even if there is some infectious disease or some trauma that is now found to be causing your ataxia, to know that is important information for your family. ►►

We know that there are infectious causes or immune system reactions to infection; we know that injuries and hypothermia can develop ataxias as years go by. There are metabolic causes like vitamin deficiency, vitamin B12 and E deficiencies, thyroid disease can target the cerebellum and cause ataxia. Certain medication prescribed for heart disease, chemo therapy drugs, epilepsy drugs can target the cerebellum and cause cerebellar atrophy and ataxia. There are environmental toxins some are common like alcohol and some are very rare and some we may not even know we are being exposed to.

There are treatable causes involving the immune system. There is a lot of research being published now about hidden cancers that put out immune chemicals that target the cerebellum. There are other antibodies produced that are not related to cancers and the one we hear about most is antigliadin associated with sensitivity to gluten, (protein in wheat). There seems to be genetic evidence that this can be a cause of ataxia, neuropathy and other neurological systems and may respond to treatment with a gluten-free diet.

Dr. Schmahmann is going to use anti-immune therapy. We also use some of it at UCLA. If we find a bad antibody we will attempt to treat it. We may get a suspicion that there is an antibody involved if the person has another autoimmune disease not known to cause ataxia. Sometimes autoimmune diseases go hand in hand with other antibodies. It seems to progress more rapidly than you would expect a regular ataxia to progress especially when the immune system is involved. Many people seem to be progressing faster than the doctor is comfortable with. You may want to try steroids. It could be a knee-jerk reaction from the neurologist when they think there is an inflammation or an immune problem going on. If you respond to the steroids it may lead to other treatments including giving specific medication

Treatment goals, treatment of known causes, whether it is dietary, replacement therapies, intoxication therapies: you improve performance with symptom specific drugs or rehabilitation with training. Preventive bystander effects: use it or lose it, means if you are living a quality life. Prevent serious complications: falling, choking, injuries, breathing problems, infections, depression. The ataxia may not kill you but these things can. We need to slow disease progression and we need to learn more about the role of antioxidants. We need to learn more about neuro-protective drugs and gene and stem cell therapy for people with non-genetic ataxias.

The diagnostic approach is to determine if it is pure cerebellar or does it involve other parts of the brain. You should do imaging, electrodiagnostics, and make sure you have a detailed family history and a detailed environmental history. Consider genetic testing. Many articles have been published looking at large populations of people with ataxia. Every ataxia center has at least one of these articles, and the one I am looking at is from Dr. Jen's group at UCLA. It talks about 38 patients with slowly progressive pure cerebellar ataxia with onset after the age of 40, primary sporadic ataxia. They screened for genes 1, 2, 3, 6, 8, 14, fragile X, and calcium channel problems. Thirty percent of these people, with no known family history, were positive for one of those genes. Eight had SCA 6, one had SCA 1, one had SCA 3 and one had SCA 8. In this particular population she didn't find any of the other ataxias but they have been reported in other groups. It may be worthwhile to do some genetic screening if you don't have a family history.

The non-genetic ataxias are currently the most challenging area of research in cerebellar disease, the area most deserving of heightened effort and we need to be looking for susceptibility genes, environmental triggers, and lifestyle factors and age related influences. ❖

# Investigating Gluten-Dependent Autoimmunity as a Possible Cause of Sporadic Ataxia

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*The following is a research summary of a grant funded by NAF for fiscal year 2005.*

## 1. Summary of the specific aims

In a considerable proportion of patients who suffer from sporadic cerebellar ataxia, a symptom of malfunction of the cerebellum, the balance centre in our brain, the cause of the disease is not known. Strikingly, up to 40% of patients with ataxia of unknown cause have sensitivity to gluten. Gluten is found in cereals such as wheat, oat, barley and rye (but not in corn or rice) and is composed of proteins ingested with a normal diet. Gluten sensitivity is a very common condition (1% population worldwide) and produces a variety of disturbances within the digestive apparatus, from very mild to severe ones. While in the majority of people these disturbances are so mild that remain unnoticed, in some individuals such sensitivity manifests with a severe inflammation of the intestine, and is called celiac disease (CD). CD is caused by an autoimmune reaction, which means that the disturbances are caused by production of antibodies reacting with one or more components of the human body (self-antigens). In the case of CD, the principal self-antigen is a protein called transglutaminase-2 (TGase2). In addition, there is production of antibodies against proteins that are components of gluten, such as gliadin (wheat), avenin (oat), ordein (barley) or secalin (rye), which act as trigger of the disease.

It was long time known that patients with celiac disease often have neurological

symptoms like migraine, depression, increased anxiety, central and peripheral neuropathies and epilepsy. However, the link between sporadic forms of ataxia and gluten sensitivity has only recently been recognised. It is becoming increasingly clear that in a significant proportion of individuals (10-40%) with neurological dysfunction of unknown aetiology (the commonest being ataxia and/or neuropathy) there is evidence of gluten sensitivity even in absence of gastrointestinal dysfunctions. Accordingly, it has been shown that removal of gluten-containing products from the diet of patients with gluten sensitivity and ataxia results in improvement or stabilisation of their ataxia. This is an important achievement since, it shows that treatment with a gluten-free diet is a simple therapeutic option which might become available also for patients with sporadic ataxia *if only they could be correctly diagnosed as having a gluten-dependent autoimmune disorder.*

We and others have hypothesized that patients with gluten sensitivity and ataxia may have circulating antibodies in their blood able to react with brain regions controlling the balance. Like almost all patients with CD, patients with gluten sensitivity and ataxia may also have antibodies against gluten and the self-antigen transglutaminase-2 (TGase2). On this basis, we submitted to NAF a project to investigate the role of anti-TGAase2 antibodies and other anti-brain autoantibodies as a possible cause ►►

of sporadic ataxia. We were interested in answering two principal questions:

1) Are anti-TGAse2 antibodies from patients with celiac disease, able to cause ataxia?

2) Are other anti-brain antibodies from patients with gluten-ataxia or celiac disease able to cause ataxia?

More in detail, during the proposed project we pursued the following two aims:

Aim 1) production of phage display antibody libraries from a patient with gluten-ataxia and isolation of anti-TGAse2 and anti-brain reactive autoantibodies;

Aim 2) assessment of the effects of passive transfer of purified phage autoantibodies *in vivo* (creation of different animal models of gluten ataxia).

## 2. Methodology

To isolate autoantibodies there are two main approaches, both exploiting the principle that antibodies bind selectively to their target. In the first, antibodies are harvested from a patient's blood sample and then antibodies that react with a given organ (the brain, for instance) are isolated through a series of purification steps using as binding substrate a protein extract from the target organ. However, this method provides only limited amounts of purified anti-bodies and it allows only to isolate pools of antibodies reacting against several self-antigens. The other approach takes advantage of the fact that antibodies are proteins that are produced from the blood cells lymphocytes and therefore it is possible to isolate from these cells the genetic information coding for each single antibody. By cloning the genetic information of the antibodies of a given patient into phages it is possible to obtain a so-called phage display antibody library. Phages are inoffensive small viruses that grow only in bacteria. They are composed of a short DNA chromosome surrounded by a coat made of a small number of proteins. When the genetic information encoding one antibody is inserted into the phage

chromosome, the phage produces a coat which displays, as an additional protein, that human antibody hence this technology is called "antibody phage display." Since the library contains the entire repertoire of antibodies of a patient, it clearly represents an unselected antibody mixture reacting against every possible self- and non-self antigen. Ideally, a good phage display antibody library should closely match the mixture of antibodies present in the blood. Once obtained a good library, the phage antibodies can be selected on target substrates similarly to what we have seen for the first approach. However, the great power of the phage display technology is that each single phage bears only one human antibody and it can be replicated separately from the others in unlimited amounts and then tested separately. Purified preparations of antibodies, all identical among each other, constitute a mono-clonal antibody, while a mixture of different antibodies represent a poly-clonal antibody.

## 3. Results

### **Results Aim 1. Production and analysis of phage display antibody libraries.**

Two IgA phage display libraries from a patient with CD and ataxia (Patient A) were already available at the beginning of the project [3]. The first was made from peripheral blood lymphocytes (PBL) while the other was prepared starting from lymphocytes extracted from an intestinal biopsy (IBL) of small intestine (duodenum), a region which is particularly affected in patients with CD. The libraries were tested for the presence of phage antibodies reacting with brain regions involved in motor control. This test was done by immunohistochemistry on rat brain sections, a procedure involving the incubation of antibodies on tissue sections followed by revelation of the bound antibodies by a colorimetric reaction.

The two libraries of the patient A were tested

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for the presence of anti-brain IgAs in comparison with the patient's serum (Fig. 1). The serum IgAs of patient A labeled neurons in the cerebellum, cortex, hippocampus, thalamus, colliculi (not shown) and brainstem (Fig. 1C). Both the PBL and the IBL phage display libraries labeled the same brain regions that were also recognized by the patient serum although the labeling was less intense (Fig. 1A, 2B). These results demonstrated that the libraries reproduce the original IgA antibodies repertoire of patient A and confirmed the presence of IgAs antibodies against brain antigens. The presence of anti-brain antibodies in the two libraries indicated the possibility to carry out the purification procedure using rat brain protein extracts as a binding substrate.



**Fig. 1: Immunohistochemistry of IgAs serum, PBL and IBL phage antibody libraries from patient A on rat brainstem.** The serum IgAs of patient A gave a positive staining on neurons of various rat brain areas including Purkinje cells and deep cerebellar nuclei of cerebellum, cortex, hippocampus, thalamus, colliculi and brainstem. The staining was particularly strong on the nuclei of neurons. Similar pattern was obtained using the PBL IgAs library (A) and the IBL IgAs library (B) and serum IgAs (C).

Since the type of antibodies that are most involved in autoimmune diseases are those of the IgG class, we have also constructed two new IgGs phage display antibody libraries from a patient with gluten-ataxia but without overt gastrointestinal manifestations (Patient B). The genetic information encoding IgG antibodies was extracted from peripheral blood (PBL) or intestinal biopsy lymphocytes (IBL) from this patient. Production of the libraries has followed previously developed methods [1]. The PBL

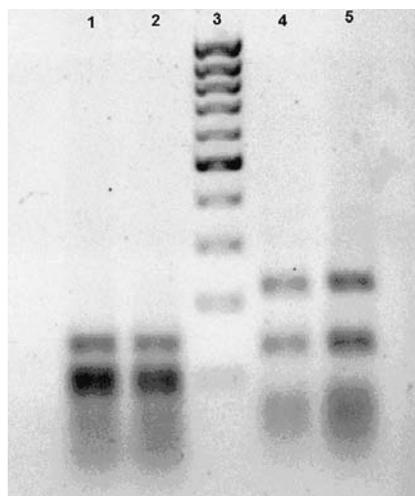
library from patient B reached a diversity of one million different clones while the IBL library reached a diversity of 200,000. Both libraries were of the IgG class, only.

**Results Aim 1. Selection of anti-brain antibodies from phage display antibody libraries.**

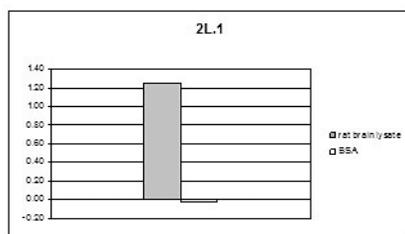
To isolate phages expressing antibodies against the central nervous system, the PBL or IBL libraries of patients A and B were selected by repetitive panning on homogenates of whole rat brain lysate (100µg/ml) or purified human Tgase-2 (10µg/ml) in Maxisorb immunotubes. Unbound phage antibodies were eluted with three washings. Phages bound to immunotubes have been eluted by incubation with bacteria DH5αF' at 37°C. After a second round of selection, single clones of infected bacteria have been dispensed into individual wells of a 96-well plate and grown at 37°C to the OD<sub>600</sub>=0.5. M13K07 helper phage at a multiplicity of infection of 20:1 have been added to each well and incubated at 37°C for 45 minutes. Half of the supernatant of each well after overnight rescue have been used directly for the characterization by ELISA on rat brain lysate (100µg/ml) or TGase-2 (10µg/ml). After two rounds of selection, we have extracted the DNA from the clones found positive and the genes encoding the antibodies were analyzed through a procedure called DNA finger printing consisting in a digestion of the DNA with specific enzymes producing a series of bands whose number and length is characteristic for each antibody gene. Only different antibodies were used for further studies. In Fig. 2 one such finger printing analysis is shown. Here, two antibodies from the PBL library of patient A were found to be identical (compare lanes 1 with 2, and 4 with 5).

Finally, the specificity of each positive clone was re-tested in ELISA on TGase-2 or on rat brain lysate and on the negative control bovine serum albumin (BSA) as show in Fig. 3 for the clone 2L1.

We have isolated in total 20 different ►►



**Fig. 2: Characterization of anti-brain scFvs from the PBL of Patient A by fingerprinting.** Two monoclonal IgA scFv antibodies have been selected from the whole PBL library of Patient A on rat brain lysate. To characterize them, they have been digested with two restriction enzymes. In lane 1 and 2 it is shown the digestion with the HaeIII enzyme of 2L.1 and 2L.2 scFvs respectively. In lane 4 and 5 it is reported the digestion with BstNI enzyme of the same scFvs. The two IgA scFvs resulted identical. Lane 3=100bp molecular weight.



**Fig. 3: Comparison between the reactivity of 2L.1 scFv on rat brain and BSA.** The monoclonal 2L.1 IgA scFv antibody selected from the PBL library of Patient A has been tested in ELISA on rat brain lysate (grey columns 100µg/ml) and on BSA (white columns 10µg/ml). Signals have been normalized on the reactivity value of the secondary antibody on rat brain lysate and BSA respectively.

antibodies (10 IgAs and 10 IgGs, see Table 1) from the phage libraries obtained from the patient with CD and ataxia (8 anti-brain + 2 anti-Tgase2 IgAs, Patient A) and the patient with gluten ataxia but no gastrointestinal symptoms (8 anti-brain + 2 anti-Tgase2 IgGs, Patient B).

**Table 1. Summary of the isolated phage antibodies.**

	Anti-brain antibodies	Anti-TGase2 antibodies	Total/#clones analyzed
Patient A, PBL library	2	0	1 IgA / 376
Patient A, IBL library	6	2	8 IgAs / 282
Patient B, PBL library	2	0	2 IgG / 334
Patient B, IBL library	6	2	8 IgGs / 268+184
<b>TOTAL</b>	<b>16</b>	<b>4</b>	<b>20 / 1444</b>

### **Results Aim 2. Injection of anti-TGase2 IgA phage antibodies in mice.**

To investigate if anti-TGase2 antibodies have a role in causing ataxia, we injected two purified single chain anti-TGase2 antibodies (class 1 and class 2 from Patient A) in the lateral ventricle of C57BL/6 male mice and we tested the effect on equilibrium. Mice were trained during 3–5 days to stay in equilibrium for 2 min on a rotarod (Ugo Basile, Italy) at 9 rpm speed, and then were implanted with a cannula and finally tested on the rotarod 1h, 3h, 6h and 24h after the antibody injection (latency to fall was recorded). When mice were treated with class 1 or class 2 antibodies, they manifested a severe ataxia at 3h and 6h after injection (Fig. 4, page 10) while injection of pep1, a control antibody, had no effect (Fig. 4, page 10). To confirm that the injection cannula had hit the lateral ventricle and that no inflammatory processes were in course, brain were extracted and frontal sections were stained with hematoxylin and eosin dyes. Data from mice in which the cannula was misplaced were not used.

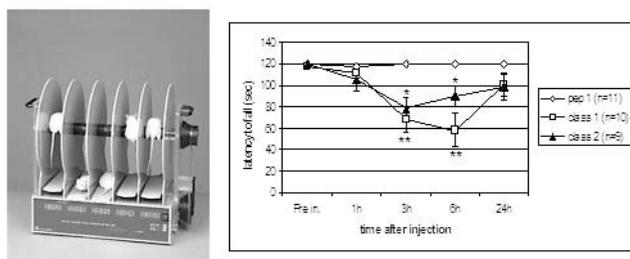
### **4. Conclusions**

For an autoimmune disorder to be defined as such, five requirements need to be met: 1) the presence of circulating autoantibodies directed to the affected organ, 2) the presence of antibody deposits within the affected organ; 3) the positive response of the patient to immuno-suppressive treatments; 4) possibility to transfer passively the pathology in animals through infusion of antibodies or lymphocytes; 5) induction of the pathology in humans or animals through administration of high doses of self-antigens.

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Before the present study, gluten-ataxia met only three of these criteria: 1) most, but not all, patients gluten sensitivity and ataxia have anti-brain antibodies; 2) in 50% of gluten ataxia patients there is evidence of intrathecal antibody production; 3) immuno-suppressive therapy or a strict gluten-free diet can improve the neurological symptoms in some patients. This study provides evidence that gluten ataxia meets requirement 4). We demonstrated that sera from gluten ataxia patients can provoke transient ataxia in mice after intraventricular injection and that the motor deficits observed in mice reflect the clinical findings observed in humans. To determine if other antibodies also have a causative role in ataxia, the purified phase antibodies will be injected in mice and their effects will be assessed. This part of the project will be terminated in future, if funds will be available.

In perspective, identifying the antibodies that



**Fig. 4: Motor coordination test on the rotarod.** Mice treated with monoclonal antibodies received three trials at 9 rpm before the intraventricular injection (Pre in.), and 1h, 3h, 6h, 24h after antibodies injection. The means of the duration of balance or latency to fall (maximum trial duration=120 sec) of the three trials was recorded. Mice treated with anti-tTGase monoclonal antibody class 1 and class 2 exhibit significant difficulty in maintaining balance on the rotarod 3h and 6h after injection compared to the performance before intraventricular injection. Mice treated with negative control monoclonal antibody pep 1 showed no decline in performance. Error bars represent SE. n= number of animals  
\*\*\* P < 0,005 (Wilcoxon test) \*\* P < 0,01 (Wilcoxon test) \* P < 0,05 (Wilcoxon test)

cause ataxia from a patient's blood sample will provide a simple but powerful tool to identify which patients with sporadic ataxia have this autoimmune disease allowing clinicians to undertake the appropriate treatment at earlier stages of the disease.

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## Stock Talk

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# BOAT1, an AXH Domain Protein, Suppresses the Cytotoxicity of Ataxin-1

Chih-Cheng Tsai, PhD

UMDNJ-Robert Wood Johnson Medical School

*The following is a research summary of a grant funded by NAF for fiscal year 2005.*

To date, nine polyglutamine diseases have been identified, including six forms of spinocerebellar ataxias (SCA1, 2, 3/MJD, 6, 7, and 17), Huntington's disease, Kennedy's disease, and Haw River Syndrome/DRPLA. My research focuses on SCA1, which is known to be caused by the glutamine-repeat expanded form of the protein ataxin-1 (ATXN1). SCA1 patients display ataxia, progressive motor deterioration and loss of Purkinje cells in the cerebellum. So far, the molecular events that contribute to the degeneration of Purkinje cells in SCA1 patients remain unclear. My recent work with ATXN1 indicated that its toxic effects may, in part, involve a related protein, which we called Brother of ataxin-1 (BOAT1). We first identified BOAT1 from the human genome, because this uncharacterized protein shares similar protein sequences with ATXN1. We additionally found a protein very similar to BOAT1 in the mouse genome. Comparing the sequences of human and mouse ATXN1 and BOAT1, we found that one particular region, called the AXH domain, is most conserved among these four vertebrate proteins. Our subsequent studies revealed that the AXH domain is required for both ATXN1 and BOAT1 to interact with an important nuclear factor called SMRT (Silencing Mediator of retinoid and thyroid hormone receptors). Because the functions of SMRT are closely associated with transcriptional repression (meaning that SMRT helps to turn many genes off), the physical association of ATXN1 and BOAT1 with SMRT therefore raises the possibility that both ATXN1 and BOAT1 also

participate in transcriptional repression.

Our characterization of BOAT1 led us to the further discovery that BOAT1 also interacts with ATXN1. This surprising finding, coupled with the known interactions between ATXN1 or BOAT1 and SMRT, indicate that these three proteins engage in complex protein-protein interactions. As a result, a triple protein complex forms; we predicted, moreover, that the properties of each protein would be influenced by its other two binding partners. To test whether this is the case, we decided to examine how BOAT1 and SMRT are expressed in Purkinje cells and whether their expression is affected by mutant ATXN1. Since a mouse model for SCA1 has been established (in these mice, mutant ATXN1 is specifically expressed in Purkinje cells), we decided to use these SCA1 mice for our studies. We were particularly keen on examining the expression of BOAT1 and SMRT in the Purkinje cells of very young SCA1 mice, particularly prior to the stage when nuclear inclusions (the hallmark of many polyglutamine diseases) and ataxia behavior can be detected. We reasoned that, if BOAT1 or SMRT expression is altered by mutant ATXN1 at a very early stage, either or both proteins will likely be involved in the SCA1-mediated degeneration of Purkinje cells.

We carried our work out through immunostaining experiments, using high quality antibodies that we developed for ATXN1, SMRT, and BOAT1, respectively. These antibodies allow us to see exactly how each protein is

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*Continued on page 12*

*BOAT1, an AXH Domain Protein...**Continued from page 11*

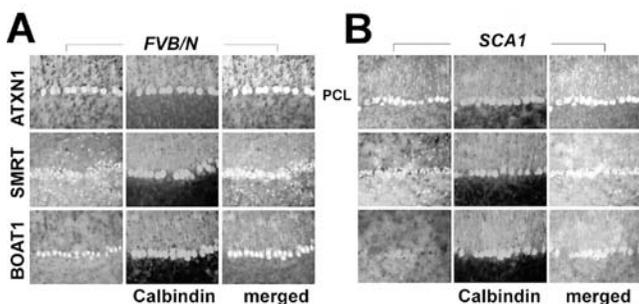
expressed in Purkinje cells. Each of these three antibodies was used to immunostain frozen brain sections derived from wild-type and SCA1 mice that were only three weeks old. At this age, SCA1 mice show no signs of nuclear inclusions and ataxia. For our control experiment, we used Calbindin antibody, because it specifically labels Purkinje cells in the cerebellum. As shown in the accompanying Fig. A, our co-immunostaining experiments for ATXN1, SMRT, or BOAT1 and Calbindin revealed that both SMRT and BOAT1, like ATXN1 and Calbindin, are expressed in the Purkinje cells of normal mice, although the expression level of SMRT is lower. When we examined the expression levels of these proteins in the age-matched SCA1 mice (see Fig. B), BOAT1, but not SMRT and the control Calbindin, appears to disappear from virtually all Purkinje cells. This disappearance of BOAT1 is particularly striking because it takes place prior to the development of nuclear inclusions and ataxia. This result tells us that the biochemical damage that mutant ATXN1 causes in Purkinje cells in fact begins at a very

early stage.

We are currently trying to determine the mechanism that mutant ATXN1 uses to shut down the expression of BOAT1. At the same time, we are also in the process of developing mouse lines that are born with reduced level of BOAT1 in their Purkinje cells. If the outcome that results from lowering the expression level of BOAT1 in Purkinje cells is similar to that found for SCA1 mice, such a result would indicate that BOAT1 may play a critical role in preventing Purkinje cells from undergoing degeneration. If this is indeed the case, blocking the deleterious effects of mutant ATXN1 on BOAT1 may provide us with strategies for treating SCA1 patients. These experiments are ongoing at the moment.

We would like to mention that it would not have been possible for us to carry out and to continue our research without the support we have received from the NAF. We hope that our ongoing research into SCA1 and other neurodegenerative disease proteins (such as Haw River Syndrome/DRPLA) will help nurture new concepts and methods to treat these devastating neurodegenerative diseases in the future.

*Note: As a result of the support from NAF, the following paper has been published: Mizutani, A., Rajan, H., Wang, L., Vig, PJS, Alaynick, WA, Thaler, JP, Tsai, C.-C. Boat, an AXH domain protein, suppresses the cytotoxicity of mutant ataxin-1. EMBO Journal 24, 3339-51 (2005). ❖*



**Fig. A & B: BOAT1 expression is reduced in the Purkinje cells of SCA1 mice at the early stage.**

Frozen brain sections, prepared from three-week-old wild-type (FVB/N) mice (A) or from age-matched SCA1 mice (B), were co-immunostained with Calbindin antibody along with ATXN1, SMRT, or BOAT1 antibodies. The Purkinje cell layer is abbreviated as PCL. Note that Calbindin is a marker for Purkinje cells, which was used as a control.

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# Deranged Calcium Signaling in SCA3 Neurons

Ilya Bezprozvanny, PhD

University of Texas Southwestern Medical Center at Dallas

*The following is a research summary of a grant funded by NAF for fiscal year 2005.*

During one year of support of the above referenced NAF grant we focused on analysis of connections between calcium signaling and degeneration of SCA3 neurons. This project is based on our discovery of association between mutated ataxin-3 and type 1 inositol 1, 4, 5-trisphosphate receptor (InsP3R1), which is an intracellular calcium ( $\text{Ca}^{2+}$ ) release channel. In biochemical experiments we demonstrated that mutant ataxin-3 binds to InsP3R1. In functional experiments we demonstrated that mutant ataxin-3 makes InsP3R1 more active. Importantly, wild type ataxin-3 (without CAG expansion) does not bind to InsP3R1 and does not activate it. Obtained results provided strong support to our hypothesis that excessive  $\text{Ca}^{2+}$

signaling may be a cause of neuronal death in SCA3 neurons. To test this idea we now perform experiments with genetic mouse model of SCA3 containing mutated human SCA3 gene with 84 CAG expansion. We hope to demonstrate that  $\text{Ca}^{2+}$  signaling blockers will prevent or slowdown degeneration of neurons in SCA3 mouse model. These studies are supported by renewed grant from National Ataxia Foundation. In addition, the grant was submitted to National Institutes of Health to provide further support for these experiments.

I am truly thankful to the National Ataxia Foundation for continuous support of our research program on causes and potential treatments of SCA3. ❖

# A Novel Ataxia in a Pedigree from the Philippines

Stefan M. Pulst, MD

Cedars-Sinai Medicine Center

*The following is a research summary of a grant funded by NAF for fiscal year 2005.*

It is with great please that I submit the following report to the National Ataxia Foundation as a final report regarding the grant "A Novel Ataxia in a Pedigree from the Philippines." For the first time, we have linked mutations in a gene that regulates how potassium enters cells to a neurodegenerative disease and to another disorder that causes mental retardation and

coordination problems. We are hopeful that these findings may lead to new ways of treating SCA diseases.

This type of gene has never been linked to nerve cell death. Its discovery resulted from a search for the gene that causes spinocerebellar

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*Continued on page 14*

*A Novel Ataxia...*  
*Continued from page 13*

ataxia in a Filipino family. This disorder typically appears in adulthood and causes loss of neurons in the brain's cerebellum, resulting in progressive loss of coordination. We were able to trace the disease in this family to mutation in a gene called KCNC3. The gene codes for one of the proteins that form potassium ions into the cell. We were also able to discover a different KCNC3 mutation in a previously identified French family with a disease called spinocerebellar ataxia type 13, which causes childhood-onset ataxia, cerebellar degeneration and mild mental retardation.

The KCNC3 gene codes for a type of potassium channel that normally opens and closes very quickly. This type of channel is particularly important in "fast-bursting neurons" that fire hundreds of times per second in the brain. They are like building blocks and are found extensively in the nervous system. Among other places, neurons are found in the brain's substantia nigra, where they aid in motor control, and in the hippocampus, where they play a role in learning. Previous studies have found abnormalities in the number of potassium channels in Parkinson's, Alzheimer's and Huntington's diseases. Together with the new study, these findings suggest that potassium channel abnormalities may contribute to a wide variety of neurodegenerative disease.

Through cell culture experiments, we have learned that the KCNC3 mutations in the Filipino and French families affect the potassium channel very differently. The mutation found in the Filipino family completely prevented the potassium channel from functioning. The mutation from the French family caused potassium channels to open earlier than

normal and close too late. This reduced the rate at which the neurons could fire.

Researchers have long known that potassium channels are important for neuronal function. Mutations in other potassium channel genes have been linked to problems such as epilepsy, cardiac arrhythmias, and periodic muscle paralysis. One type of potassium channel defect has also been found in a disorder called episodic ataxia type 1 that causes brief episodes of ataxia without neurodegeneration. However, potassium channel mutations have never before been linked to neurodegenerative disease or mental retardation. The findings were surprising because mice lacking the KCNC3 gene have only mild behavioral changes.

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 the activity of  
 potassium channels.  
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It is not yet clear exactly how the potassium channel mutations cause neurodegeneration. One theory is that the mutations might increase the amount of calcium that can enter cells, causing them to die because of over overstimulation. The altered potassium channels might prevent neurons from coping with damage from reactive molecules called free radicals that are produced during metabolism. The mutations also might cause subtle developmental defects that reduce the long-term survival of neurons.

The new findings suggest that spinocerebellar ataxia and other neurodegenerative diseases might be treatable with drugs that alter the activity of potassium channels. To maximize the benefits and reduce side effects, researchers will need to find drugs that are specific for this type of channel.

We now plan to use cell culture and animal models to learn exactly how the mutations cause neurodegeneration. These studies may lead to improved treatments for a number of diseases. ❖

# Review of What We Have Learned

*Presented by John W. Day, MD, PhD*

*John W. Day, MD, PhD, is Professor of Neurology at the University of Minnesota and Research Medical Liaison of the National Ataxia Foundation. Dr. Day received his MD from the University of Minnesota and subsequently received a PhD in Neuroscience from the Albert Einstein College of Medicine. He trained in Neurology at the University of California, San Francisco and has been involved in the diagnosis and care of ataxia patients for 20 years. Dr. Day is Director of the Paul and Sheila Wellstone Muscular Dystrophy Center at the University of Minnesota where he has active ataxia and neuromuscular clinics. He also cares for pediatric ataxia and neuromuscular patients at the Gillette Pediatric Specialty Healthcare Clinic in St. Paul. Dr. Day has collaborated for many years with Dr. Laura Ranum and Dr. Lawrence Schut, with whom he has worked to identify and characterize SCA 5 and SCA 8 as well as other forms of ataxia.*

*Traditionally at NAF's Annual Membership Meeting, someone does a quick review of what the meeting's speakers have said about their area of study. The following is Dr. John Day's summary, as presented.*

Let's begin with Dr. Schmahmann, the local guru on ataxia, who revealed to us not only some inner disease in terms of the autonomy of the cerebellum but he also dealt with some novel treatments. Some very common sense aspects of controlling symptoms and opened up the idea of other things going on besides movement problems. In ataxia we usually think of it being aspects of problems dealing with motor control. It is not to say it isn't a large part of the disease but what it shows that we not only have problems with movements but in addition to controlling motor function, we are also having problems with coordination of thought and emotion. We are finding out that the cerebellum is involved in a number of different functions in addition to controlling our arms, legs, speech and eyes. It is also involved in how to coordinate, in a comparable way, some of our emotions and some of our thoughts. Therefore coordination of thought, coordination of motion, and coordination of emotion are all a part of this.

Dr. O'Hearn helped us understand aspects of degeneration and another theme that came up repeatedly at the conference was the idea of different complements to ataxia in terms of the disease process. We have normal nerve cell degeneration but there are probably some developmental, metabolic or energy production aspects to the degenerations. There are probably some aspects of physiology where just the cells aren't functioning properly. There are a number of different things and the more we understand it the more targets we have for treatment. I think that a number of the sessions helped to understand that.

It is great to see Dr. Runko here for a number of reasons. One of which is it is always good to see young people involved and Friedreich's ataxia is showing up in fruit flies. The genetics of fruit flies are so intricately understood that it creates a powerful tool to figure out exactly what is going on electrically.

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*Continued on page 16*

*Review of What We Have Learned*  
*Continued from page 15*

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I am a strong advocate of Dr. Runko's approach to understand what is going on in FA by identifying what is going on in the fruit fly.

Dr. Jen added another element in terms of what I call a physiological complement of ataxia. The disease she was talking about was not necessarily a disease of degeneration of the cerebellum as she was talking about the episodic ataxias. That gave us some new insight on what may be going on in this altering function, a theme that came up at the end of Dr. Pulst's talk when he started talking about aspects of nerve cell function, electrical signaling of nerves themselves is altered and that leads to some of the aspects of ataxia.

Dr. Pulst introduced us to a number of things in his role as the Research Director for NAF. He did an outstanding job of showing where the research money goes and the breakdown of the grants funded, seed money for established investigators, young investigator and post-doc awards and how to keep it all going. He didn't have enough time to tell us about SCA 13 which is a new disease he discovered recently that is beginning to emerge. In ataxia we have degeneration of nerve cells, abnormal development of nerve cells, and we have abnormal function of nerve cells. A lot of these aspects are interrelated. You can start with abnormal function such as a SCA 13 with abnormal potassium channels which can lead to degeneration. You can start with abnormal development which is now suggested in some of the developmental disorders that can also detail other forms of ataxia as well. That presages or leads to additional degeneration. We are beginning to understand many of these different elements and how they affect the nerve cells in the cerebellum. We are seeing how the interplay works.

Dr. Koeppen did his usual elegant studies and demonstrations of how the cerebellum is wired and helped us understand again how the

abnormal structure is leading to abnormal function. We have a normal cycle of tuning the cerebellum and it is constantly clicking along in order to fine tune the coordination of motion, emotion, and thoughts. If the "wiring is off," that is part of the underlining problem with ataxia. It can be a problem in the cerebellum. It can be a problem of the nerve cells going to the cerebellum or it can be a problem of outflow of the cerebellum. In all ways he was able to give us a sense of what is going on.

Dr. Ranum showed us a new disease, hopefully, one that is going to put ataxia "on the map." I think that we all hope that someday we will not have to explain to everyone, all the time, what ataxia is. In these studies of SCA 5 you also see the importance of not only creativity but of incredible persistence to track down the cause of this disease. It has opened up a new idea on how these cells are damaged. The structural abnormality is within the cell. Each individual cell has its own internal skeleton and it is that internal skeleton that is abnormal in SCA 5. This leads to the damage of the individual cells of the cerebellum. Dr. Schut's role in that was interesting in a number of ways. Not only because the overall straightforward presentation of the disease but because of his role in this organization and in ataxia for so many years.

I really enjoyed Dr. Friedman. He exemplified the humility one must have in "the front lines" of seeing patients on a daily basis. We just have to realize that we can't know everything. These diseases are complex as we learned in the talk by Dr. Schmahmann and how he was talking about some of the other non-motor problems of ataxia, whether it was the REM sleep or other aspects of pain or fatigue and other complements of these diseases that are not often talked about.

Dr. Perlman in her usual clear way helped us understand a lot of what is going on in the sporadic ataxias which are a huge part of this overall disorder, understanding how to diagnose them and then understanding how we need ►►

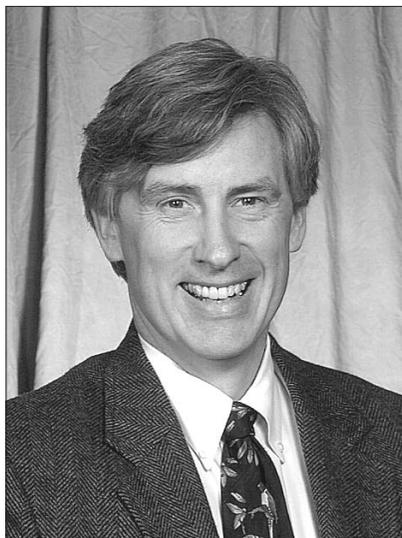
to manage them and some of the ideas for the future.

Lisa Demers talked about the genetic counseling. I think we are at the verge of having to do this on a much broader scale. As treatments are coming down the road we are not going to want to wait until somebody's cerebellum is destroyed to find out what they have. At some point we are going to need to be screening people before they are affected. If we have meaningful treatments for FA (FA is probably going to be the first one "out of the gate" to have some truly meaningful treatments) we are going to want to identify people before they are symptomatic. That is going to change the way we do medicine in order for us to begin to identify people and then what we do with that information. We are starting to do that in other recessive disorders in Minnesota. Just two weeks ago we started screening every newborn child for Cystic Fibrosis, because there are now management approaches that are extremely helpful for Cystic Fibrosis. We better start thinking about it because it is going to start "coming down the pike" soon. When are we going to start doing that for FA and the other disorders and how are we going to manage that? This is a big deal that we are going to have to start thinking about. Right now the medical system is not geared up for it but it is at our doorsteps. We are thankful and excited about it. If we have treatments we are not going to want to wait until somebody is severely diseased before we start using them.

Dr. Gerwitz helped us understand the complexity of these diseases in that FA affects the heart. The heart is important in terms of overall functioning and the importance of energy reduction is part of that. Dr. Gomez gave us an

update on some technology and Dr. Wilensky in his usual elegant fashion helped us understand some of the more common elements of these diseases and ways to deal with them.

We have to thank the people with NAF; they have been extraordinary in putting this meeting together. We all know Arnie, DeNiece, and Char of the Board of Directors and Lisa, Lori, Bridget, Julie, Jerry, Camille, Becky and Nicole, whom many of you have met because they are very active and around. Last but certainly not least, the people from the greater



**Dr. John Day**

Boston area support group who have been great in running this meeting. NAF has been involved in things other than this meeting. Dr. Pulst was able to share with us many of the research efforts that have been undertaken in the last year, in basic, clinical and translational efforts. The goal here is to understand the ataxias so that we can begin treating them. I am holding up a picture of the lighthouse and we can see that NAF is taking the energy of the light from all of these investigators in an effort

to channel and focus all that effort into the target which is developing, understanding and diagnosing various forms of ataxia. It is our impression or understanding, our goal in this organization is to channel all of these efforts in translational, basic and clinical research directed at all of these diseases so that we can come up with enough power and energy focused on the development of treatments. I am honestly more optimistic today than I have been for a long time that we are going to see these diseases brought under control in our lifetime. I hope that during the course of the meeting you have been able to get some sense of there being a "Beacon of Light" as is the theme of the meeting for us to march onto the future. ❖

# Genetic Programs Regulation Cell Fate Decisions in the Rhombic Lip, a Birthsite of Neurons Affected in Ataxia

Rebecca L. Landsberg, PhD  
Harvard Medical School

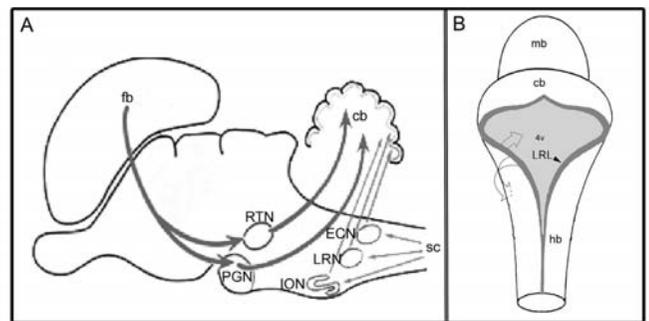
*The following is a research summary of a grant funded by NAF for fiscal year 2005.*

In this study we analyzed the production of brainstem neurons involved in the regulation of balance and coordination. These specific neuron subtypes arise from a unique pool of progenitor cells in the embryonic hindbrain known as the rhombic lip. By examining the rhombic lip of embryonic mice with genetic mutations we have begun to understand the genetic basis for the development of these critical neurons.

Derangements in balance and coordination, the behavioral hallmarks of ataxia, result largely from the selective vulnerability of neurons comprising different regions of the brain. One such region is the cerebellum because of its critical role in maintaining balance and posture as well as coordinating voluntary movement. Another is the precerebellar system, a series of neural clusters (called nuclei) situated in the hindbrain that are involved in regulating balance, coordination, and motor activity by forming connections between the forebrain, cerebellum, and spinal cord (Fig. 1A). In general, a cell type-specific vulnerability to aberrant development and/or degeneration typically reflects the specific differentiative properties unique to those cells, for example, the gene expression profile of a given cell type. Thus, elucidating the genetic programs that underlie the specification and differentiation of a particular neuronal cell type provides a powerful means to uncover genes that confer upon these neurons a susceptibility to derangement and disease. Using this logic, we conducted genetic

and embryological studies in the mouse aimed at elucidating the genetic pathways responsible for conferring physiological identity upon neurons of the precerebellar system.

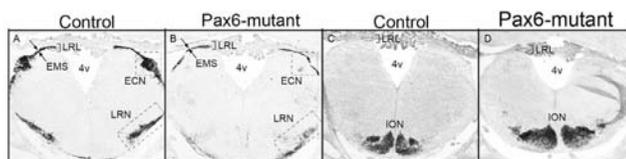
The precerebellar system is comprised of five major nuclei: the pontine gray (PGN) and reticulotegmental (RTN) nuclei in the pons, and the inferior olive (ION), lateral reticular (LRN), and external cuneate (ECN) nuclei in the medulla (Fig. 1A). We have shown that neurons populating these critical nuclei originate from a zone of progenitor cells in the embryo called the lower rhombic lip (LRL) (Fig. 1B). Previous studies by our lab and others have provided evidence that many of the ►►



**Fig. 1: Adult precerebellar system and embryonic hindbrain.** A. Schematic of adult mouse brain showing relative locations of the precerebellar nuclei in the hindbrain. Heavy arrows (center) represent neural connections formed between the forebrain (fb), PGN, RTN, and cerebellum (cb). Light arrows (right) represent neural connections formed between the spinal cord (sc), ECN, LRN, ION, and cb. B. Schematic of a mid-gestation mouse hindbrain (hb). The pool of precursor cells known as the lower rhombic lip (LRL) forms around the fourth ventricle (4v). mb—midbrain; cb—cerebellum.

genetics program enacted in the progenitors of the LRL determine the fate of the daughter neurons produced from this region. In other words, the ability to form specific precerebellar cell types appears to be established in progenitor cells of the LRL, thereby pointing to this region as an important site from which to identify specification and differentiative factors – factors that may ultimately predispose these cells to the vulnerabilities underlying many ataxias.

In this study, genetic fate-mapping techniques were used to track sets of precerebellar neurons from their site of origin (the rhombic lip) to their final position in the mature brain. We identified two distinct, physically separable progenitor populations in the LRL. The first is characterized by the expression of the pro-neural gene, *Math1* and generates the neurons of the PGN, RTN, ECN, and LRN but not the neurons of the ION. The second is comprised of cells that likely generate certain neurons of the ION and are, in part, characterized by the expression of the pro-neural gene *Ngn1*. We found that the future neuronal identities assumed by these two populations of progenitors are regulated by the transcription factor, *Pax6*, a protein that regulates the expression of other genes. Loss of *Pax6* in the



**Fig. 2: Loss of *Pax6* alters size of precerebellar nuclei.** Cross-section through the hindbrains of *Pax6*-mutant (B, D) or control (A, C) late-gestation embryos stained for markers of the ECN and LRN (A, B-boxed regions) or ION (C, D). Staining reveals a decrease in the size of the ECN and LRN and an increase in the size of the ION of *Pax6*-mutants. *EMS*—extramurally migrating neurons; *4v*—4th ventricle; *LRL*—lower rhombic lip.

mouse results in a decrease in the number of neurons populating the PGN, RTN, ECN, and LRN (Fig. 2A, B). Our recent studies demonstrated that in contrast to the other precerebellar nuclei, the size of the ION is increased by more than two-fold in the brains of *Pax6*-mutant mice (Fig. 2C, D). The changes in precerebellar nuclei size in the *Pax6*-mutant mice were accompanied by alterations in the composition of their respective progenitor pools – the *Math1*-expressing progenitor population decreased while the *Ngn1*-expressing progenitor population increased. This study provided the first evidence that *Pax6* regulates the development of the precerebellar system by influencing the future fate of LRL progenitor cells. ❖

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Call (763) 553-0020 or e-mail [naf@ataxia.org](mailto:naf@ataxia.org) to find out more about how you can help give to help those with ataxia. Thank you.

# Development of a Mouse Model of Spinocerebellar Ataxia with Neuropathy

Cornelius F. Berkoell, MD, PhD  
Baylor College of Medicine

*The following is a research summary of a grant funded by NAF for fiscal year 2005.*

Spinocerebellar ataxia with neuropathy (SCAN1) is an inherited ataxia. As a consequence of the brain degeneration, patients are unable to walk and confined to a wheel chair by late adolescence to early adulthood. We have characterized the clinical features of this disease and have identified the genetic cause as mutations in the gene for the DNA repair enzyme tyrosyl-DNA phosphodiesterase (TDP1). To understand better the function of TDP1 in neural development, maintenance, and disease this end, we proposed: 1) to determine whether other DNA repair pathways that could compensate for the deficiency of TDP1 are expressed in the affected neurons; 2) to identify the proteins that TDP1 associates with in order to obtain insights into the pathways that TDP1 functions in; and 3) to generate a mouse model of SCAN1 so that we can study the pathophysiology of this disorder in vivo. The progress on each proposed aim follows.

**Aim 1.** Determine whether other DNA repair pathways that could compensate for the deficiency of TDP1 are expressed in the affected neurons. *Aim completed.*

In yeast two redundant pathways for TDP1 have been well characterized. Components of one of these two pathways are expressed in the same cells as TDP1 and could therefore compensate for a deficiency of TDP1. Therefore the lack of a redundant pathway in the neurons cannot account for SCAN1.

**Aim 2.** Identify the proteins that TDP1 associates with. *Aim completed.*

While this work was in progress another group published the interacting proteins for

TDP1; therefore, we focused on aims 1 and 3. See *Nature* 434:108-113. This study confirmed that TDP1 was involved in DNA repair and that mutations of TDP1 could adversely affect gene expression.

**Aim 3.** Generate a mouse model of SCAN1. *Aim in progress.*

Our hypothesis going into this project was that SCAN1 was caused by loss of functional TDP1. Therefore to test this, we generated mice that do not express functional TDP1. Surprisingly the mice were healthy and never developed ataxia or neuropathy. Although this might mean that mice are a poor model for SCAN1, we tested an alternate hypothesis: development of SCAN1 arises not only from loss of functional TDP1 but also requires the mutations observed in the human patients. In other words, only specific mutations of TDP1 will cause SCAN1.

Confirming this proposal, our initial studies show: 1) that depletion of mutant TDP1 from SCAN1 patient cells improves the ability of these cells to repair DNA; and 2) that the mutant TDP1 in SCAN1 cells becomes stuck on the DNA and can only be removed by functional TDP1. Final confirmation of our hypothesis awaits generation of a mouse expressing TDP1 that has the mutation found in the SCAN1 patients.

In summary, this study has more precisely defined how mutations of TDP1 cause SCAN1 and has provided a clear direction for future studies of TDP1 in the nervous system and for generating a model system that will allow us to test potential treatments for SCAN1. ❖

# Mouse Model for X-Linked Congenital Ataxia

Joseph Gleeson, MD

University of California, San Diego

*The following is a research summary of a grant funded by NAF for fiscal year 2005.*

In this project, we proposed to generate a mouse model for a gene that was found to be mutated in some forms of congenital ataxia, the type of ataxia that is seen in newborns and associated with a disorder in development of the cerebellum. Creating an animal model for a human disease is a critical step in understanding the basis for the disease, and in developing and testing potential therapies prior to their use in humans. Although these mice are incredible important for research to progress, they take at least a whole year to create and then at least another year to analyze and characterize the mouse, to see how similar it is to the human disease. Thus we would not expect to have significant results to report back to the NAF within the timeframe of this grant.

During the course of this research project, we determined that the initial animal model that we planned to make was untenable because it was not as easy as we thought it would be to shift to creating a mouse model of a different genetic form of congenial ataxia for one gene that we recently found to be mutated. This animal model is currently being developed in the lab, and has proceeded smoothly and according to plan. We do not have specific details of the results of the experiment yet, partly because we had to shift to a different mouse model halfway through the grant award, and partly because of the long time it takes to develop these animal models. We hope to have firm results in the near future and look forward to acknowledging the support of the NAF on scientific reports that result from this work.

I would also like to thank NAF for the impor-

tant work it is doing to promote awareness and help in the scientific discovery of causes of ataxia. One of the major focus areas of my laboratory is in finding the causes for Joubert syndrome, a disease in which part of the cerebellum fails to form. In this condition, children are born with severe medical problems, including severe muscle weakness, breathing problems and ataxia. There is life-long disability and no treatment is available. Through the research we are doing, we have been able to contribute to the knowledge of this disorder by identifying the first two genes for Joubert syndrome. These genes have unknown function at present, so the first step is to determine their role in the function of the cerebellum. The goal of this research project is to improve the diagnosis and treatment of these conditions. I hope that we can continue to work with the NAF to move this research forward.

Also, I am proud to say that the NAF has provided important financial and administrative support for a scientific conference that we are hosting entitled "Cerebellar development: Bench to Bedside," to be held in Washington, DC November 9-12. It will bring together the world's experts in how the cerebellum is put together, and the kinds of diseases that can result when this process does not occur correctly. This will be the first conference of this type, and the timing is perfect because there has been explosion of knowledge about the causes of these disorders in humans. The NAF has helped a lot in the support of this meeting, and is yet another way that the NAF serves as a catalyst for many types of important research. ❖

# SCA26 is Caused by a Mutation in a Vital Protein Synthesis Gene, Which is the Target of Diphtheria Toxin

Guo-Yun Yu, PhD  
University of Minnesota

*The following is a research summary of a grant funded by NAF for fiscal year 2005.*

We previously located the SCA26 lesion on the short arm of chromosome 19. Using candidate gene sequencing and methods of standard population genetics, we further pinpointed the mutation to a single nucleotide change in a gene, called protein Eukaryotic translation elongation factor 2, EEF2 for short. The mutation caused a Histidine substitution of a Proline at position 596 (P596H) in the protein sequence coded by this gene. This gene is vital to protein synthesis. It happens that this protein is also the target of the Diphtheria toxin of the Diphtheria bacteria. The toxin attacks the posttranslational modified Histidine residue at position 715 (H715). EEF2 is a well-studied gene; the crystal structure of the protein for baker's yeast has been resolved. This gene is well-conserved, at the protein level, 66% of the sequence of the human EEF2 are identical to the yeast EEF2. We expect the two proteins have similar structure. Using the yeast EEF2's structure as a reference, we found that the SCA26 mutation (P596H) is the next-door neighbor of the diphtheria toxin target H715.

Beyond that H715 of EEF2 is the diphtheria toxin-targeting site; we are not clear about the real biological functions and its posttranslational modification process of H715. However, recent research has linked it to ovary cancer, and cell cycle control. Structure determines functions. We believe the SCA26 mutation will have an impact on the P715 and its associated biological functions. Our discovery of this mutation provides an excellent opportunity to know more about the ataxia disease at molecular level and the real function of the toxin site. We also found that P596 may be an important CDK5 kinase site. CDK5 kinase is a brain-specific kinase, and it regulates many important functions in neurons. The mutation P696H may have destroyed this regulatory site. In summary, we pinpointed the mutation of SCA26 to a vital protein synthesis gene, which happens to be the diphtheria toxin target.

The vast knowledge accumulated from studying protein synthesis and diphtheria provides an excellent opportunity for us to understand ataxia. ❖

## Tell Your Story in *Generations*

Personal stories are an important part of this *Generations* newsletter. They give inspiration and encouragement to our readers. We have received many letters that have expressed how a single article has changed someone's life.

If you have a story you would like to share, we would love to hear from you. We welcome all

stories, poems and photos and will review all submissions.

Please send materials to the National Ataxia Foundation c/o *Generations*, 2600 Fernbrook Lane, Suite 119, Plymouth, MN 55447 or e-mail [naf@ataxia.org](mailto:naf@ataxia.org). Please include a SASE if you would like your materials returned.

# Young Ataxia Hero

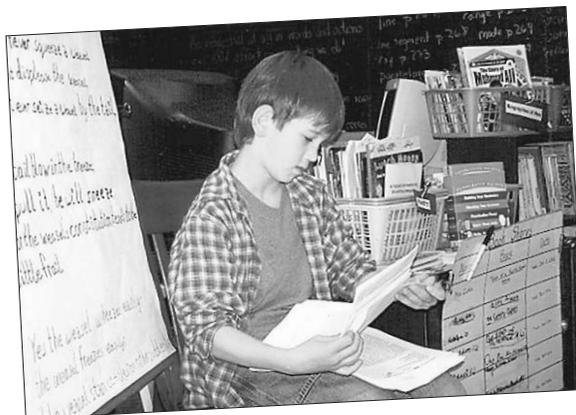
The following letter was submitted by Landon Leger's fourth-grade teacher.

On Wednesday, April 24th, Landon Leger entertained questions about what he has learned about ataxia, a disease that has affected his family. He attended a conference in Boston where he met many people with different types of the disease. Because he was eager to share his experiences with me, his teacher, Landon lent me a pamphlet so I could understand its causes, symptoms and progression. As we discussed what I read, I asked Landon if he would like to speak to the class about what he knew. He eagerly accepted.

Landon invited his classmates to ask him questions about the conference, the disease, his family and his thinking about this issue. While many of the children are aware that Landon's mother, Stacy, has a difficult time walking and speaking, several did not know why. Those who know that Stacy has ataxia had questions about the origin, progression and symptoms of this neurological condition. Several asked about how Landon feels about his potential to have this disease as an adult.

Landon's candid approach to this serious topic was admirable. He was upfront about his thoughts concerning his family's experiences and related them to his thinking of others with disabilities. While only nine years old, Landon has a mature outlook regarding this disease. He knows he has the potential to have it as an adult, but his thinking is mature: "I'm not going to worry about it now and ruin my childhood."

Landon is a leader in my classroom and I believe his positive feelings for and comfort with people with disabilities will help his peers to react the same way. As a society we need to be more accepting of those different from us — our society starts with our children, like Landon.



The National Ataxia Foundation  
50th Annual Membership Meeting

# “The Bridge to Hope”

Memphis, Tennessee — March 22-25, 2007

The National Ataxia Foundation and NAF Mississippi Chapter would like to invite you to join them in celebrating the 50th anniversary of NAF—The Bridge to Hope, 1957-2007. The meeting will be held on the Mississippi River at the Downtown Memphis Marriott in Memphis, TN. The dates are March 22-25, 2007. Make your plans to join your friends and enjoy a Memphis breeze.

## Thursday, March 22

This is typically a day for arrival. Many attendees come in on Thursday to get settled, rest, or venture out to see the sights before the start of sessions.

**Leadership Meeting** – The Leadership Meeting will be from 1 to 5 p.m. This meeting is traditionally for Ambassadors, Chapter Presidents, and Support Group Leaders. If you are interested in becoming an ambassador or support group leader please e-mail Lori ahead of time at [lori@ataxia.org](mailto:lori@ataxia.org).

**Internet Group** – There will also be an Internet Group get-together from 6 to 8 p.m. for those interested in meeting others who participate in ataxia chat sites, including ENAF, Internaf, Tricks of the Trade, Ataxia Forum, Ataxia Chat 2002, and FAPG.

## Friday, March 23

This year's meeting program format will be a little different than last year. Please check back on our website for updates on Friday's schedule.

**Workshops & Breakouts** – Friday morning, both 45 minute and 1½ hour sessions will be available on various topics. We are busy

scheduling topics and speakers for these sessions and more information will be supplied closer to the date of the meeting.

**Birds of a Feather** – In response to comments from last year's meeting we are going to continue to schedule Birds of a Feather on Friday afternoon. Groups will be sectioned off in individual or divided rooms based on the type of ataxia, caregivers, parents, etc. This is a tremendous opportunity for you to meet others with your type of ataxia or who share in a similar situation, and make friends that will last a lifetime. Medical professionals will also be on hand, circulating between groups, to answer your questions.

**Friday Night Reception** – Please join us for a reception in the Convention Center Ballroom for a wonderful NAF 50th Anniversary Celebration. All registered meeting attendees are encouraged to attend and entrance to this event is included with your registration. Make plans to come and celebrate 50 years of NAF. More information will be available closer to the event.

## Saturday, March 24

**General Sessions** – Saturday morning and afternoon will feature General Sessions in the Convention Center Ballroom. General Sessions are large group presentations, typically with a medical or research focus. Many of the world's leading ataxia researchers and clinicians, along with other ataxia experts, will present the latest research and additional information. We will also have general sessions on “What is NAF,” “The History of NAF,” and “What is Ataxia.” ▶▶

General Sessions will be followed by a Question & Answer Session. A more detailed schedule will be available soon.

**Church Services** – Both Catholic and non-denominational services will be held at the hotel if you choose to participate. Service times to be announced soon.

**Saturday Evening Banquet** – Join us for dinner and entertainment on Saturday for our traditional banquet with a local Southern flare. There will be wonderful food, fabulous entertainment, a raffle for fantastic prizes, and another chance to get together with each other and meet new friends. This evening promises to be full of fun!

### **Sunday, March 25**

**General Sessions** – Sunday morning wraps up the conference with the final round of General Sessions and a Question & Answer Session from a panel of speakers.

### **About the Hotel**

The Memphis Downtown Marriott is located in the heart of downtown Memphis at 250 North Main Street and is close to shopping, museums and night life.

The hotel is 15-20 minutes from the Memphis International Airport, is an official stop on the Memphis Trolley Line and is connected to the Memphis Cook Convention Center. The hotel offers complimentary coffee and tea in each room as well as a newspaper.

The Memphis Downtown Marriott features Magnolia Grille with American favorites, including a daily breakfast buffet and weekday luncheon buffet. The Trolley Stop Bar, located in the lobby, is also available for snacks and hors d'oeuvres. Recreational activities for you to enjoy at the hotel include an indoor swimming pool, complete fitness center, sauna, and whirlpool.

To reserve your non-ADA room please visit the Memphis Marriott Downtown at [www.memphismarriottdowntown.com](http://www.memphismarriottdowntown.com) for more

information or call 1-800-228-9290 for reservations. Please let reservations know you are with the National Ataxia Foundation group to get the \$126 standard room rate. Our group code is ATA.

NAF will be taking ADA room reservations, NOT the hotel. ADA rooms will fill up fast, so please contact Lori at NAF by calling (763) 553-0020 to reserve (or cancel) your ADA room immediately. NAF has a limited number of shower chairs, toilet frames, and tub bars available on a first-come, first-served basis at the Memphis Marriott Downtown hotel front desk.

### **About Memphis**

Memphis is the birthplace of the Blues and rock 'n' roll. It is the home of Elvis Presley. Originally a sleepy southern cotton town bordering Arkansas and Mississippi, Memphis now brings music images to mind: an aged blues player strumming a guitar, a young Elvis swiveling his hips on stage, and young hopefuls recording their first record in a remote studio. But this city of great musical heritage has so much more to offer!

There are plenty of free and inexpensive things to do in Memphis. Visitors can take the trolley and walk down historic Beale Street, which offers free music in the park, nightclubs, art galleries, museums, restaurants and shops lining the street. The trolley is wheelchair-accessible with wheelchair lifts at each stop. Each trolley car can accommodate two wheelchairs and runs every 10 minutes.

You can have your picture taken at the Graceland Gates, home of Elvis Presley, and visit Meditation Garden, where Elvis, his parents and grandparents are buried, for free each morning before 8:00 a.m. You will want to visit the Cooper-Young Antique District and Entertainment District, featuring unique shops, boutiques, galleries, and specialty restaurants. It

# Featured Board Member of the NAF: Earl McLaughlin

Earl McLaughlin was born and raised in San Diego, CA. After leaving the Air Force, Earl attended college at San Diego State University where he graduated with honors and received a BS in Accounting and a BA in Economics. He later received an MBA in Information and Decision Systems. Earl also has passed the CPA exam.

Earl was a Toastmaster for 13 years where he achieved the level of Able Toastmaster (ATM). As a Toastmaster, he won recognition including winning the Toastmaster's District 5 Humorous Speech Contest in 1996.

Recently, Earl retired as a Principal Accountant with San Diego Gas and Electric Company, where he worked since 1984. In his free time, Earl has been teaching sixth-grade Catholic religious education for the past 22 years and is active in the Knights of Columbus.

Earl is married to Renata and both share a love of life and commitment in supporting the important work of the National Ataxia Foundation. In fact, as Earl says, "I have a vested interest in the success of the National Ataxia Foundation, I have ataxia." Earl was diagnosed at a young age with Friedreich's ataxia.

In 1984 Earl became an active member of the Foundation and in 1986 co-founded the San Diego Ataxia Support Group, the first NAF support group. Earl is currently the support group leader.

In 1988 Earl was elected to the NAF Board of

Directors and serves as the Board Chair of the Fund Raising Committee and Board Chair of the Abilities Expo Committee. Earl's commitment and passion in his quest to tell people about ataxia and the National Ataxia Foundation is seen through his frequent speeches he gives to groups and organizations.

Earl stated, "If we (people with ataxia) are not going to work hard for NAF, how can we expect someone without ataxia to do it for us?" Earl is a solid example of how one person can make a difference. Earl has encouraged his company and the people he works with to support the efforts of the Foundation. Many have become frequent contributors and supporters of NAF programs and events.

Under Earl's leadership, the San Diego Support Group has hosted three NAF annual membership meetings in 1989, 1994, and 2004. The 1989 meeting was the first time that an NAF annual membership meeting had been located in California.

When you talk to Earl about an annual membership meeting his eyes light up. Earl stated, "If someone does not believe that God lives in all people, they have not been to an annual meeting."

Earl began attending NAF's annual membership meeting in 1986 and has attended every conference since that time. As he tells those who are first timers to the conference, "This may be your first annual meeting, but not your last." ►►



**Earl McLaughlin**

## A Leader Remembered: Kay Bell

We mourn the passing of a courageous woman, Kay Bell.

Kay suffered for 30 years from a progressive disease called Hereditary Ataxia which, in her case, caused generalized brain atrophy. She was unable to walk for the past 11 years and needed an in-home lift to place her onto her scooter due to progressive weakness in her arms. She was employed as long as she was able, but the disease claimed her energy.

Through all of this she never complained. She put on her happy face to all.

Kay was born in Portland, ME in 1950. Her father was in the military, so the family moved around the USA. She lived in Fayetteville, NC for 23 years, where she raised her three children. Her symptoms probably began in her late 20's, but she wasn't diagnosed until she moved to Huntington Beach, CA in 1989.

Kay Bell founded the Orange County Ataxia Support Group soon after her diagnosis. Her group was featured several times in Diane Rodecker's column in the Orange County *Register*. She was not a quitter. In fact, doing one thing was never enough.

Being a visionary, she always saw what needed to happen next. Others would say

"what you want will take a lot of work." Kay's answer was, "but it is needed," and she would find a way to get it done. She not only served on the Board of the National Ataxia Foundation, she used her administrative abilities to set up one of their national conventions in Southern California.

Kay was active in getting Gov. Schwarzenegger to sign a proclamation for International Ataxia Day each year. She was currently trying to get the laws changed so that many of the sufferers of ataxia would be covered under GHPP (Genetically Handicapped Persons Program) Insurance.

She was politically involved. The Republican Women's Club of Huntington Beach

honored her several times for putting together their monthly award winning newsletter.

Kay is missed terribly by her family. She leaves her daughters and their husbands, Karen and Tom Covington and Petra and Terry Tyndall, and her son and his wife Paul and Helen Bell. She leaves her grandchildren, Connor and Alaina Covington, William Tyndall, and Paul and Joan Bell. She leaves one sister, Carolyn Campbell.



**Kay Bell**

Earl has given countless hours in his efforts to help carry out the important mission of the Foundation.

Through chairing fund raisers, speaking to groups about ataxia, raising awareness about ataxia through International Ataxia Awareness Day (IAAD), and exhibiting at various Abilities Expos throughout the country, Earl is a true champion of the Foundation and the ataxia community.

Friedreich's ataxia has had a profound impact on Earl's life. Even with his challenges, he faces each day with a resolve to continue his efforts

in making life better for all who are impacted by the ataxias. As a board member, Earl continues to bring forth new ideas and important programs in helping ataxia families.

"Through the Foundation there is common ground and common good for all of us who are affected by ataxia," Earl stated. "Some of us may have Friedreich's ataxia, while others may have a form of SCA, and others may have an unidentified form or a sporadic form of ataxia. Each of us working together has the ability to support each other to make a difference." Earl leads by example. ❖

# Generations Word Find

Please see directions and terms at right. Answers appear on **page 40**.

W	Q	P	I	W	B	R	A	I	N	S	T	E	M	L	H	G	K	F	G
B	N	F	O	C	U	V	N	T	V	M	O	W	U	B	X	J	Z	T	W
D	G	J	H	A	N	T	I	S	E	N	S	E	D	N	A	U	A	K	P
F	K	B	Z	N	C	W	J	C	A	X	E	H	M	O	U	C	H	B	R
R	A	L	T	T	M	V	O	V	B	N	M	A	S	G	Q	L	H	W	O
G	S	M	T	I	Q	I	N	Y	J	U	B	T	W	I	T	Y	K	J	T
P	D	B	G	S	C	R	G	W	N	G	E	Q	A	U	N	L	P	U	E
J	F	O	V	E	E	A	X	E	R	S	H	I	P	K	B	E	W	T	A
E	G	N	U	N	N	K	J	G	D	Y	S	C	O	L	I	O	S	I	S
O	H	T	R	S	L	E	F	W	V	B	Q	D	Z	F	L	G	L	K	O
N	X	Q	F	E	Q	S	F	G	H	D	V	E	N	W	T	T	R	Y	M
E	J	I	U	R	T	A	N	R	Z	E	T	R	A	N	S	G	E	N	E
U	Q	Z	D	N	E	J	P	Z	E	A	W	U	B	R	C	K	K	U	L
R	E	N	E	A	G	S	W	O	W	Q	H	J	I	A	T	O	F	S	N
O	R	I	E	S	T	D	P	G	P	X	U	A	G	P	M	L	Y	M	O
C	Y	T	Z	D	F	I	Q	I	U	T	B	E	R	A	L	R	H	E	I
X	I	S	T	E	Z	N	O	F	R	M	O	Z	N	V	W	J	M	J	T
J	W	O	R	T	K	B	C	N	X	A	L	S	B	C	V	C	L	R	A
G	H	E	W	G	W	H	K	P	I	U	T	R	I	T	Y	V	E	X	R
P	L	D	E	Q	A	Z	C	X	B	W	D	I	X	S	E	M	P	F	I
Q	R	T	H	E	T	E	R	O	G	E	N	E	O	U	S	Y	U	I	P
R	E	P	X	A	S	E	T	Y	P	J	L	Q	Z	N	R	J	Z	T	S
N	U	C	L	E	A	R	I	N	C	L	U	S	I	O	N	S	T	M	E
N	Z	R	I	M	O	T	O	R	N	E	U	R	O	N	G	E	O	L	R
V	H	W	C	Y	R	U	I	M	C	Q	A	R	A	T	A	X	I	A	N

# NAF's New Web Site

The National Ataxia Foundation launched its new web site, [www.ataxia.org](http://www.ataxia.org), earlier this summer. We welcome all of you to visit the new web site and explore.

The new site offers NAF-funded research summaries of studies which are being conducted today, more links, more current issues of *Generations*, and a Neurological Resource List of neurologists in your area.

The site also provides you with a site map to help you navigate through the site, chat rooms and bulletin boards, downloadable fact sheets on ataxia, and much more. In addition, you

have choices of font sizes and an opportunity to donate on-line. Check out the new web site and see the changes.

You may also want to check back periodically because the web site will be getting additional phases added. The next phase will be launched later this year.

See you online!



## Word Find Directions

Circle the terms defined below when you find them. They can be found across, down, and diagonal.

**Antisense DNA:** A synthetic DNA strand that is complementary to a particular strand of target DNA with a complementary sequence of bases. This results in preventing expression of the gene encoded. These proteins can be used to selectively turn off production of certain proteins or block genetic instructions.

**Antisense RNA:** It works as described above but is a complementary RNA sequence that binds to a naturally occurring (sense) mRNA molecule, thus blocking its translation.

**Apoptosis:** Programmed cell death.

**Ataxia:** Poor coordination. It can be used to refer to a neurologic symptom which can have many causes or to denote one of several degenerative diseases that cause poor coordination.

**Brain Stem:** The lowest part of the brain, which merges with the spinal cord. It consists of the medulla oblongata, midbrain, and pons.

**Gene Frequency:** The percentage of a give allele (gene) in a certain population.

**Heterogeneous:** A descriptive word that says two genes are unlike each other.

**Nuclear inclusions:** Also called aggregates. They are clumps of insoluble protein. Mutant proteins in

poly-glutamine diseases tend to "clump up" in the cell nucleus of affected nerve cells. This suggests that proteins are not degraded efficiently and accumulate over time.

**Motor neuron:** A nerve cell that carries information from the central nervous system to the muscle.

**Oxidation:** The process by which a substance combines with oxygen. This process causes a loss of electrons in an atom and thus there is an increase in positivity of that atom.

**Proteasome:** One of three types of molecules (proteasomes, ubiquitins and chaperones) that are involved in protein degradation. Proteasomes break protein down for recycling. They act like a cellular waste facility.

**Respiration:** A term used by physiologists and biochemists, to describe the process of breathing and the intracellular oxidation of substrates (nutrient substances).

**Scoliosis:** Sideways curvature of the spine.

**Transgene:** A foreign that is introduced into an organism by injecting the gene into newly fertilized eggs. Some of the animals that develop from the injected eggs will carry the foreign gene in their genomes and will transmit it to their offspring.

# Boosting Food Intake

## What to Do When Appetite is Poor

As the body ages, a person has to make more of an effort to eat wisely. Most older people need fewer calories, but their bodies absorb fewer nutrients so they must eat high-nutrient food to maintain good health. They must get more nutrients from less food. Check with the doctor before starting any special diets, especially for the person with a swallowing impairment. Also, check with a doctor, pharmacist, or registered dietitian to know what effect prescription medicines have on nutritional needs.

### Tips for Improving Nutrition

- Offer food when the person is most hungry, and be sure dentures fit correctly and eyeglasses are on.
  - Encourage the person to eat food with the fingers if it increases intake.
  - Add non-fat powdered milk to any food with liquid in it, such as desserts, soups, gravy, and cereal.
  - Add butter, whipped cream, or sour cream to foods.
  - Add cottage cheese or ricotta cheese to casseroles, scrambled eggs, and desserts.
  - Grate hard cheeses on bread, meats, vegetables, eggs, and casseroles.
  - Use instant breakfast powder in milk drinks and desserts.
  - Add nuts, seeds, and wheat germ to breads, cereal, casseroles, and desserts.
  - Add beaten eggs to mashed potatoes, sauces, vegetable purees, and cooked puddings.
  - Add honey, jam, or sugar, to bread, milk drinks, fruit, and yogurt desserts.
  - Add mayonnaise to salads and sandwiches.
- NOTE: These may not be the best foods for a*

*person under special medical treatment. Special diets and products to improve nutrition should only be used on the advice of a doctor or registered dietitian.*

### Economical and Easy Food Tips

#### Pasta and Beans/Lentils

Did you know that pasta, along with beans and lentils, are among the most economical food choices? The good news is that they are also good for you and the person in your care.

#### Pasta

Look at the unit prices on the store's shelves. This will tell you how much you are paying per ounce so you know which one is the least expensive. There is no need to make meat sauce for your spaghetti. Plain old tomato sauce is best for your heart and your pocket book. Most people eat about four times more protein than they need, so skipping the meat is no problem.

Did you know that you can make big batches of pasta and then freeze it in freezable storage bags or containers? It is best if you freeze it in small portions for easy reheating later on using the microwave.

#### Beans and Lentils

Beans and lentils are among the best-priced sources of protein. They are high in fiber and B vitamins and, unlike animal protein; they don't contain saturated fat or cholesterol to clog your arteries.

Lentils are one of the easiest legumes to cook. They don't need soaking and they cook rather quickly – in about 20 minutes. Beans are easy to cook too. It is best if you soak them in ample water overnight and then cook them the ▶



next day. Make sure you add salt or acidic ingredients at the end of cooking so you don't make them tough.

It is a good idea to cook lentils and beans in large batches and then freeze them in small portions for later use.

Here are fun and easy ideas you can do with beans and lentils:

- Add them to salads. When you don't feel like cooking, toss a few beans with lettuce and other veggies and serve your salad with whole grain toast. Add them to potato salad or make bean salad.
- Make a quick soup. Add cooked beans or lentils to frozen vegetables and low-sodium V8.
- Beans and rice. Serve cooked lentils or beans over cooked rice. Season them with a little chili powder and garlic powder.
- Spaghetti sauce. Lentils add hearty flavor and texture to spaghetti sauce.

### **Taking Care of Yourself: Housework is Great Exercise!**

The U.S. Surgeon General suggests 30 minutes of moderate physical activity at least five days per week. Moderate intensity is anything that raises your heart rate. Thirty minutes sounds like a lot, but you don't have to do it all at once. If your chores increase your heart rate for 10 minutes or more, you can count it toward your exercise goal. Ten straight minutes of moderate intensity activity three times per day would give you the recommended 30-minute workout.

Mowing your lawn with a push mower, moving furniture when you vacuum, chopping wood, and washing the floor on your hands and knees are all good examples of moderate-intensity exercise. Light dusting, washing dishes, and ironing are considered to be light-intensity activities and would not count toward your daily activity minutes. So check with your doctor, then go ahead...turn on the radio to

## **Attention Federal Workers**

The National Ataxia Foundation is recognized to receive funds through the Combined Federal Campaign (CFC).

The Foundation gratefully acknowledges those government employees who have given so generously to the CFC in support of the important work of the National Ataxia Foundation.

To contribute to the Foundation through the CFC, the designated CFC number is **1028**.

We welcome all government employees to contribute to NAF through their local CFC. We also ask that you encourage your co-workers to also support the Foundation's efforts.

## **Annual Ataxia Research Drive**

Give help and hope to those affected by ataxia by contributing to the 2006 National Ataxia Foundation Annual Ataxia Research Drive.

Each research dollar brings us closer to stopping ataxia. Please give as generously as you can.

## **Remembering NAF in Your Will**

Today is a gift and tomorrow is not promised. What we do today can change the future.

Adding the National Ataxia Foundation to your will gives hope for today and a promise for a brighter future.

# NAF Merchandise

## BOOKS

**“Ten Years to Live”** by Henry Schut

The story of the Schut family’s struggle with hereditary ataxia and the impact it had on this extended family. Paperback, photos. \$8.75 (includes S&H)

**“Keep A Goin’”** by Jeff and Melinda Cromwell

Fifty stories about ataxians around the world. A portion of the proceeds goes to NAF’s research program. Paperback. \$13 (includes S&H)

**“Living with Ataxia”** by Martha Nance, MD

*New second edition!* A compassionate, easy to understand explanation and ideas on how to live with ataxia. Paperback. \$14 (includes S&H)

**“Healing Wounded Doctor-Patient Relationships”**

by Linda Hanner and contributor John J. Witek, MD  
Offers demonstrations of how effective dialog can help move patients and doctors to productive relationships. Paperback. \$10 (includes S&H)

**Friedreich’s Ataxia Research Cookbook**

Julie Karjalahti, of Savage, MN, has published this cookbook to raise money for FA research. Recipes from around the United States. \$12 (inc. S&H)

**“Recipes and Recollections”** by Kathryn Hoefler Smith

Full of delicious recipes and recollections. Perfect for fund raisers. Proceeds go towards FA research. Paperback. \$10 (includes S&H)

**Managing Speech & Swallowing Problems**

by G.N. Rangamani, PdD, CCC-SLP  
A basic guide to understanding and managing speech and/or swallowing problems. \$7.50 (includes S&H)



## VIDEO / CD

**Ballads of a Family Man CD**

A CD containing 10 songs in memory of Billa Ballard. \$5 of the purchase price goes to support the work of the NAF. \$13 (includes S&H)

**“Together there is Understanding” Video**

A continuation and expansion of the NAF video “Together There is Hope,” this 50-minute video provides an in-depth look at ataxia and ataxia research. VHS \$20 or DVD \$25 (includes S&H)

## SHIRTS / MISCELLANEOUS

**NAF Denim Shirts**

Denim with white embroidered NAF logo. \$27.50



**2006 Annual Meeting T-Shirt**

Vintage long-sleeve with “Beacon of Light” logo. Sizes XL to XXX-large. \$10

**2005 Annual Meeting DVD or VHS**

Set of 5 DVDs \$75. Set of 4 VHS \$50.

**“Ataxia is not a foreign cab” T-Shirts**

White. New design. Sizes small to XXX-large. \$10

**“Ataxia is not a foreign cab” Sweatshirts**

Ash colored. Sizes small to XXX-large. \$20

**Window Clings & Bumper Stickers**

\$1 each or 6 for \$5

**NAF Ataxia Awareness Bands**

Blue. One size fits all. \$2



**NAF Ataxia Awareness Ribbon Magnets**

Blue with white lettering/logo. \$4

**To order, call (763) 553-0020, fax (763) 553-0167 or mail this completed form to National Ataxia Foundation, 2600 Fernbrook Lane, Suite 119, Minneapolis, MN 55447**

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SIGNATURE: \_\_\_\_\_

*Boosting Food Intake*  
Continued from page 31

great music and do those chores while building a healthier you!

Source: [www.diabetes.org](http://www.diabetes.org)

### Resource for You

The person in your care may be eligible for the Meals on Wheels program if he or she:

- Is age 60 or older with a spouse of any age,

or a disabled person under age 60.

- Cannot use kitchen appliances.
- Has no motivation to prepare a meal and no caregiver to help cook.
- Has become homebound in the winter months.
- Is recuperating from serious illness or surgery.

For more information, visit Meals on Wheels at [www.mowaa.org](http://www.mowaa.org). ❖

## From the Desk of the Executive Director

The National Ataxia Foundation began direct funding of ataxia research in 1978. Over those years the Foundation has funded hundreds of studies throughout the world. Each of these studies has brought us closer to finding more answers that will help us stop ataxia.

Gene identification, better understanding of gene function, expanded classification of the ataxias, and learning more about the hereditary and sporadic ataxias are vital steps in finding treatments and ultimately a cure.

The Foundation has embarked on this journey in funding research, encouraging scientists to enter the field of ataxia research, and bringing clinicians and researchers together to uncover the mysteries of ataxia.

Many of the discoveries made have been through research supported by the National Ataxia Foundation. Individuals throughout the nation have given generously to support the Foundation's annual ataxia research drives. Individual contributions – your contributions – are making a difference in the fight against ataxia.

In October the Foundation will begin the 2006 NAF Annual Ataxia Research Drive. Funds received through this drive will be used to support the most promising ataxia research studies. We are asking for your crucial support in

giving scientists the keys to unlock the mysteries of ataxia.

In the Fall of each year the NAF Medical and Research Advisory Board (MRAB) reviews research applications from scientists throughout the world. After careful and thoughtful consideration, the MRAB makes funding recommendations in December to the NAF Board of Directors. At the December meeting the NAF Board of Directors determines the funding on the most worthy research studies for FY 2007



**Michael Parent**

Over the years a number of vital research studies were not funded because of lack of financial resources. That is why it is so imperative for each and every one of us to support the 2006 NAF Annual Ataxia Research Drive. We

have seen tremendous research gains over recent years. Let us not lose research opportunities and fall behind because of lack of funding. Your research dollars truly do make a significant difference in the Foundation's ability to support these essential research studies.

When you receive your 2006 NAF Annual Ataxia Research Drive appeal letter in October, please give as generously as you can. Each dollar brings us one step closer in ending ataxia. Your support makes all the difference. Thank you.

*The Bridge to Hope*  
Continued from page 37

is also home to the First Church of the Elvis Impersonator. The Peabody Place Entertainment and Retail Center includes the Peabody Hotel, Beale Street, Fed Ex Forum, the Orpheum Theatre, and AutoZone Park.

The center is anchored by a 22-screen Muvico Theater complex; Jillian's a multi-faceted entertainment experience including dining, a video café, and sports bar. Peabody Place also features Tower Records, which offers the latest in music and video and often offers live entertainment, featuring many Beale Street musicians.

The historic Peabody Hotel is located here. It features the march of the famous Peabody ducks, which takes place daily at 11 a.m. and 5 p.m. Afterwards, take the elevator to the roof to see the ducks' home and the wonderful views of Memphis.

The Sun Studio Shuttle is a free shuttle service from Graceland, Sun Studio, Rock 'n' Roll Museum and Soulsville: STAX Museum of the American Soul Music. The shuttle is complimentary but each attraction has admission costs. If you require a wheelchair accessible shuttle, please call Sun Studio at 1-800-441-6249 or (901) 521-0664 to make reservations in advance. The wheelchair-accessible shuttle is still free of charge, but reservations must be made in advance.

Please watch for more  
Annual Membership Meeting  
information and registration forms  
on our website, [www.ataxia.org](http://www.ataxia.org),  
and in the Winter 2006-07  
issue of *Generations*.

For more information on these and other attractions that Memphis has to offer, please visit the Memphis Convention & Visitors Bureau at [www.memphistravel.com](http://www.memphistravel.com).

### Registration

Registration will be open at limited times during the meetings. Please check in the Winter 2006-07 issue of *Generations* and our meeting program for registration hours throughout the meeting.

### Transportation

The Memphis Area Transit Authority (MATA) offers public bus service from the lower outer drive near Terminal C. The airport route, 32 East Parkway Airport, services the airport hourly. To contact MATA direct, you may call (901) 274-MATA. The Downtown Memphis Marriott is not located directly on the MATA bus line.

MATAplus is a service designed to meet the transportation needs of people with disabilities in the Memphis area. In order to utilize the benefits of MATAplus, riders must have a disability that prevents them from riding the MATA fixed route bus system. In order to utilize MATAplus service, you need to fill out an application. To request your application or to get more information about MATAplus please call 722-7140 from 8 a.m. to 4 p.m., Monday through Friday.

Arrow Transportation provides wheelchair accessible transportation to and from the Memphis Airport & Memphis Marriot. Tours to local attractions and Tunica, MS are also available. Reservations must be made in advance by March 1, 2007 and can be made by calling (901) 523-2002 and asking for the National Ataxia Foundation group rate.

Wheelchairs Express is a service for anyone needing wheelchair accessible transportation to/from the airport. Please make reservations directly with them in advance. The number for Wheelchairs Express is (901) 353-3500. ❖

# Letter to the Editor

by Martha Harlam

Inspired by all the articles of sufferers of ataxia, I felt it necessary to share my story with others in the hope that it might inspire someone to “keep going.”

I was diagnosed at age 34 with Cerebellar Ataxia. Just at the peak of my powers, the disease stopped me from pursuing my operatic singing career in Europe. I had been singing professionally since I was six years old. After my voice matured, and with intensive classical training at University, I went on the audition trail in 1973 and landed my first engagement as an opera singer. My travels with singing took me to Germany, Austria, Switzerland, Israel, Great Britain, and, of course, Italy.

The thought of doing anything other than singing for my supper was nowhere in my calculations. Until one day as I was crossing a swaying bamboo bridge, some 60 meters above the stage in *Madame Butterfly*, I felt an uneasiness in my gait. I couldn't tell if the trouble was the swaying bridge or something else. I'd always crossed that bridge, I thought to myself. Tossing the episode aside I went on with the daily routine of rehearsals and performances.

Two weeks later I found my balance was off and the ability to maneuver staircases and ramps on stage became fearful chores. I felt more and more uneasy. Then the real signal came when I tried to sing a rapid passage with others on stage and I found myself struggling with the articulation of the Italian. The conductor approached me, saying “you were always behind the beat tonight, please keep up with the rest of the ensemble.” That was the last straw. I had always been a consummate musician. The very thought of not keeping up with the rest of the singers was terrifying.

As time went on – almost two months – I found myself struggling with all things requiring fine motor skills and swallowing. That was it. I was off to investigate the problems. The first thing I did was call my parents in the States. My mother had always had a history of unbalance, slurred speech, and problem doing kitchen chores. I was aware that she was undergoing

testing at the UCLA Ataxia Center for a “rare neurological disorder” but little was known about it at the time. It turns out they diagnosed her with Friedreich's Ataxia.

I therefore checked in at the Neurological Center of the Cologne/Bonn University Hospital. After an extensive series of tests, a CAT scan and numerous questions about life style, diet, and stress, plus a spinal tap. After test completion, six men in white doctors coats were all standing around my bed telling me that I, too, had Friedreich's Ataxia or OPCA, but they weren't quite sure which. The scan was showing grey shadings in the cerebellum that were definitely contributing to my balance, speech, and motor problems.

Now they were all trying to convince me that singing on hydraulic stages or managing staircases, or walking in costume in high-heeled shoes would have to be a thing of the past. Oh sure, I could have gone on singing, but they were advising me at age 34 for the future ahead. Thank God I listened to them.

Today I have a live-in caretaker who helps me with everything. I am truly dependent on just about anyone and everyone to help me maneuver about. But that hasn't stopped my brain, heart, and soul! Having moved from the cold of Germany to the dry warmth of Spain has made a tremendous difference in the progression of the ataxia.

I am active and I use my singing experiences to organize fundraising events for a charity I created that is determined to establish only the second hospice on the Costa Blanca Spain. This will be a living legacy dedicated to my mother, who died in a hospice in Florida in 1995 due to complication from her ataxia. The Sweet Charity Hospice Fund is helping terminal and chronically disabled people and their families receive end-of-life care all across the southern part of Spain (see our website at [www.hospice-spain.com](http://www.hospice-spain.com)). It is a living testimonial to my mom.

Don't let the ataxia get the best of you! Inform yourself how to manage the disorder and “KEEP ON GOING.”

**We welcome your letters and comments. See the inside front cover for contact information.**

**C**hapter and **f**Support Group News  
*from Around the Country*

**Alabama Ataxia Support Group**

*By Becky Donnelly*

The Alabama Ataxia Support Group met in April for a dinner meeting at the Red Lobster in Vestavia Hills, AL. The group enjoyed a meal and fellowship together and then heard the exciting news of Dr. Laura Ranum's discovery of the SCA-5 (Lincoln) ataxia gene.

The group met again in June at Green Valley Baptist Church in Hoover, Al, for a luncheon and meeting. The group posed for a group picture for use on the quilt for the 2007 NAF Annual Meeting, with a friend of the group, Sandye Nance, as photographer. Other topics included the Ataxia Registry, approval of a welcome letter for use in our Support Group, and Cell Group reports. The program was given by our own Janet Skotnicki, a volunteer with Hand-in-Paw, Animal-assisted Therapy, who brought along her Annabell, who brought much delight to the group.

The group also made plans to attend the Concert for Ataxia Awareness, featuring The Claire Lynch Band, to be held in Huntsville on Saturday, July 22, coordinated by Dianne Williamson. Many group members and friends traveled to Huntsville to attend, and to assist Dianne Williamson as needed. It was a WONDERFUL evening! The music was superb. Thanks for the hard work.

**Greater Atlanta Support Group**

*By Dave Zilles*

The Greater Atlanta Support Group held an outing to the Atlanta Zoo in June. It was a great time for everyone. We met at a central location to have lunch and then everyone was able to go off on their own and tour the

Zoo. Fortunately we had a nice cool day. Our next outing is planned on September 30 and we will visit Stone Mountain which is a giant granite outcropping near Atlanta. We have found that getting everyone together on an informal social basis is a great way see each other and have fun. This year we cut back our formal meetings to four a year so we could have more social events.



**Greater Atlanta Support Group at the Atlanta Zoo.**

We are very saddened to report we lost one of our members in June. Lauren Kate Loftin passed away on June 27 due to complications resulting from her long battle with Friedreich's Ataxia. Kate was 24 and very active in the Support Group. She had also been named Ms. Junior Wheelchair Georgia in 2003. Our hearts go out to Bob and Judy on their loss.

Fund raising is very important, so the support group decided to offer a Seven-Night Western Caribbean Cruise aboard Carnival Cruise for two. The tickets are \$5 and the drawing will be held on November 4. Each support group member is being asked to sell at least 25 raffle tickets. We are also going to sell them at a home show in one of the bigger malls here in Atlanta. All proceeds will go to NAF and ataxia research. We have plenty of tickets, so if you would like to sell some, please let us know. ▶▶

The biggest news is what one of our members has done to help young disabled adults live more independently. Lynn Robinette, founder of the Wishes-4-Me Foundation, closed on their first group home in July. The house is being renovated to allow three people to reside at the home and have 24-hour care using the community services resources. Lynn's daughter Robin (22) and Nelda Van Schoick's daughter Becca (24) plan to be the first occupants. Lynn also announced that after asking Bob and Judy Loftin for their blessing, the house will be named Kate's Home in honor of Kate Loftin. This concept had been a dream of Lynn's and the Wishes-4-Me Foundation for several years. It is so important that our young adults be able to live the best they can. For more information you can go to the website [www.wishes4me.org](http://www.wishes4me.org).

We also plan to celebrate International Ataxia Awareness Day with a group signing of the Proclamation with Governor Perdue and our annual IAAD picnic at Lake Lanier on Sunday, September 24.

**Northeast Florida Ataxia Support Group**

*By June McGrane*

Our support group meetings convene every two or three months, influenced by holidays or convenience to members. We have had President Bill Ossmer of the Advocates for Disability Claimants, Inc., speak at a recent meeting.

The June 24 meeting was held in St. Augustine at the Captain's Quarters Clubhouse. The speaker for this meeting was Dr. Nathaniel Whaley, a neurologist with the Mayo Clinic of Jacksonville. He covered many types of Ataxia and research and distributed many charts. He encouraged discussions from members and answered many questions.

We discussed International Ataxia Awareness Day in September and the ataxia quilt for the 2007 NAF 50th Anniversary Membership Meeting. I will be making the patch. Refreshments were served by our



**The Northeast Florida Ataxia Support Group at the Captain's Quarters Clubhouse.**

hosts, Ann and Wayne Mayo, along with Liz and Dick Ingraham.

The next meeting was scheduled for September 23. We will have a luncheon at the Homestead Restaurant in Jacksonville where we will celebrate IAAD. Our speaker has not been decided as of this date.

**BC Ataxia Society**

*By Shannon Connors*

It has been another busy and successful year! Along with our annual Christmas party and various outside events we enjoyed many speakers at our meetings this year. Among them was Christine Gordon of the BC Coalition of People with Disabilities, speaking on the CSIL program (Choices in Support for Independent Living) at our November meeting. This meeting was well attended and very informative. A booklet and fact sheets were made available to all attending.

At our January meeting, Dr. Sian Spacey of the UBC Neurogenetics Clinic came to speak. She explained ataxia and answered many of our questions. In addition, she gave a slide presentation outlining the research she is doing on the role of calcium channels in the development of cerebellar ataxia. This again proved to be a very interesting and informative meeting. Our February meeting included a discussion of fundraising, a meet-and-greet and a general question-and-answer session. Plans were also made for a "Beat the Winter Blah's Night" at the River

Chapter & Support Group News  
Continued from page 37

Rock Casino in Richmond.

During March, the BC Ataxia Society hosted a Tax Seminar for People with Disabilities. Eileen Reppenhagen, a CGA specializing in this field, conducted the workshop. Eileen spoke about tax credits and deductions for anyone who has an infirmity or a disability, or for the caregivers who assist them. She spoke for three hours and answered many questions. For more information, visit Eileen’s web site at [www.taxdetective.ca](http://www.taxdetective.ca). There was a charge of \$10 to attend this workshop in order to cover speaker expenses. It was a break-even evening but was well-attended by creating much awareness for both ataxia and the BC Ataxia Society.

April and May meetings included discussions on issues such as our upcoming fundraiser, donations (made to both NAF and the UBC Neurogenetics Clinic) and also thoughts and concerns of an across-Canada cycle ride by a BCAS member.

On May 14 many members also met and joined Bill Lee and his new wife Joan before they embarked on a honeymoon cruise to Alaska. Bill and Joan are from the Maryland Chapter of NAF.

In June we held our Annual General Meeting (AGM). As expected, I gave my resignation as President. After more than six years at the helm and countless hours of dedicated work, I felt I owed it to myself and my family as well as to BCAS members. Although BCAS was and always will be close to my heart, the time had come to step down. I had done all that I could and it was time to let new blood in. I was excited at the prospect of any change and in helping with the transition. Most of all, I was excited of having the chance to attend a BCAS meeting and relaxing, without the added stress previously put on me.

My spirits were raised at a fundraiser we held in July. I received overwhelming support from BCAS members and emotions took over at the end of the event when thanks

were given to me. At that moment, I realized not only how much I was appreciated but also that it was these people (members) whose feelings really mattered to me. It was truly a special moment and meant a lot to me!

By the time you read this, we will have held our annual picnic. It is once again being hosted by my husband and me at our home. Living on a farm with lots of room for parking, no neighbors to bother, and an in-ground pool for sun worshippers and lots of shade for others, it is the ideal location.

This will be my last submission to *Generations* as the new executive will take over on September 1. As mentioned before, I wish them all the best and thank you again for all the support I have received over the years!

.....

**Advocacy Forum of the ASENT Meeting  
Chesapeake Chapter, Bethesda, MD**

*By Carl J. Lauter*

The Chesapeake Chapter represented itself and NAF at the 5th Annual ASENT Advocacy Forum, held on March 9 in Washington, DC. NAF is a member of ASENT, and we of the CC-NAF like to attend these meetings not only for our own interests, but also to help push information and awareness about the ataxias among researchers, clinicians, pharmaceutical facilities, Congress, and the general public. This is the third year we have been invited and have attended.

We set up an information table in the evening among the other advocate groups to provide information pamphlets about ataxia. We had several “hits” – people asking about ataxia and research grants. About 200 research and clinical scientists, medical students, pharmaceutical representatives, and government officials were in attendance.

The overall theme of this year’s meeting was titled “Emerging Therapeutic Targets for Neuro-therapeutic Development – Delivery Systems for the Next Generation.” The entire three-day event covered such topics as ►►

“Mitochondria, Neurodegeneration and Neurotherapeutics,” “Alpha-synuclein as Therapeutic Target for Parkinson’s Disease,” “Biomarkers in Clinical Trials for Neurological Diseases,” “Basic and Applied Science of Stem Cell Therapy,” “The Blood-Brain Barrier: Bottleneck in Brain Drug Development,” “Challenges in Evaluating Novel Approaches,” “Globalization of Healthcare: How Does the International Conference on Harmonization Help?” and “Issues for Neurologic Therapies – Problems with the Present System.” We saw that research pertaining to the neurological diseases is very active and interactive between diseases.

This year’s Advocacy Forum was titled “Drug Development in Critical Times: The Role of Patient Advocates.” As is described in the program, “ASENT and the patient advocacy organization groups have a common denominator when it comes to advocating for patients with diseases and disorders of the central nervous system.” The leadership of ASENT is dedicated to building continuing relationships and encouraging communication with the advocacy community and the ASENT Advocacy Forum is one way we are fostering those relationships.

The goals of ASENT, as described in the 2006 program, are to “Provide a forum for broadly defined interest areas of academia, government, industry, and advocacy concerned with the field of neurotherapeutics; promote dialogue, understanding, and cooperation among the interested groups; develop information and seek consensus on matters; organize education and training for healthcare practitioners, biomedical scientists, and officials participating in the neurotherapeutics field.”

Presenters this year were Ira Shoulson, MD, University of Rochester; Russell Katz, MD, Food and Drug Administration; Stuart Peltz, MD, PTC Therapeutics; Reijo Salonen, MD, Pfizer, Inc.; Robert J. Beall, PhD, Cystic Fibrosis Foundation; and Michael Zigmond, PhD, University of Pittsburgh.

The afternoon sessions dealt with Spinal Muscular Atrophy (SMA), including topics of “Virtual Drug Development: Role of the Non-Profit Sector,” “Biology of SMA,” “Drug Discovery for Motor Neurons,” and “Development Considerations in Orphan Disease.” A summary of the afternoon: The unique genetics of SMA have prompted investigation of multiple therapeutic pathways that may be of importance to many other disorders including ALS, muscular dystrophy and retinitis pigmentosa. The challenges in the search for SMA therapeutics have led the orphan disease community to new pathways for drug development in neurology.

My evaluation is that it was good to see so many representatives from a wide variety of organizations representing the various diseases, which indicates that awareness is of prime importance.

.....  
**The Denver Area Ataxia Support Group**

*By Tom Sathre*

The Denver Area Ataxia Support Group met on May 6 at Swedish Hospital. Seventeen attended, about half of which were ataxians and three were first-timers! We watched a video summary by Dr. John Day of the 2005 NAF meeting. We were highly encouraged by Dr. Day’s statements: it’s good to know such encouraging news about one of the ataxias.

Additionally, it was decided to meet in March, June and September rather than our current meeting plan, which is twice a year. This revised schedule starts in 2007, since the 2006 meeting plan is already set, with September 9 being the only time left in 2006.

The latter part of this meeting was given over to discussion about topics for these meetings. Suggestions were: local transportation to meetings (AccessARide), a local gait clinic, genetic counseling, effective medications, equipment, financial aspects of disability and living wills, tinnitus, alternative

Chapter & Support Group News  
Continued from page 39

treatments and diets. In addition, there was one volunteer for putting together one of these presentations.

**Howard County Ataxia Support Group**

By Melba McCarthy & Kathy van't Hoff

Sixteen attended the June meeting of the Howard County Ataxia Support Group. Jackie Simmons of Stress Management Services in Columbia, MD gave a presentation on "Stress Management" which was very informative.

The origin of the word "stress" was in relation to steel – how much stress or weight could steel take before bending. Ms. Simmons said that we have been raised to believe that we have control over our lives; with health problems, that control is impacted. We need a support system to discuss and to recognize what we cannot control – poor health (ataxia).

She compared the victims of the disease "ataxia" as people with normal bodies, "just more normal than most." That is, we all feel and our bodies react, just slower than most "normal" bodies feel/react. It is an interesting way to compare the changes caused by ataxia.

Ms. Simmons shared tips to control the stress in our lives. For example, she discussed the three A's – Anger, Acceptance, and Attitude – and talked about how to work through all three. Also, hope for and work for a "chronically cheerful" attitude. Try to access the "laugh" portion of your brain.

Our newest member is Izzy. This lovely young lady has beautiful soulful eyes, black curly hair and long shapely legs. She also knows how to shake certain parts of her body to get attention and show her approval. Her heritage is French. She doesn't have ataxia herself; she is a caregiver. Izzy is Tim's new service dog. We expect to see this lovely poodle at upcoming meetings and events. Izzy comes to Tim after many

months of hard work with Fidos for Freedom. We were fortunate to have Izzy's trainers (Paul and Sara Kriedeman) join us for our meeting.

**New England Ataxia Support Group**

By Donna & Rich Gorzela

As you read this issue of *Generations*, our group will have already had our barbeque at Michael's and our September meeting at Mass. General.

Michael Martignetti has stepped down as our group leader. He certainly has done a lot for us over the last decade. He even helped start this group!

The two of us have been members of this group for over seven years, and hope we can continue Michael's inspirational leadership! ❖

**Word Find Answers**

Here are the answers from the puzzle on page 28.

W	Q	P	I	W	B	R	A	I	N	S	T	E	M	L	H	G	K	F	G
B	N	F	O	C	U	V	N	T	V	M	O	W	U	B	X	J	Z	T	W
D	G	J	H	A	N	T	I	S	E	N	S	E	D	N	A	U	A	K	P
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G	S	M	T	I	Q	I	N	Y	J	U	B	T	W	I	T	Y	K	J	T
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C	Y	T	Z	D	F	I	Q	I	U	T	B	E	R	A	L	R	H	E	I
X	I	S	T	E	Z	N	O	F	R	M	O	Z	N	V	W	J	M	J	T
J	W	O	R	T	K	B	C	N	X	A	L	S	B	C	V	C	L	R	A
G	H	E	W	G	W	H	K	P	I	U	T	R	I	T	Y	V	E	X	R
P	L	D	E	Q	A	Z	C	X	B	W	D	I	X	S	E	M	P	F	I
Q	R	T	H	E	T	E	R	O	G	E	N	E	O	U	S	Y	U	I	P
R	E	P	X	A	S	E	T	Y	P	J	L	Q	Z	N	R	J	Z	T	S
N	U	C	L	E	A	R	I	N	C	L	U	S	I	O	N	S	T	M	E
N	Z	R	I	M	O	T	O	R	N	E	U	R	O	N	G	E	O	L	R
V	H	W	C	Y	R	U	I	M	C	Q	A	R	A	T	A	X	I	A	N

# NAF Chapters & Support Groups

*This is a list of NAF chapters and support groups. The use of these names, addresses and phone numbers for any purpose other than requesting information regarding NAF or joining a chapter or support group is strictly prohibited. We encourage you to contact the chapter or group nearest you.*

## Chapters

### Chesapeake Chapter

Carl J. Lauter, President  
5938 Rossmore Dr.  
Bethesda, MD 20814  
(301) 530-4989  
(301) 530-2480 FAX  
E-mail: carjlauter@erols.com  
Web: www.geocities.com/  
HotSprings/Oasis/4988/

### Louisiana Chapter

Carla Hagler, President  
PMB 51056  
2250 Gause Blvd.  
Slidell, LA 70461  
(985) 643-0783  
E-mail: ataxia1@earthlink.net  
Web: http://www.angelfire.com/  
la/ataxiachapter

### Mississippi Chapter

Camille Daglio, President  
P.O. Box 17005  
Hattiesburg, MS 39404  
E-mail: daglio@c-gate.net

## Support Groups

### Alabama

#### Birmingham, AL S.G.

Becky Donnelly  
16 The Oaks Circle  
Hoover, AL 35244  
(205) 987-2883  
E-mail: donnelly6132B@aol.com

### Arizona

#### Phoenix Area S.G.

Rita Garcia  
2322 W. Sagebrush Dr.  
Chandler, AZ 85224-2155  
(480) 726-3579  
E-mail: rrtg22@cox.net

#### Tucson Area S.G.

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*Chapters and Support Groups*  
Continued from page 41

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**The deadline for  
the Winter issue  
of Generations  
is November 3**



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## Virginia

See Chesapeake Chapter

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## Electronic Support Groups

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## International Support Groups

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#### Ataxia Society Vancouver

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E-mail: info@bcataxia.org  
Web: www.bcataxia.org

# Ambassador Listing

*The following is a list of NAF Ambassadors. Ambassadors are often in areas not served by a support group or chapter. Please get to know your Ambassadors, and if you would like to become an Ambassador please contact the NAF office for an application.*

## Alabama

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*Continued on page 44*

*Ambassadors**Continued from page 43***New York**

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**If you are interested in helping ataxia research by donation of tissue after death, please contact Dr. Koeppen for information and details.**

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## **International Ataxia Awareness Day**

Many National Ataxia Foundation members were busy participating in International Ataxia Awareness Day (IAAD), held each year on September 25.

Some contacted local political representatives, planned awareness ceremonies, set up awareness booths, and others planned fundraisers such as golf tournaments and craft shows.

If you held an activity for IAAD, please share it with us. Submit your articles for publication by November 3 for inclusion in the next issue of *Generations*. Thanks!

# Calendar of Events

## October

- 2 Spokane Area S.G. Meeting at Sacred Heart Hospital in the Mary Bead Room from 5:30 to 7 p.m.
- 7 Howard County (MD) S.G. Meeting from 9 a.m. to noon at Parkinson & Movement Disorders Center of Maryland Conference Room, 8180 Lark Brown Rd., Ste. 101 in Elkridge, MD
- 11 Willamette Valley Ataxia S.G. Meeting from 11 a.m. to 12:30 p.m. at Albany General Hospital in Albany, OR
- 14 Kansas City (MO) Ataxia S.G. Meeting from 2 to 4 p.m. at NE Library, 65 Wilson Ave, Kansas City, MO
- 14 Main Ataxia S.G. Meeting
- 14 Tampa Bay, FL S.G. Meeting from noon to 3 p.m. at Feather Sound Community Church, 13880 Feather Sound Dr., Clearwater, FL
- 14 Northern Texas S.G. Meeting at Las Colinas Medical Center, 6800 MacArthur Blvd., Irving, TX
- 14 Northern California Ataxia S.G. Meeting
- 14 Orlando Ataxia S.G. from noon to 3 p.m. at Dr. Phillips Library
- 14 Pennsylvania S.G. Meeting at Mercy Suburban Hospital, DeKalb Pike, Norristown, PA on the 2nd floor Gerber Room from 10 to 11:30 a.m. with lunch to follow
- 14 New York Ataxia S.G. at Orzac Geriatric Center from 1 to 3 p.m.
- 14 San Diego Ataxia S.G. Meeting from 1 to 3 p.m. at Sharp Rehabilitation Center, 2999 Health Center Dr. (behind Sharp Memorial Hospital)
- 17 Twin Cities S.G. Meeting at 7 p.m. at Presbyterian Home in Roseville (off 35W on Co. Rd D). Contact Lenore H. Schultz for more details.
- 18 New Jersey Ataxia S.G. Meeting at 7 p.m. at Children Therapy (Cerebral Palsy) Center in Fair Lawn (Berkshire Rd. at the corner of 30th St.)
- 21 Orange County Ataxia S.G. Meeting from 2 to 5 p.m. at Newland Street Church of Christ, 13852 Newland St., Garden Grove

- 26 Ataxia Society of Vancouver, BC Meeting at 7 p.m. at the Caring Place, Richmond
- 28 Alabama Ataxia S.G. Meeting/Luncheon/Program from 10 a.m. to 2 p.m.

## November

- 2 Howard County (MD) S.G. Meeting from 9 a.m. to noon at Parkinson & Movement Disorders Center of Maryland Conference Room in Elkridge, MD
- 3-5 Abilities Expo – Northern California at the Santa Clara Convention Center
- 4 Greater Atlanta S.G. Meeting at Emory Center for Rehabilitation Medicine
- 6 Spokane Area S.G. Meeting at Sacred Heart Hospital in the Mary Bead Room from 5:30 to 7 p.m.
- 8 Utah Ataxia S.G. Meeting and Tour of the new Moran Eye Clinic Building
- 8 Willamette Valley Ataxia S.G. Meeting from 11 a.m. to 12:30 p.m. at Albany General Hospital in Albany, OR
- 11 Kansas City (MO) Ataxia S.G. Meeting from 2 to 4 p.m. at NE Library in Kansas City, MO
- 11 Los Angeles Ataxia S.G. Pizza Party
- 11 Pennsylvania S.G. Meeting at Mercy Suburban Hospital in Norristown in the 2nd floor Gerber Room from 10 to 1:30 p.m. with lunch to follow
- 11 Northern Texas S.G. Meeting at Las Colinas Medical Center in Irving, TX
- 11 New York Ataxia S.G. at Orzac Geriatric Center from 1 to 3 p.m.
- 15 New Jersey Ataxia S.G. Meeting at 7 p.m. at Children Therapy Center in Fair Lawn, NJ
- 18 Tucson Area S.G. Meeting
- 18 Orange County Ataxia S.G. Meeting from 2 to 5 p.m. at Newland Street Church of Christ in Garden Grove, CA
- 18 Tampa Bay, FL S.G./Orlando Ataxia S.G. Meeting at Feather Sound Community Church in Clearwater, FL. This is a joint meeting. The Orlando S.G. is coordinating a carpool to ensure all can attend.

*Calendar of Events**Continued from page 37*

- 19 Chicago Area S.G. Good Samaritan Hospital White Oak Room from noon to 4 p.m.
- 19 Tampa Bay, FL S.G. Meeting from 11 a.m. to 3 p.m. at Feather Sound Community Church in Clearwater, FL. Speaker will be Dr. Cheryl Paul from USF Speech and Swallowing Clinic. A Thanksgiving meal will be served.
- 21 Twin Cities S.G. Meeting at 7 p.m. at Presbyterian Home in Roseville, MN.
- 23 Ataxia Society of Vancouver, BC Meeting at 7 p.m. at the Caring Place in Richmond, BC

**December**

- TBA Alabama Ataxia S.G. Cell Group social outing
- 2 Carolinas Ataxia S.G. Meeting from 11 a.m. to 3 p.m. at Bible Baptist Church in Matthews, NC (near Charlotte)
- 2 Howard County (MD) S.G. Meeting from 9 a.m. to noon at Parkinson & Movement Disorders Center of Maryland Conference Room in Elkridge, MD
- 2 Orlando Ataxia S.G. from noon to 3 p.m. at Dr. Phillips Library
- 4 Spokane Area S.G. Meeting at Sacred Heart Hospital in the Mary Bead Room from 5:30 to 7 p.m.

## Young Adult Ataxia Group on MSN

There is a new Ataxia Young Adults Group on MSN.

If you are a young adult and would like to chat with others about ataxia, come check us out at <http://groups.msn.com/Ataxia-YoungAdults>.

You will find areas for Chat, Messages, Pictures, Calendar and Links. All you need to join is a free Windows Live ID.

Help yourself and help others by sharing in our Young Adult Ataxia Group. Visit today!

- 9 Kansas City (MO) Ataxia S.G. Meeting from 2 to 4 p.m. at NE Library in Kansas City, MO
- 9 Pennsylvania S.G. Christmas Luncheon
- 9 Northern Texas S.G. Meeting at Las Colinas Medical Center in Irving, TX
- 10 St. Louis Ataxia S.G. Meeting from 2 to 5 p.m. at Meramec Community College, 11333 Big Bend Blvd., Business Administration Bldg., Room 105, St. Louis, MO
- 13 Willamette Valley Ataxia S.G. Meeting from 11 a.m. to 12:30 p.m. at Albany General Hospital in Albany, OR
- 14 Maine Ataxia S.G. Meeting
- 16 Phoenix Area S.G. Christmas Social
- 16 Orange County Ataxia S.G. Meeting from 2 5 p.m. at Newland Street Church of Christ in Garden Grove
- 18 Twin Cities S.G. Meeting at 7 p.m. at Presbyterian Home in Roseville, MN
- 20 New Jersey Ataxia S.G. Meeting at 7 p.m. at Children Therapy Center in Fair Lawn, NJ.
- 28 Ataxia Society of Vancouver, BC Meeting at 7 p.m. at the Caring Place in Richmond, BC

**January 2007**

- 13 Northern CA S.G. Meeting at 11:30 a.m. at Our Savior's Lutheran Church (Recreation Hall), 1035 Carol Lane, Lafayette, CA. Contact Deborah Taylor Omictin for more details.
- 16 Twin Cities S.G. Meeting at 7 p.m. at Presbyterian Home in Roseville, MN

**February**

- 17 Chesapeake Chapter Annual Medical Meeting from 9 a.m. to mid-afternoon at the Theater Arts Center, Montgomery College, Rockville, MD. Contact Carl Lauter for more details.
- 20 Twin Cities S.G. Meeting at 7 p.m. at Presbyterian Home in Roseville, MN

**March**

- 20 Twin Cities S.G. Meeting at 7 p.m. at Presbyterian Home in Roseville, MN
- 22 NAF Leadership Meeting in Memphis, TN
- 23-25 2007 NAF Annual Membership Meeting in Memphis, TN**

# Memorials and In Your Honor

*The National Ataxia Foundation is grateful to those who have made contributions in memory or in honor of their friends and families whose names are listed below. This list reflects contributions made from May 2006 through July 2006. We are sorry that we cannot separate the memorial contributions from those made in honor of someone, as sometimes the person making the contribution does not let us know if the contribution is a memorial or in honor of their friend or family member.*

Alexander Family	Crawford Family	Marybeth	Mullaney Family	Windy Smith
Beth Asp	Walter Croxton	Kolanowski	Kaela Mullaney	Abbie Spellman
Denise Drake- Asselin	Tova Daniels	William Keaveney, Sr.	Carol Murphy	Charles Stebbins
Joan Augustine	Charlene Danielson	Robert Keithly	William Murphy	Cathy Steward
Sharon Baggett	John Day	Florence Kettner	Robert Mutschler	Sylvia Stieffermann
Jeffrey Bailey	Ramiro Del-Real	Matthew Kraft	Helen Myers	Linda Stine
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Vicki Balogh	Fred Donnelly	Marlene Kusumoto	Delbert Olberding	Sheila Suriano
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Violette Barr	Ronald Eakins	Herb Lee	Aklish Parmeswar	Fayne Thiel
Barton Beck	James Ellson	Linda Lee	Shirley Perret	Leslie Tobias
Betty Beck	Kenneth Esch	Lisa Lee	Quincy Powers	Dr. Amyee Torres- Michels
Clair Beck	Floyd Eustache	Pam Lee	Stephen Price	Jesse Tucker
Kay Bell	Pat Fagg	Amy Lenahan	Amy Pridmore	Carol Tylar
Jerry Bender	Joseph Falcon	Sylvia Lindsey	Linda Reetz	Carol Unnewein
Zohar Birin	Katherine Falcon	Peggy Littlejohn	Carl Regutti	Frank Vaccarella
Kim Bishop	Janet Fariel	Kate Loftin	Grace Regutti	Mary Vida
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Gordon Boyles	Patricia Greene	Lisa Marsh	Mary Reyes	David West
Carol Brand	Paschal Guercio	Bradley Masserant	Dr. George Rieman, Jr.	Martina Wiese
Jane Brewer	Carol Haley	Bradley Masserant Family	Joyce Robbins	Connie Wolff
Edgar Brown	Dynah Haubert	Victor Masserant Family	Nathan Robinson	Ronnie Wright
Lula Brown	David Hazelgrove	Elaine Maxey	Ricardo Roca	Anne Wynne
Madeline Brown	Sharon Hazelgrove	Harold Maxey	Madalyn Rogers	Thomas Wynne
Willis Brown	Jeffrey Helman	Darrin McCarty	Ainslee Santa- Croce	Dennis Yosick
Chris Buechel	Michael Helman	Charles McLaughlin	Donald Santa- Croce	Nathan Young
Janice Buuck	Marie Helminiak	Earl McLaughlin	Blaise Santianni	Ryan Young
Kenneth Canter	Alan Hendley	Reggie Mellon	Larry Schut	
Andrew Carey	David Henry, Jr.	Refiye Miller	Loretta Schut	<b>Support Groups</b>
Richard Carr	Judith Hoffenberger	Minnie Molini	Rebecca Schutte	BC Ataxia Society
James Christman	Johnny Hogan	Clarence "Pookie" Montecino	Robert Schnefer, Jr.	Chicago Area
Frank Coffey	William Huber	Dolores Morello	Sherry Sharp	New England
Claire Costa	Jeans Day	Joyce Morelock- Rector	Joan Sigmon	N. California
Johnny Costa	Fundraiser		Marvin Smith	Orange County
Debbie Covington	Frances Johnson		Robin Smith	Phoenix Area
Dr. William Covington	R. Jurasek			San Diego



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Simply fill out this form and mail with your check or credit card information to the National Ataxia Foundation.

Honor/Memorial envelopes are available free of charge by writing or calling NAF.

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- In Memory    In Honor    Gift Membership

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From:

Name \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

**MEMBERSHIP**

Yes, I want to help fight ataxia! Enclosed is my membership donation, which enables NAF to continue to provide meaningful programs and services for ataxia families. (Gifts in US Dollars)

- Lifetime membership                      \$500 +

*Annual memberships:*

- Patron membership                      \$100-\$499
- Professional membership              \$45 +
- Individual                                      \$25 +
- Household                                      \$45 +
- Addresses outside the U.S. please add \$15

Your Name \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

E-Mail \_\_\_\_\_

**PAYMENT INFORMATION**

*Gifts are tax deductible under the fullest extent of the law.*

- Check. Please make payable to the National Ataxia Foundation.

Total Amount Enclosed \$ \_\_\_\_\_

Credit Card:    Visa    Master Card

Name on Card \_\_\_\_\_

Card # \_\_\_\_\_

Exp. Date \_\_\_\_\_

Signature \_\_\_\_\_

Phone Number \_\_\_\_\_