

FSH Watch



CONNECTING THE COMMUNITY OF PATIENTS, FAMILIES, CLINICIANS, AND INVESTIGATORS



ADVOCACY

World FSHD Day

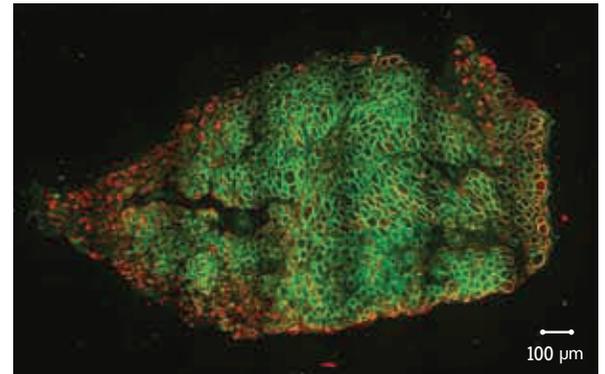
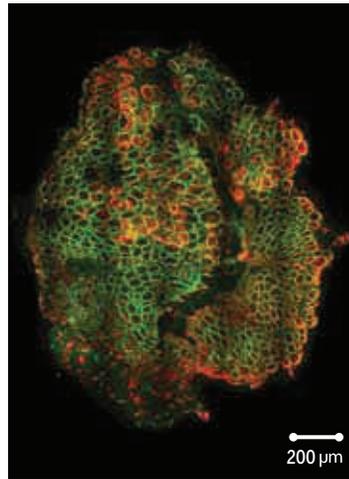
International awareness campaign launches June 20

by NATALIE MOSS
FSHD Global Foundation

Facioscapulohumeral muscular dystrophy is deserving of awareness and support on the global stage. As such, on June 20, the FSHD Champions—an alliance of seven FSHD organizations from around the world—will launch “World FSHD Day,” a global awareness and fundraising campaign.

With the help of the FSH Society and SHIFT Communications, we have created a logo for World FSHD Day. Patients, families, healthcare providers, researchers, policy makers, and the general public will be motivated through the World FSHD Day social media online campaign to share a common voice and a common goal:

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These micrographs show muscle tissue grown from human cells transplanted into a mouse. The green color indicates the presence of human spectrin protein, and shows that most of the cells in these muscles did indeed originate from the transplanted human cells.



RESEARCH

Mouse grows a human muscle

With a little zap, transplanted human cells flourish in a mouse

by JUNE KINOSHITA
FSH Society

It's like something out of Dr. Frankenstein's underground laboratory, but a University of Maryland Medical School team led by Robert Bloch, PhD, has successfully coaxed human muscle precursor cells to grow and form mature muscle in a mouse. Among the tricks used to accomplish this feat was the application of electric currents to the transplanted cells.

The study, published in the journal *Skeletal Muscle*, notes, “These studies were supported initially by a fellowship ... from the FSH Society.”

The researchers used “immortalized myoblasts,” which are immature muscle cells that had been genetically reprogrammed

to divide without limit. The cells were provided by Dr. Woodring Wright, an NIH Wellstone Center researcher, who derived them from a muscle biopsy from an FSHD patient and healthy family members. That tissue donation was made possible by FSH Society travel funds that enabled the donors to be seen, evaluated, and biopsied by Kathryn Wagner, MD, PhD, at the Kennedy Krieger Institute in Baltimore, Maryland.

Previously, Wagner's team had reported on a successful effort to graft slivers of human muscle tissue onto the legs of living mice. (See *FSH Watch*, Spring 2014.) These “xenografts” provided a way to study human FSHD muscle tissue in an experimental animal. While impressive, this approach was limited by the scarce supply of FSHD muscle and the delicate, time-consuming microsurgery required.

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No place like home

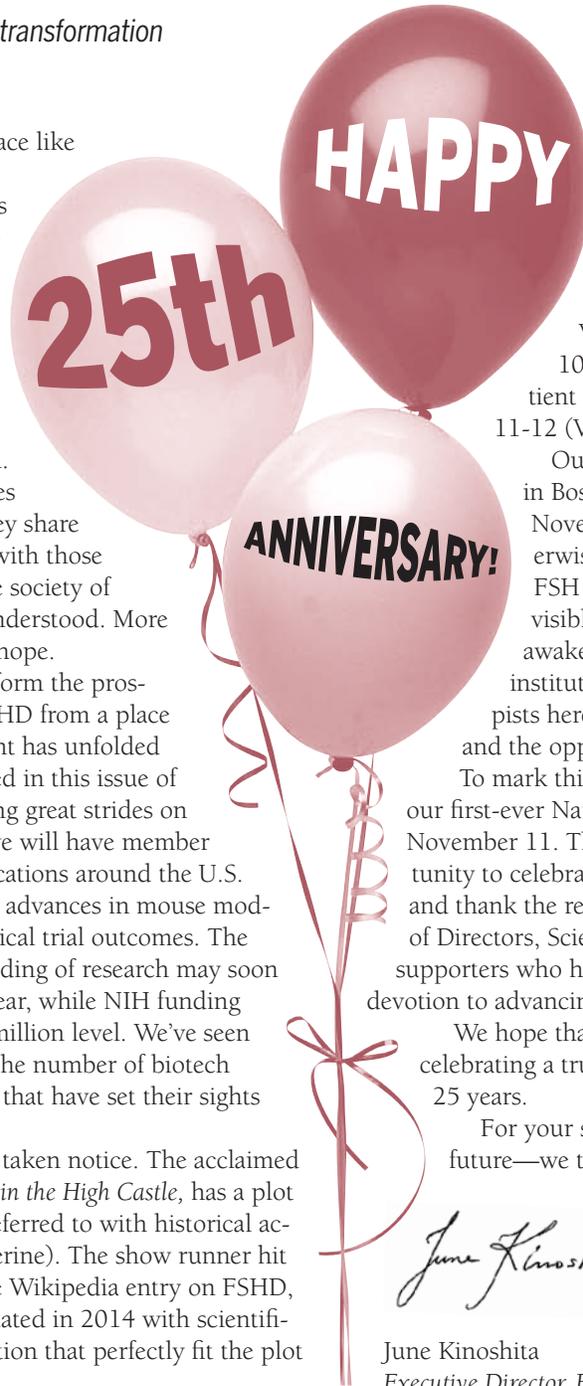
Celebrating 25 years of transformation

by JUNE KINOSHITA

There is no other place like it. I feel at home.” Every day, we hear words like these from individuals with FSH muscular dystrophy who are comforted and excited to discover the FSH Society. Finally, they no longer have to face this disease on their own. Instead of the blank stares that greet them when they share news of their condition with those around them, here in the society of “FSHers,” they will be understood. More than that, they will find hope.

The journey to transform the prospects for people with FSHD from a place of darkness to one of light has unfolded over 25 years. As reported in this issue of *FSH Watch*, we are making great strides on many fronts. This year we will have member meetings in nearly 20 locations around the U.S. We are seeing significant advances in mouse models, biomarkers, and clinical trial outcomes. The FSH Society’s annual funding of research may soon surpass \$1 million per year, while NIH funding is approaching the \$10 million level. We’ve seen an exponential jump in the number of biotech companies and pharmas that have set their sights on FSHD.

Even Hollywood has taken notice. The acclaimed Amazon series, *The Man in the High Castle*, has a plot twist involving FSHD (referred to with historical accuracy as Landouzy-Dejerine). The show runner hit on the idea thanks to the Wikipedia entry on FSHD, which our members updated in 2014 with scientifically up-to-date information that perfectly fit the plot requirements.



To mark the 25th anniversary of the FSH Society, we are holding our two major conferences back-to-back this year: The annual International Research Consortium (IRC) Workshop will be on November 10-11, and the FSHD Connect Patient Conference will be on November 11-12 (Veterans Day holiday weekend).

Our dual meeting will take place in Boston. While a New England November may not be ideal weatherwise, it’s vitally important for the FSH Society to become much more visible in our home base. We must awaken the world-leading medical institutions, industries, and philanthropists here to the importance of FSHD—and the opportunity to help solve it.

To mark this occasion, we are also hosting our first-ever National Gala on the evening of November 11. This will be a very special opportunity to celebrate our scientific achievements and thank the researchers, clinicians, our Board of Directors, Scientific Advisory Board, and supporters who have contributed with untiring devotion to advancing our cause.

We hope that many of you can join us in celebrating a truly remarkable, transformative 25 years.

For your support—past, present, and future—we thank you sincerely,



June Kinoshita
Executive Director, FSH Society

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FSH Watch

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Washington, DC Counsel

Morgan Downey

Research Programs

Daniel Paul Perez
daniel.perez@fshsociety.org

Executive Director

June Kinoshita
june.kinoshita@fshsociety.org

Director of Finance and Administration

Lisa Schimmel
lisa.schimmel@fshsociety.org

Office Manager

Doris Walsh
doris.walsh@fshsociety.org

Executive Assistant

Robyn O’Leary
robyn.oleary@fshsociety.org

FSH Society, Inc.

450 Bedford Street
Lexington, MA 02420 USA
(781) 301-6060
info@fshsociety.org

www.fshsociety.org

It is our editorial policy to report on developments regarding FSHD, but we do not endorse any of the drugs, procedures, treatments, or products discussed. We urge you to consult with your own physician about any medical interventions.

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June Kinoshita, Executive Director
FSH Society
450 Bedford Street
Lexington, MA 02420 USA
june.kinoshita@fshsociety.org

Look for us on the Internet at www.fshsociety.org.
Editors: June Kinoshita, Daniel Paul Perez
Copy Editor: Elaine Alibrandi
Editorial Assistance: Howard Chabner, Doris Walsh
Graphic Design: Leslie Anne Feagley
Printing and Mailing: ShelDon Print & Design, Duluth, Minnesota

Q&A with Dr. Rabi Tawil, Part 1

About the FSHD Care Guidelines

Here are selected questions from an FSH Society webinar held on October 1, 2015, with Rabi Tawil, MD, co-director of the MDA Neuromuscular Disease Clinic at the University of Rochester, New York, and lead author of the first evidence-based care guideline for FSHD, a project the FSH Society supported through consultations and advocacy. Summaries of the guideline can be downloaded here: <https://www.fshsociety.org/resources/>

DR. TAWIL: FSHD is a relatively rare disorder, and because of that, it's difficult to come up with evidence-based guidelines. Evidence-based means that you go through the literature, and there are a lot of papers that you can use for evidence for certain approaches to taking care of patients with FSH muscular dystrophy. So as a consequence of FSHD being a relatively rare disorder, there are only a few physicians who have experience in caring for individuals with FSHD. Even general neurologists, and even more so, primary care physicians, have little or no knowledge



Rabi Tawil, MD

of this disorder and how to take care of patients with FSHD.

To write the evidence-based guideline, we first gathered the evidence, reviewed all the literature that has been written about FSHD, decided what are the most important clinical questions that we need to address and limited ourselves to where there is evidence, analyzed the evidence, and then provided practice recommendations based on this evidence.

A literature search found 977 abstracts of journal articles. There were very strict criteria to consider good evidence. The 977 abstracts were narrowed down to 176 articles that we thought contained good evidence that we can look at.

Q: I would like to get your thoughts on physical activity for young adults who have been diagnosed. Are they better off staying highly physically active, more specifically, doing weight training, or should they try to conserve their muscle strength?

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NEWS AND EVENTS

New Board of Directors members elected

Maintaining the standard for FSH Society leadership

by **JUNE KINOSHITA**
FSH Society

The FSH Society Board of Directors has elected two new members at its February 2016 meeting. The newly elected directors, George Pollock Jr. and Neil A. Solomon, MD FACP, bring extensive experience in business, finance, medicine, and the healthcare industry to help guide the future development of the FSH Society.

Pollock is a co-founder, director, and chief financial officer of vXchnge Holdings LLC, which provides carrier-neutral data center services in North America. Prior to his current role, Pollock was chief financial officer of Switch and Data Facilities Company, Inc., a NASDAQ listed company that provided data center services in 34 markets across North America. "I'm very interested in increasing awareness of FSHD and raising funds to support promising research," Pollock said.

Pollock earned BS and MS degrees in accounting from the University of Florida. He has a passion for bicycle racing and continues to ride on a regular basis. He is a native of Florida and currently resides near Tampa with his wife, Jane. They have two children, Emily and Jacob, both currently in college.

Neil A. Solomon, MD FACP, is a physician,



George Pollock Jr.



Neil A. Solomon, MD FACP

managed care expert, and health system innovator. While serving in various physician executive roles at Kaiser Permanente, Health Net, and Blue Shield of California, and through chairing and teaching in several statewide practice improvement initiatives in California, Dr. Solomon developed and led large-scale programs to improve quality and efficiency in the healthcare system.

With affected family members, Dr. Solomon says, "I am personally very committed to improving the lives of people with FSHD, their families, and to finding a cure."

Previously, Dr. Solomon founded and led NAS Consulting Services, a healthcare advisory company to medical groups, hospital systems, and health plans. Dr. Solomon is co-founder and chief medical officer of MedZed, LLC, a telemedicine-enabled home care company that helps frail and vulnerable individuals receive excellent healthcare services in their own homes. Dr. Solomon received his medical degree from the Yale University School of Medicine and practiced internal medicine for 20 years in ambulatory, hospital, and institutional settings. He lives in San Francisco with his wife and two children. 

FSH Society submits testimony to U.S. Congress

Pushing for \$24 million in NIH funding for FSHD

by JUNE KINOSHITA
FSH Society

FSH Society President & CEO Daniel Perez has submitted his annual testimony to the U.S. House Appropriations Committee’s Subcommittee on Labor, Health and Human Services, Education and Related Agencies (LHHSE). This year, the Society has requested \$24 million FY2017 appropriations for NIH research on FSHD. Identical testimony was submitted to the Senate.

“As tiny as it is, the FSH Society continues to deliver huge results in improving our understanding of FSHD—and in turn helping scientists be more competitive at NIH,” Perez notes. Check out the chart on our website of 2015 NIH-funded projects that received early-stage support from FSH Society grants.

You can share these testimonies with your senators and House representatives via their chief of staff or Health Legislative aides to let them know that increased funding for NIH and specifically for FSHD research is important to you. You can locate your congresspersons at senate.gov or house.gov and contact them by phone, email, web, or letter.

Read and download the House and Senate testimonies on our website: <https://www.fshsociety.org/advocacy-2/> 



Today’s successes are the fruit of years of diligent advocacy. In this archival photo, Daniel Perez testifies at a congressional hearing in 2007.

▶ NIH funding for FSHD hits new record

EARLIER FUNDING FROM THE FSH SOCIETY FUELED MANY STUDIES

We have some good news to share on National Institutes of Health funding for FSHD. As part of the FSH Society’s work on the Muscular Dystrophy Coordinating Committee in Washington, DC, we recently received fiscal year 2015 data on NIH support for the muscular dystrophies and were very pleased to see NIH funding for FSHD research at \$8,397,995. We thought you would too.

It is great to see this number increasing, with \$9 million estimated for fiscal years 2016 and 2017. With funding for muscular dystrophies overall at \$80 million, the share invested in FSHD has for the first time risen

above 10 percent.

With all the great research opportunities in FSHD today, we hope total NIH funding will soon exceed \$10 million per year.

“I can remember when we started the Society,” recalls Daniel Perez, President & CEO of the FSH Society. “NIH funding for muscular dystrophy overall was just about \$10 million per year, with FSHD funding at only \$200,000.” This all began to change with the MD-CARE Act of 2001, which the FSH Society originated and worked diligently on to pass.

Out of 33 FSHD projects funded by the NIH in 2015, two-thirds (22 projects) had previously

received support from the FSH Society. This is an example of your donations in action. Our Scientific Advisory Board selects the strongest ideas, which the FSH Society funds so that investigators can generate the data they need in order to win larger NIH grants.

While this growth is cause for celebration, we still have much work to do. “Despite the great success of the past six years in the science of FSHD brought about by Congress, NIH, nonprofit funding agencies, patients, families, and researchers,” said Perez, “we are gravely concerned that FSHD research remains vastly underrepresented in the NIH portfolio.”

FSHD Research Dollars (in millions) & FSHD as a Percentage of Total NIH Muscular Dystrophy Funding

Fiscal Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016e	2017e
All MD (\$ millions)	\$39.5	\$39.9	\$47.2	\$56	\$83	\$86	\$75	\$75	\$76	\$78	\$77	\$80	\$80
FSHD (\$ millions)	\$2.0	\$1.7	\$3	\$3	\$5	\$6	\$6	\$5	\$5	\$7	\$8	\$9	\$9
FSHD (% total MD)	5%	4%	5%	5%	6%	7%	8%	7%	7%	9%	10%	11%	11%

Sources: NIH/OD Budget Office & NIH OCPL & NIH RePORT RCDC (e = estimate)

NEW BUSINESSES AIM TO SUPPORT FSHD

Next time you want to get someone an extra-special gift, choose one that also helps raise awareness and funds for the FSH Society! Here are two companies with a mission to help support our work:

Glamour Dux (glamourdux.com)

Online purveyor of beautiful everyday and luxury jewelry. Started by a husband-wife team whose lives have been affected by FSHD, this company will donate 10 percent of profits to the FSH Society.



Anson Calder (ansoncalder.com)

Luxury leather accessories designed to be universally accessible, Anson Calder is the brainchild of an entrepreneur with FSHD. Every item comes packaged with information about FSHD and the work of the FSH Society.



The last one in

Volunteering for research, feeling the weight of responsibility

by **DAVID LUKAS**
Village of Lakewood, Illinois

I was diagnosed with FSHD in April 2015. In October 2015, I participated in a clinical research study in Rochester, New York, at the University of Rochester Fields Center for FSHD Research. I am the final participant for this study, which includes three visits to Rochester over the course of a year. What follows is my journal entry about my experience participating in this study.



David Lukas

On the plane flying home from Rochester. Such a whirlwind day of emotions. At this moment, flying and looking out the window at the sky, the clouds, and the land below, I can't help but feel introspective about my place in this world. Yes, I'm one of seven-plus billion people, but I'm a very small percentage of people with FSHD. And then taking it a step further and being the last subject to be included in this study has me feeling special, unique, and honored. Yet I still have my feet on the ground.

There have been several moments today where I've been on the verge of being a hot mess and breaking down to a waterfall of tears. Those tears would be a mixture of gratitude, fear, feeling fortunate, honored, responsible, and pressured. Trying to unpack each of those emotions seems overwhelming and daunting to me. Yet there is no time like now when everything is still fresh and I have a small window on this plane to get these thoughts down. Because the truth is, when we get home, real life starts again and I will always be able to find an excuse not to sit down and write this all out. So here goes....

What's hitting me right now is pressure. I feel like I have this pressure to "do well" in this study. Which I realize is crazy cause I'm answering questions and doing strength exercises. But I feel like I have to be a good subject and give them good data so I can help the research of FSHD move forward. And I feel like the FSHD community and every single doctor, nurse, and technician who has worked on this study is waiting for me to finish so they can publish this research, which has been going on for two years.

Everyone is waiting for this. Especially the drug companies. So knowing that all of these people are waiting on patient 37 to finish feels very heavy to me. Not in a bad way, but I can feel the weight.

Just thinking about this research not being completed and thinking about how all the time and energy that had been spent would be for nothing until I came along. It blows me away. Thinking about all the people who might have been turned away until they found me when my neurologist reached out still blows my mind. None of this is a coincidence. I was supposed to be patient 37. My being the final FSHD subject to complete this research project is probably too much for me to grasp at the moment. But I can tell you I'm on the verge of tears with the immensity of that.

I have an obligation to my FSHD community. It's up to me. And while I can see and realize I'm not solving anything and I'm not the one doing the work on this disease, I'll be the one responsible for finishing this research so we can continue to learn more about FSHD and move closer to a cure or stop gap for this disease. Again, I sound like a broken record, but while the thought of the immensity of that brings me to tears, I don't fully grasp all that entails.

I also feel responsible to my children to do all I can to advance what

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Measuring FSHD muscles with EIM

An inexpensive, fast tool for clinical trials?

by JUNE KINOSHITA
FSH Society

As growing numbers of biotechnology and pharmaceutical companies show interest in developing treatments for FSHD, it has become urgently important to develop “clinical outcome measures”—methods to show whether an experimental treatment is having an effect.

At first glance, this may seem like an obvious task. Just show that a drug can restore or increase a patient’s strength, and we wouldn’t need a fancy tool. But that is setting a very high bar and would overlook drugs that can stop or slow the muscle degeneration, which is something most FSHD patients would greatly welcome. However, showing that a drug can slow down or stop disease progression is not an easy thing to do.

To demonstrate that a drug can slow down FSHD, one needs to be able to predict how rapidly a patient will lose strength or function. Because the course of FSHD varies so much from person to person and is highly unpredictable, this means researchers would need to follow the “natural history” of a large number of patients and look at average rates of change in this group. They would then use this to predict how a second group of patients would change over time, and see if having that group on a drug would lead to an outcome that deviates from the prediction.

With a slow-progressing, highly variable condition like FSHD, this traditional approach requires large numbers of patients and longer study times to produce results that are robust and less prone to misleading statistical flukes. But this also greatly ratchets up the cost of clinical trials.

One way to address this challenge is to develop tools that allow researchers to more directly measure changes in the muscles of individual patients. With magnetic resonance imaging, for example, healthy muscles appear dark while dystrophic muscles become infiltrated with fat and scar tissue, which shows up as a white shadow on the image.

Using MRI, one can now see a muscle become fat-infiltrated over the course of perhaps two years. But this approach requires great expense and fortitude on the part of research subjects, who must lie still inside the claustrophobic barrel of a whole-body MRI machine while being scanned from head to toe to search for the rare muscle that is transitioning from healthy to dystrophic.

Seeing these obstacles to containing the cost and difficulty of clinical trials, three years ago the FSH Society awarded a grant to Jeffrey Statland, MD, of the University of Kansas Medical Center,



The Skulpt device (bottom) is marketed to consumers to take electrical impedance myography readings from muscles and record them through a smart phone app (top).

who was then working at the University of Rochester Medical Center to investigate whether a technology called electric impedance myography (EIM) could provide a fast, inexpensive alternative.

The EIM device employed in the Rochester study is manufactured by Skulpt, Inc., of Boston, Massachusetts. It uses a low-intensity electrical current to obtain information about underlying muscle structure.

Statland’s team made EIM measurements of muscles of the face, arms, legs, and trunk in 35 patients. With ages ranging from 18 to 75, the volunteers all had FSHD confirmed by a genetic test (mostly FSHD Type 1) and symptoms ranging from mild to severe, and all were still able to walk. It took about 20 minutes for a trained technician to make EIM measurements on all of these muscles.

The volunteers were also given standard muscle function tests such as the time to go from lying down to sitting up, time to put on a jacket, and how far they could walk in six minutes.

Eighteen volunteers returned within three weeks to be measured with EIM again, to assure the researchers that the method was reliable from visit to visit.

The results showed that the EIM values were reliable and correlated well with traditional strength and functional tests. Statland now plans to investigate how sensitively EIM can detect the deterioration of a muscle over time. The hope is that a small change in an EIM value may give people an early sign that a drug is working, increasing the confidence that going forward with longer studies with more people makes sense.

If EIM proves to be a good tool for tracking FSHD outcomes, it may also be possible to use a mobile version of the EIM device to allow

patients to take their own muscle measurements at home. Skulpt, Inc., makes a portable version of the EIM device which is a consumer product sold for use in physical and athletic training.

“The funding from the FSH Society makes projects like this possible,” said Statland. “The FSH Society grant enabled us to recruit participants and obtain promising pilot data, which then allowed us to apply for additional funding from organizations such as the National Institutes of Health to complete this project.” FSHWatch

Reference

Statland JM, Heatwole C, Eichinger K, Dilek N, Martens WB, Tawil R. Electrical impedance myography in facioscapulohumeral muscular dystrophy. *Muscle Nerve* 2016 Feb 3.

Q&A WITH DR. RABI TAWIL, PART 1

... from page 3

DR. TAWIL: There's increasing evidence that aerobic exercise is good and makes people who have FSHD feel better. They are more active and more physically fit because of it. Now, obviously, there's a certain breakpoint; if somebody is very weak, then they have limited capacity to do certain types of exercises, so it's kind of a combination of remaining as active as possible without draining yourself so much that you cannot go through the whole day. And this is why it's really important to not go out on your own, but actually seek the help of a physical therapist and work closely with them to see what is the most appropriate type of exercise for you to do. And, again, that's just aerobic exercise. Weight training should not be the type of weight training to build muscle, but more with light weights, because if you apply resistance or heavy weights, depending on how affected you are, you may get some overuse injuries to your shoulder, for example, just because you're overdoing it. Everybody has to remember that their joints are only as good as the muscle around them. If your muscles around your shoulders or your knees, for example, are not very good, you have to be very careful about weight training.

Q: Why is FSHD2 genetic testing not readily available, and what makes it so difficult to diagnose?

DR. TAWIL: There are several levels of testing that you have to do, and it was really developed all in one lab. Most of the data were generated from one lab in Holland, and it's a very tedious process, but I'm happy to say that the University of Iowa Lab is now offering FSHD2 testing.

Q: I am wondering if you are aware of any advances in the treatment for FSHD?

DR. TAWIL: Yes, since doctors have figured out that the expression of DUX4 in muscles is what causes FSHD, there's a lot being done on treatment, and I can tell you, five years ago, no drug company was interested in FSHD; now there are many drug companies working on treatments. Ultimately, the best treatment is going to be something that targets the source. If there's a way of turning off DUX4, that would lead to stopping FSHD, basically, and potentially reversing it.

But there are other approaches that you can take also to treating some of what we call the downstream effects of DUX4 expression in muscles. There's a company called aTyr that's now looking at a very new product that they're developing that's anti-inflammatory and they think—and we know—that at any one time, patients with FSHD have inflammation in one or more muscles, and this company is doing a study right now. There are several sites in Europe. There are six sites in the U.S. (*Editor's note: Visit the FSH Society website for a list of clinical trial sites.*)

They're looking for very specific patients to do this on, and so what they will do is scan somebody with an MRI, and based on the appearance of the MRI, if there's an indication that any one muscle is inflamed, then that person would qualify for the study. This is an early-phase study. The treatment is given intravenously once a week, and they will repeat the MRI, and if evidence of inflammation goes away, then it means that their medication is doing what it's supposed to do. Then, if they're successful in this early-phase

study, they'll do a second study that goes on for a longer period of time, and then they will determine if turning off the inflammation actually helps prevent the muscles from getting worse. (See our story on aTyr's trial, page 14.)

Q: The anti-inflammatory process that you're looking at now under the current study: Is there any information about the effect of some of the other biologics such as Humira, when taken for other conditions, on FSHD?

DR. TAWIL: No, there is not. And this is a very good question. I think one of the issues has been that we really don't know whether the inflammation is a primary thing or a kind of byproduct of the muscle fiber destruction. Many years ago we did a trial with prednisone, which is not a very specific anti-inflammatory, but it's a very powerful one nonetheless, and we did it in 15 patients; we gave them high doses for three months, and there was no difference in their strength, and, actually, the only thing that happened is that they gained a lot of weight.

But it is a good question. Could it be that a more targeted new biologic—would it be useful for FSHD? I don't know. I'm on the fence as to being certain that treating inflammation is really going to make a difference as opposed to it being just a byproduct of the underlying dystrophy. You know you don't want to go in with a big hammer that can cause a lot of side effects, when you're not certain about what can happen. What's interesting in the aTyr trial was that their product actually seems to be very safe and very well tolerated, and in the lab experiments that they've done, it seems to be a fairly powerful anti-inflammatory. I thought there was not a lot of risk to it, and it's worthwhile trying.

Q: I need more sleep than the average person. I seem to fatigue faster than my cohorts. Is this common with FSHD?

DR. TAWIL: I think this is common—this is common in really all of the muscular dystrophies, and it has to do oftentimes with the increased energy that somebody with FSHD has to put out to achieve a normal amount of walking or climbing stairs. But the other thing is to make sure that there's no other issues that are causing fatigue. Fatigue can be caused by many things, and one of the commonest is problems with sleep, and so again, this is one of the things that physicians should be asking their patients. If somebody's predisposed, if they have a lung capacity that's reduced, they may not have any problems when they're sitting up, but when they lie down, their lung capacity is smaller because they don't have gravity helping expand their lungs. And they may have nighttime hypoventilation, meaning that they are not getting rid of their carbon dioxide, and they wake up fatigued in the morning. This is something that needs to be looked into as a potential cause for daytime fatigue. [FSHWatch](#)

Reference

Evidence-based Guideline: Evaluation, Diagnosis, and Management of Facioscapulohumeral Muscular Dystrophy, a report of the Guideline Development, Dissemination, and Implementation Subcommittee of the American Academy of Neurology and the Practice Issues Review Panel of the American Association of Neuromuscular & Electrodiagnostic Medicine.

Feed your soul

Artists adapt to keep creating

by **AMY BEKIER**
San Diego, California

One thing is abundantly clear. No matter the degree of disability, FSHD does not define our soul, nor can it break our spirit if we refuse to let it. The FSH Society asked me to write this article because I am an oil and pastel artist. So I put out a call on social networks asking our FSHD community of artists, artisans, musicians, and craftspeople to tell me what they use to help them continue to enjoy their creativity.

The response was amazing. Some humbly responded that they don't use anything different than they do in their daily lives. I've come to realize that the things they do every day to accommodate their weak hands, inability to lift their arms, or support their spines have become so commonplace that they don't realize the tricks and unique ways they hold their embroideries, paintings, tools, and instruments.

I started painting about 12 years ago when I realized that my lifelong passion for golf and golfing travel was no longer sustainable. Although I am right-handed, I paint with my left because I can no longer raise my right arm. I sit on a high-back swivel stool with a lowered easel so that the top of the canvas is below shoulder height. I don't like slanted tables because they distort the painting and I wind up with figures that have huge heads and little feet. I suppose that would be okay if I were Picasso, but I have a long way to go before I can brag. You can see my work at amyzoeart.com.

On February 5-7, 2016, the FSH Society sponsored a booth at the LA Abilities Expo to celebrate and display work by artists with FSHD and their indefatigable passion for living. Michelle MacKay's abstract and desert art along with my oil paintings were on display.

Visitors were drawn to the colorful booth to learn about FSHD for the first time. Some were FSHD patients who had never seen another person with their disease. FSH Society members and their families volunteered to staff the booth. Their support is greatly appreciated. Special thanks to Antonio Sturniolo and his Roman Gadgets tablet case invention for transporting, setting up, and breaking down the booth, as well as supplying much of the equipment.

In addition to my own art, I've included two detailed adaptations from artists whose spirits soar while performing what they love.

Brian D.

If you like bluegrass, then Brian D. of the Stagerobbers (stagerobbers.com) is up your alley. The band has played at FSH Society fundraisers, sells CDs, and performs at many venues. Brian's friend devised a shoulder harness (see photo) to help him hold his violin without becoming overly fatigued.



Amy Bekier at the Los Angeles Abilities Expo booth for Artists with FSHD.



Brian D. uses a shoulder harness to help him hold up his violin.

Jim H.

Jim has a fascinating character, and I mean that in the most complimentary way.

Jim's family has been in the fishing and tackle business in south Florida ... well, forever. Jim was a lifelong light tackle angler, and when he could no longer do what he loves, he learned to love what he is doing and now creates an affordable line of unique 3D acrylic fish wall décor for anyone who enjoys the beauty of saltwater game fish (fishrenderings.com).



Example of 3D acrylic fish wall décor by Jim H.

The wall décor is a division of his nonprofit, *Armchairanglers.org*, through which Jim is raising money to provide safe, first-class fishing opportunities to those with physical challenges. His wish is to build a fiberglass pontoon boat, matching floating dock, safety wheelchair tie-downs, inflatable vests, electric fishing reels, and Coast Guard equipment, and to hire fully licensed local captains to ensure a memorable day on the water. Make sure to look Jim up when you're in south Florida!

The accompanying sidebar includes even more adaptations from various artists who shared with me their passions for this article.

If I've left anyone out, I apologize. You all are such an inspiration and an amazing group.

And so, my FSHD family of friends, never give up your passions! Keep devising ways to accommodate your bodily changes, or find new outlets to continue to feed your soul. [FSH Watch](#)

Editor's note: Amy Bekier and Michelle MacKay serve on the Board of Directors of the FSH Society.

How do YOU feed your soul?



Individuals who have come up with adaptations so they can continue in their creative pursuits.

- ▶ Jim F. uses a padded lap board while reclining with arm-height tables.
- ▶ Jim H. digitally colors and inks over scanned pencil-and-ink drawings (topjimcomics.deviantart.com).
- ▶ Victoria, an art teacher, knows of an FSH Society member who wears a clavicle brace.
- ▶ Jennie H., an artist and photographer, uses a slanted surface while raising her seat to rest her forearms on her legs (artwithjennie.com).
- ▶ Peter V., a bookbinder and conservator, suggests a drafting table and tries not to stay in one position for too long.
- ▶ Anne L., a quilt maker, can no longer sit at her machine because of a weak stomach and back, so she now sews by hand.
- ▶ Robert K. uses a gaming chair.
- ▶ Ben L. creates neon structures and writes music, because he finds that it is “still possible to fly” (beneon.com and vimeo.com/134561045).
- ▶ Kristie C. paints wine bottles and does vinyl work on tiles.
- ▶ Christina B. has perfected painting shabby chic furniture, which doesn't have to be perfect.
- ▶ Kelly J.C. posts her crafts on Instagram: [@kellyjellycake](https://www.instagram.com/kellyjellycake).
- ▶ Raquel M. makes small clay figurines by relaxing her elbows often.
- ▶ Sandra B. and Christie I. build up their armrests with pillows.
- ▶ Lauren M. leans on the armrest of her wheelchair and holds one arm with the other while propping her elbow on the table to paint.
- ▶ Zabrisa Z. paints pastels by using a “bridge” (mahl stick) to rest her wrists. She and Dani P., a watercolorist, place their easels on a slanted surface.
- ▶ Sara R. plays the cello. She takes frequent breaks and stretches, but lives with the fatigue and pain rather than give up her love of music.
- ▶ Molly B., who is a graphic artist, found that a HAG Capisco chair has saved her back.





Minneapolis Meetup

Learning about FSHD genetics from a world expert

by **MARGE BRCHAN**
Blaine, Minnesota

A group of FSHD folks from Minnesota gathered at the University of Minnesota on November 7, 2015. There were probably 12 persons with FSHD, plus their support persons. One individual who has a sibling with FSHD attended by herself.

Our guest speaker and host, Michael Kyba, PhD, from the University of Minnesota gave an excellent overview of FSHD genetics. He also fielded many questions and answered as best he could, considering that he is not a medical doctor. His assistant and a lab assistant were there as well and did a great job of making all of us feel comfortable.

We used the opportunity to help Dr. Kyba with one of his new research projects: to determine whether an FSHD biomarker can be detected from a urine sample. I believe he was able to collect a fair share of samples that afternoon.

I certainly heard from the participants at our November meeting about the desire for more opportunities to learn more about the



condition as well as discussing living with FSHD.

We are now planning another get-together—a picnic in a park—for June 11,

2016, at Coon Rapids Regional Park in Coon Rapids, Minnesota. We hope to see you there! (Check the FSH Society's website for details.)

[FSHWatch](#)

Member meetings

WESTERN WASHINGTON FSH SCHOOL

The Western Washington FSH School meets on the third Saturday of each month at Luther's Table in Renton, Washington. Regulars include (left to right) Karen Elizabeth, Bob Loudon, Amanda Rickard, and Karla Nuss, as well as myself. We meet to share information, hear about the latest research from Amanda (who has moved to San Diego; we shall miss her!), and plan fundraising and advocacy initiatives. Bob had planned an ambitious trip in his motorized wheelchair for this summer: to travel across the state of Washington from the Oregon to Canadian border. Unfortunately, he needed some emergency surgery this spring and will have to postpone the venture to a future date. We'll be there to support him! Let us know if you would like to join us!

— Nancy Payton
FSH Society Board of Directors



FSH Society receives Staples Foundation grant

Supporting education and awareness

by JUNE KINOSHITA
FSH Society

The Staples Foundation has awarded the FSH Society a \$3,000 grant, which will be utilized to support academic scholarships for college students who work to raise awareness of FSHD. This spring, the Society helped fund a scholarship competition administered by the Jain Foundation in which eligible students competed for the awards by posting a fact and image about FSHD over social media channels to educate the public about the condition.



The Staples Foundation is the private charitable arm of Staples, Inc., through a program called 2 Million & Change that allows Staples associates around the globe to direct donations to nonprofit organizations focused on academic education or job skills. The program encourages local community involvement by awarding larger grants to organizations where associates are highly engaged in volunteering or fundraising—up to \$25,000 per organization.

We have Patrick Welch to thank for opening the door to this opportunity. Patrick, who works at a Staples store in Shelton, Connecticut, put the application for the grant into motion, motivated by a desire to support the FSH Society because his father, Shawn, is affected by FSHD. Shawn, a retired crime analyst, was diagnosed in 1980. Once the online application had been initiated, the FSH Society completed the form by detailing a request for funding that aligned with the Staples Foundation's interest in expanding educational opportunities for youth.

The FSH Society's educational scholarship collaboration with the Jain Foundation was a great match to the Staples Foundation's mission. The Jain Foundation is a Seattle-based nonprofit whose mission is to cure muscular dystrophies caused by dysferlin protein deficiency, which includes the clinical presentations of limb-girdle muscular dystrophy type 2B (LGMD2B) and Miyoshi muscular dystrophy 1 (MMD1). Because of the rarity of LGMD2B, along with the fact that about 10 percent of the time LGMD cases are misdiagnosed FSHD cases, the foundation had reached out to other patient advocacy organizations for lesser-known muscular dystrophies, reasoning that by banding together, the organizations would be more effective in raising awareness. Winners of the scholarships will be determined in June 2016. [FSH Watch](#)

Ultragenyx Pharmaceutical to sponsor FSHD drug development project

Daughter's FSHD motivates St. Louis researcher

by JUNE KINOSHITA
FSH Society



Naia Sverdrup (left) inspired her father Fran (right) to take up FSHD research.

Ultragenyx Pharmaceutical, Inc., a biopharmaceutical company focused on the development of novel products for rare and ultra-rare diseases, and Saint Louis University's (SLU) Center for World Health and Medicine announced that they have entered into a three-year agreement to collaborate on the development of small molecule therapeutics for the potential treatment of facioscapulohumeral muscular dystrophy (FSHD).

The SLU team is led by Fran Sverdrup, PhD, whose lab has been supported through a grant from the FSH Society ("BET Proteins as Therapeutic Targets in FSHD," awarded \$51,425 from February 2014 cycle).

Sverdrup decided to go into the field when his daughter was diagnosed with infantile FSHD (see *FSH Watch*, Winter 2012). "By combining our center's drug development capabilities with the rare disease expertise of Ultragenyx, this collaboration may increase the chances and accelerate the process of delivering an effective therapy to patients with FSHD," said Pete Ruminski, executive director for the SLU center. "The fact that our own scientist's daughter has FSHD provides extra motivation and passion to our team's efforts to find a therapy to treat her and all those with the disease."

Under the Ultragenyx agreement, Sverdrup's team will identify and conduct preclinical research of small molecules for the potential treatment of FSHD. Ultragenyx, based in Novato, California, has an exclusive option to an exclusive license to existing and future intellectual property arising from the collaboration.

For details, see press release: Ultragenyx and Saint Louis University's Center for World Health and Medicine Announce Research Collaboration to Advance Muscular Dystrophy Treatment (<http://www.nasdaq.com/press-release/ultragenyx-and-saint-louis-universitys-center-for-world-health-and-medicine-announce-research-20160323-00345>). [FSH Watch](#)

THE LAST ONE IN

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we know about this disease. To show them what it means to fight and not give up, and do everything in my power and not come up with excuses about the travel and inconveniences of all this. It's too important! Having done this now, I can't imagine not doing this.

I guess the other thing I'm feeling now is more of an identification with FSHD. I've been fighting with it and butting heads with it since I got my diagnosis, to the point where I hesitated to try on the FSHD shirt I got for my birthday because it was another way to make this real. And while I realize it's just a shirt, I felt this hesitation to try it on. Yet now having participated in round one of three of this study, I feel more ready and accepting to wear the FSHD shirt, as well as the label, around my neck. Just realizing that is kind of staggering for me right now. That's pretty significant in my book.

While answering some of the questions today, I was filled with a mixture of gratitude and fear. The fear came in when reading about these symptoms of FSHD that I don't have, but fearful I might someday. Then layered with that fear is gratitude that I only have the symptoms I do. So it was quite the juxtaposition for me.

Sometimes I feel that I have it easy with FSHD because of the symptoms I have. I've seen the worst-case scenarios and they are terrifying! Yet that doesn't make me identify with the disease any less. It still makes me feel bad, but then the gratitude kicks in that I only have the symptoms I have and I don't have anything worse.

There is also a lot of gratitude in me for having my fiancée Brandi here. Not only "here" as in physically sitting next to me

on this plane, but as in here with me on this journey through this disease. I don't know that I'd be flying home from Rochester, NY, having just taken part in a cutting-edge research study on a super rare disease if I didn't have her. She fills me with strength and confidence that we'll handle anything life and this disease throw our way. She knows me. She knows how to take care of me. She knows how to support me. She knows how to read me. She knows how to ask good questions. So grateful she's right here by my side to prop me up when I need it and walk side by side holding my hand when it calls for that, too.

Well, it's time to wrap this up. We just passed the skyline of Chicago and we're about home. Can't wait to hug my babies. It will be done with a little more love today. And isn't that what we all want? Isn't that what we all deserve? I have to remember the why of everything I do, right?

The why for me will all be snuggled in their beds tonight with a hug and kiss from their Dad and/or partner along with "I love you." And they can sleep easy knowing that this man won't give up and won't stop fighting and won't stop seeking answers and won't stop pushing FSHD forward in any way possible.

Because even the smallest step forward is significant. I don't take that responsibility lightly. Yes, it's heavy, really heavy, but these diminished shoulders haven't depleted enough to not bear the weight. I got this. I'm not going to let my family, my community, and most importantly, myself down.

That's why. 

North Carolina report

LEARNING AND SHARING IN WINSTON-SALEM

The third meeting of "FSHD Carolinas" was held on March 5, 2016, at Parkway United Church of Christ in Winston-Salem, NC. Nineteen people attended: nine with FSH and 10 who were supporting spouses and/or family members.

Following introductions and general discussion of individual experiences with FSHD, the attendees shared practical information and tips to aid in managing this disease.

Meredith Huml gave an update on a paper she recently co-authored on how to improve registries for patients with FSHD. This paper has been accepted for publication in the *Journal for Clinical Studies*.

The group then divided into separate discussion groups: people diagnosed with FSHD and supporters of those with FSHD.

Next, we had a presentation by Laura Hagerty, PhD, scientific program officer for the Muscular Dystrophy Association. Laura is an MDA scientist who oversees scientific grants for FSHD research. There is some promising collaboration between the FSH Society and the MDA, and early-stage FSHD clinical trials are going on, so we were not left without hope.

The next meeting will be held on September 24, 2016, in Raleigh-Durham at Triangle Presbyterian Church and hosted by Ray Huml. (Check the FSH Society event calendar on page 20 for details.)



-Judy Tayloe, Rural Hall, North Carolina

FSH Society takes over Boston's TD Garden

Shooting hoops to raise funds

by JUNE KINOSHITA
FSH Society



Our first-ever basketball tournament, at Boston's legendary TD Garden—home of the Boston Celtics—was a rousing success. Teams from Acceleron Pharma, SHIFT Communications, O'Connor Drew, Mouse Specifics, Social Sports Boston, and Friends of Joel Desilets enjoyed vying with one another in knockout and free-throw competitions as well as half-court games. Social Sports Boston won the playoffs, while Mouse Specifics claimed the Youth team trophy.

Following the tournament, about 100 revelers crowded into Causeway Restaurant and Bar for delicious food, plenty of beer, and a lively auction presided over by Rich Davey, former commissioner of transportation for the state of Massachusetts. Items donated by the Celtics Foundation, Aileen Healy, Chris Stenmon, Westin Copley Place, Bill Walton, and Staci Weber brought in some \$4,000.

University of Massachusetts Medical School scientist Peter Jones, PhD, gave a heartfelt talk about how a graduate student with FSHD inspired him to go into the field.

After dinner, everyone flocked back to TD Garden to cheer the Celtics to a 107-96 win over the Orlando Magic. For the FSH Society, the evening was a big win, too, with nearly \$20,000 in net profits.

We thank our sponsors, Acceleron Pharma, Clif Bar, Eastern Bank Community Foundation, Mouse Specifics, O'Connor Drew, Staples Foundation, Tom Mansir and Hewlett Packard, George Pollock, and SHIFT Communications. And a huge "thank you" to our staff and fantastic event committee chaired by Dan Zeigarnik, with additional help from Joel Desilets and Staci Weber. [FSH Watch](#)



Ghostly Gala

ANGELENOS STRUT THEIR STUFF AT THE WORLD-FAMOUS CICADA CLUB



We're ready to welcome you to the 2016 Ghostly Gala!

Our first-ever fundraiser in Los Angeles for the FSH Society, just before Halloween 2015, was called the "Ghostly Gala to Vanish FSHD." Appropriately, people arrived in fanciful costumes and posed on the red carpet before sashaying into the world-famous Cicada Club in downtown Los Angeles in the 1920s Art Deco Oviatt Building—where *American Horror Story* with Lady Gaga was filmed just weeks before. The Ghostly Gala raised some \$90,000 and exceeded our wildest dreams!

Our celebrity host, Max Adler, was unable to attend in person and instead provided an amusing recorded introduction. He had a good excuse not to be there; he was busy acting in director Clint Eastwood's next feature film, *Sully* (which is scheduled for release this September).

Comedian Wendy Liebman filled in wonderfully as MC with her signature brand of wry humor. She also served alongside actor Obba Babatundé and Max Adler's friend, the magician Micah Cover, as judges during the costume contest. During the reception, Micah Cover delighted guests with sleight-of-hand tricks, while Deborah Berman provided additional entertainment in the guise of a fortune teller.

Dean Mora's Modern Swing Quartet kept the mood romantic and energetic with their repertoire of 1930s and 1940s classic tunes, which they played through dinner and later for dancing.

The absolute highlight of the event was testimonies from people in the FSH Society talking about how facioscapulohumeral muscular dystrophy has affected their lives. We also heard from the executive director of the FSH Society, June Kinoshita, and Amanda Amell, a researcher from Seattle.

Melanie Pollack of Maximum Events ran a fabulous silent auction; she and her assistants were smooth, efficient, and added a fun touch of glamour with their flapper costumes. The amazing auctioneer Zach Krone ramped up the bidding during the live auction to a fever pitch. With such prizes as one of

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aTyr Pharma to expand Resolaris™ trial

Preliminary results support further trials

by **JUNE KINOSHITA**
FSH Society

The San Diego-based biotech company aTyr Pharma released findings on March 30, 2016, from a Phase 1b/2 clinical trial of its experimental therapy Resolaris™ in adults with facioscapulohumeral muscular dystrophy (FSHD). The volunteers tolerated the drug well and showed improvements in some patient-reported outcome measures. While the number of patients in the study is small, the company stated that the results were encouraging enough to support expanding the trial.

The randomized, double-blind, placebo-controlled trial studied Resolaris in three dose escalation cohorts (0.3, 1.0, and 3.0 mg/kg) across four sites and a total of 20 patients. The study was designed to evaluate

the safety, tolerability, immunogenicity (immune reaction to Resolaris), and pharmacokinetic (PK) profile of Resolaris in adult FSHD patients. The study also evaluated the usefulness of tools that could potentially measure drug effectiveness, such as magnetic resonance imaging (MRI) to observe muscles with high water content (thought to indicate inflammation) and patient-reported outcomes.

Volunteers were treated and followed for three months. The study did not observe any difference in the MRIs between controls and patients receiving the drug, but it found that patients on Resolaris reported improvements primarily in their activities, independence, and emotions. The findings

were felt to be encouraging enough to justify continuing the trial and expanding it to additional clinical trial sites.

The company is currently recruiting for two trials: 1) a 12-week trial for patients between the ages of 16 and 25 who had onset of symptoms before age 10; and 2) a 12-week trial for adults with FSHD and limb-girdle muscular dystrophy type 2B (LGMD2B). Trial details and sites are posted here: <https://www.fshsociety.org/find-a-clinical-trial/>

Read aTyr's press release here: <http://www.prnewswire.com/news-releases/atyr-pharma-announces-encouraging-phase-1b2-results-for-resolaris-in-its-first-rare-myopathy-trial-300243634.html> 

Letter to My Younger Self

I would tell you to run
run so much every muscle in your body aches
and burns
run after, run from, run to
say yes to hikes to the waterfall
darling, you didn't know it would be the last
time
soak up as much beauty from nature as you can
stand
look.

I would tell you not to be afraid
everyone has a breaking point, yours is mental
you're going to go through hell and back but
emphasis on the word back
you make it out alive
crying is not a sign of weakness
it's the sign of a strong person getting stronger
know that your own physical limitations
shouldn't compare to anyone else's
push your boundaries until you are dancing
precariously close to the edge
you can do it
and for goodness sakes just listen to mom and
put in your hearing aids
you're going to regret it when you're struggling
to keep up with conversations
no one cares how they look, if anything they're

curious
maybe a little bit ignorant—my darling, you can
change that
start with your voice and work your way up to
your actions, they don't have to be in the
dark forever
though you might find the darkness better
you will spend a lot of time alone
wondering why on earth were you burdened
with this disease, such an ugly stupid disease
if you could just smile you'd for sure be the
social butterfly your sister is
there is nothing wrong with you, my beautiful
girl
so what if you aren't bubbly, outgoing, and
always cheerful?



Zabrisa Zelinski

there is no shame in being different
the summer you spent cutting out words to
form the collage of inspiration that hangs on
your wall
will also be the summer you find yourself
you live in denial for long time
it would be so easy if you would just face up to it

Look your disease square in the eye and say hi
but I know life is never easy and the sooner you
get that into your stubborn head,
the sooner you will start to live
you will make it through the year you swear will
kill you
find your own definition of success
strength is not always measured in physical
capabilities
it's okay to ask for help
If I could tell you one thing
you are braver than you think
thank you, Z
for being
for persevering
for shining your shiny glow
you are never, ever alone.

*In honor of #RareDiseaseDay
- Zabrisa Zelinski, Tucson, Arizona*

Coming “out of the closet” on FSHD

Raise awareness among the people around you

by **ROBIN STEMPLE**
Shanksville, Pennsylvania

At a “Meet and Greet” event last year, held by Blind and Vision Rehabilitation Services of Pittsburgh, the new parent company of the Somerset County Blind Association, I got into a conversation with a good friend regarding my recent retirement. Although I thought it was now general knowledge, she was unaware that I have facioscapulohumeral muscular dystrophy (FSHD), which is now affecting my ability to walk. This was a major factor in my decision to retire.

While my friend was familiar with Duchenne muscular dystrophy (DMD) and amyotrophic lateral sclerosis (ALS), popularly known as Lou Gehrig’s disease, she had never heard of FSHD. I thought it might be time to come out of the closet, as it were, and make the community more aware of this condition.

I also thought it might help to set the record straight. If you’ve seen me out somewhere in the community, the way I stagger as I’m walking might lead you to believe I’ve developed a drinking problem! I assure you, that’s not the case.

FSHD is actually more prevalent than either Duchenne muscular dystrophy or ALS. While it’s typically diagnosed in the teen years, there are cases identified in infancy and other cases that aren’t diagnosed until people are in their sixties.

FSHD typically causes muscle weakness in the face, neck, shoulders, and upper arms, hence its name, but it also often affects the muscles in the trunk, as well as the lower legs, ankles, and feet. It can progress to affect almost any skeletal muscle.

Progression can be rapid or extremely slow. In my case, I was diagnosed when I was 14. For me it was the inability to raise my arm that led to the eventual diagnosis, which was confirmed with a muscle biopsy. While my shoulders have gotten progressively weaker over the years, I’ve been able to compensate for it, and not many people outside my family even knew I had the condition.

Over the past three years, however, the disease has really affected all the muscles in the trunk, as well as the lower legs, leading me to be very unbalanced when I’m walking. The balance issues, combined with the muscle weakness and my blindness, kind of all piled up on me, leading to my retirement decision.

Just as I fought blindness 20 years ago with the founding of the Somerset County Blind Center, I’m planning to fight FSHD as long as I can. I’ve gotten involved with the FSH Society, a national organization that funds research to find a cure for this particular type of muscular dystrophy. The FSH Society is small, but they’ve consistently gotten top ratings from Charity Navigator, which rates nonprofits on how well they handle contributions and fulfill their mission.

My first step toward taking action was a Thanksgiving concert with my singing group, Apostles Creed, on Sunday, November 22, 2015, at Unity United Church of Christ in Berlin, Pennsylvania, to benefit the FSH Society.

I would love the opportunity to talk with other people with first-hand experience of life with FSHD. I believe I’m the only person

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Musclepalooza

PERSEVERANCE PAYS OFF



A late-night jam session at Musclepalooza.

Hi, my name is Rachel Brown. I am 14 years old, and I am the daughter of Alan Brown. My father was diagnosed with FSH muscular dystrophy long before I was born. As I grew up, I started wondering what this disease actually was. My father could walk, but not for long distances at a time. Over the years, it started getting worse and worse. All my family wished for was a cure. That is why we started a fundraiser called Musclepalooza.

Musclepalooza helped raise money for the FSH Society and the Kennedy Krieger Institute. My family and I had never planned a fundraiser before. The most we had ever done was probably a yard sale. We knew that this event would be hard to pull off. We only had a small budget to fill such big shoes.

Over the course of planning this event, I went around to various shops with my parents and asked them to donate to this event. Many said yes, but there still were rejections along the way. Sometimes it is hard to open up somebody’s mind and heart as to what is actually important in the world. We persevered. We worked harder after those rejections, and many gracious volunteers and companies provided us with just enough support to have an outstanding fundraiser.

During the event, everything was a blur. It all went by so quickly the first year. I remember the live music and the amazing food, and silent and live auctions. I remember running around making sure everything was in place to ensure that this plan was successful. That year we raised \$17,000. All of this money went to my dad’s amazing doctor, Dr. Wagner. She had had her research budget cut, and this fundraiser ensured that she could keep on saving lives.

The second year that we did this event, things went a lot smoother. For example, we didn’t blow the generator minutes before we opened the doors. We also had superb food and outstanding live music with more support than before. We even had Super Bowl 50 tickets to auction off! That year we raised a whopping \$30,000.

Altogether, we raised \$47,000 over the two years. Just imagine how many people that money will help! Sure, this event was a lot of hard work, but it did pay off. All in all, this event was an amazing experience for my family and our friends. It’s great to know that in a world like the one we live in today, people still care. It truly is a heartwarming feeling.

– Rachel Brown, Doylestown, Pennsylvania

Newly awarded FSH Society grants

Setting ever-loftier goals for research funding

Summaries edited by **JUNE KINOSHITA** and **DANIEL PEREZ**
FSH Society

This year, to date, the FSH Society has awarded \$598,242 in grants to new projects. In August 2015, competitive groups submitted the projects, which were then reviewed by our Scientific Advisory Board.

With these awards, the Society continues to significantly expand funding for FSHD. In 2015, the Society funded a total of \$949,221, a 16 percent increase over total funding in 2014. This year, we aspired to increase our research funding to \$975,000 with the support of our members, fundraising event organizers, and benefactors. We can't thank them enough for their dedication and generosity.

For full details on our grant awards, please visit www.fshsociety.org/funded-grants/.

August 2015 grant submission cycle awards

► PROTEIN CHEMISTRY AND PROTEIN-PROTEIN INTERACTIONS OF DUX4 AND DUX4-FSHD MOUSE

Jocelyn Eidahl (Scott Harper, mentor)
 Nationwide Children's Hospital, Columbus, Ohio
 \$70,000 (request one-year extension)



Jocelyn Eidahl

Specific Aims: The overall objective of this study is to identify, characterize, and ultimately inhibit DUX4 protein modifications that may contribute to its toxic properties in FSHD muscle. Delineating how DUX4 protein function is regulated is an important, unmet need in the field.

The DUX4 gene encodes a transcription factor that activates downstream toxic pathways, including apoptotic cascades ("programmed cell death"). I hypothesized that post-translational modification (PTM) may be one important mechanism affecting DUX4 protein function. PTMs play key roles in how a protein binds to other molecules, where it goes inside a cell, and how stable the protein is. My primary goal was to first identify whether DUX4 could be post-translationally modified, then subsequently map DUX4 PTMs and determine their contribution to DUX4-induced toxicity. By accomplishing this goal, we hope to establish a framework for therapeutic intervention designed to disrupt DUX4 modifications and prevent toxicity to muscle.

► INVESTIGATION OF 4-METHYLUMBELLIFERONE AS A C1QBP-TARGETING FSHD THERAPEUTIC

Alec DeSimone (Charles Emerson, mentor)
 UMass Medical School, Worcester
 \$150,000 for two years



Alec DeSimone

Summary: In this project we will evaluate the potential of a chemical called 4-methylumbelliferone, or 4MU, to serve as a drug to treat FSHD. We became interested in

4MU because in cells that express the DUX4 gene (a prime suspect in FSHD), 4MU prevented many genes "downstream" of DUX4 from being activated. DUX4 is what is known as a transcription factor, a "master switch" gene that switches other genes on. In the case of FSHD, those other genes are suspected of playing a role in damaging and killing muscle cells. In previous research, we identified a protein called C1QBP that interacts with DUX4, and seems to act like a partner in crime to set off various cell-damaging reactions. We will investigate how 4MU targets C1QBP to block the harmful effects of DUX4. We will use an FSHD mouse xenograft model, established in our lab, to conduct studies to determine if 4MU treatment can inhibit DUX4-target gene expression in a living animal. This will help us better evaluate 4MU as a potential FSHD therapeutic.

4MU is of interest for development as a drug because it is already being used in Europe to treat biliary dyskinesia and has had its short-term safety established in several studies. It is also being investigated in both cell culture and animal models as a treatment for specific cancers.

► STUDY OF THE CO-REGULATORY ROLE OF DUX4 ON SEX HORMONE NUCLEAR RECEPTORS AND THE PROTECTIVE EFFECT OF SEX HORMONES ON DUX4-MEDIATED CELL TOXICITY

Sabrina Pagnoni and Constanza Cioffi (Alberto Rosa, mentor)
 Council from Argentina (CONICET)
 \$120,000 for two years



From left, Hernan Paci, Maria Laura Raymond, Julieta Quintero, Alberto Rosa, Sabrina Pagnoni, and Constanza Cioffi.

Summary: Our laboratory, together with A. Belayew's laboratory, originally proposed that aberrant expression of DUX4 is harmful to cells, contributing to the pathogenesis of FSHD. We demonstrated that DUX4 is a nuclear protein, endogenously expressed in cultured FSHD myoblasts (immature muscle cells), pro-apoptotic and cytotoxic when expressed in transfected cells. We recently analyzed the DUX4 molecular domains contributing to its toxicity, subcellular transit, and nuclear location. In these studies, we

recognized an LLXXL motif at the C-terminal region of DUX4, which is present in co-regulators of nuclear hormone receptors (NRs). Preliminary studies from our laboratory showed that DUX4 is a co-regulator of the progesterone NR. We also found that progesterone protects cultured cells from the toxic effect of DUX4. In this project, we will study the role of DUX4 as a co-regulator of NRs of sex hormones as well as the protective effect of sex hormones on the toxicity of DUX4. These studies are relevant to the understanding of the normal function of DUX4 as well as its pathogenic role in FSHD and the future rational approaches for the treatment of FSHD patients.

► **A GENOME-WIDE CRISPR KNOCK-OUT STRATEGY TO IDENTIFY MODIFIERS OF FSHD**

Angela Lek (Louis Kunkel, mentor)
Boston Children's Hospital, Boston,
Massachusetts
\$78,000 for one year



Angela Lek

Summary: Facioscapulohumeral dystrophy (FSHD) is a common but unique form of muscular dystrophy requiring multiple factors to create a “permissive” state for disease manifestation. Over recent years, several genetic (DUX4) and epigenetic (hypomethylation) factors have been linked to FSHD pathogenesis; however, it has become clear that the field has not elucidated all factors required for disease manifestation.

Mounting clinical evidence suggests the existence of modifier genes with the capacity to regulate DUX4 transcript and/or protein function. Recent advances in genome-editing technologies proposed for use in this project now should enable us to uncover these remaining missing links. Through the systematic introduction of loss-of-function mutations into genomic DNA, we can interrogate the genome for answers that may explain the variability between patients, as well as the non-penetrant effects of DUX4 in some individuals.

In this project, we propose a targeted genome-scale knock-out screen to identify genes that can reduce the phenotypic impact of DUX4 expression when inactivated. We hypothesize that there exist gene targets of DUX4 whose loss will render DUX4 unable to trigger a dysregulated cascade of gene expression, thus abrogating its toxicity. These candidates likely serve as genetic modifiers of FSHD, and will be readily identified by downstream sequencing and computational analysis for detection of CRISPR target genes enriched within these DUX4-“resistant” cell populations. This will allow the generation of a complete list of gene candidates with the potential to influence the pathogenic outcomes associated with DUX4 misexpression. Identified gene hits will be cross-referenced to our whole-genome sequencing data of non-manifesting FSHD carriers to search for sequence variants that may enable us to narrow down promising candidates for functional follow-up

studies.

Validation of candidate modifier genes will be performed in our established zebrafish model of FSHD. Additionally, we will utilize our repository of FSHD patient cells to genome edit our candidate genes and subsequently measure changes in known FSHD biomarker expression.

FSHD is a challenging disease whose remaining unanswered questions cannot be accomplished alone. Hence, our proposal involves a multi-institute collaboration, bringing together a wealth of patient resources (Wellstone Center), the latest in genomic technology (Broad Institute), and a well-established animal model of FSHD (Boston Children's Hospital). Not only will the identification of these modifier genes for DUX4 resistance provide valuable insights into FSHD disease pathogenesis, but they will also present as solid leads that can be directly targeted for therapeutic intervention in humans with FSHD.

► **TO DETERMINE THE INITIAL RESPONSIVENESS TO FSHD DISEASE PROGRESSION OF A SYSTEM OF SYNCHRONIZED WIRELESS MOTION SENSORS**

Jeffrey Statland, MD
University of Kansas, Kansas City
\$39,044 for one year



Jeffrey Statland, MD

Summary: The goal of this research project is to establish a quantitative assessment tool to evaluate changes in dynamic motion of persons with FSHD. We will use a portable wireless motion analysis system to analyze people when performing common functional motor tasks like getting up from a chair, walking, turning, postural sway during quiet standing, and arm range of motion.

Since molecular advances have identified potential therapeutic targets for future FSHD clinical trials, there is an urgent need to develop reliable and responsive outcome measures for FSHD treatments. Established FSHD outcome measures such as manual muscle testing (MMT) and quantitative myometry (QMT) have been validated in a large natural history study, but fail to demonstrate disease progression in time periods of less than one year. Similarly, measuring motor performance during everyday tasks is not sensitive to changes in FSHD in less than three years. Using such strength or functional outcome measures in a clinical trial will significantly hinder the drug development process because it will require large numbers of subjects and long treatment intervals. This is problematic in a rare disease where access to patients is limited.

Measures of dynamic motion while performing functional motor tasks may be more sensitive than measuring strength to early changes in muscle function. A prior study using laboratory-based motion analysis identified a subset of FSHD patients with abnormal

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Volunteers are essential

Is there a study near you?

by **JUNE KINOSHITA**
FSH Society

To crack the mystery of FSHD, patients are absolutely essential. All of the breakthroughs were made because patients stepped up to the plate. We cannot guarantee when a treatment will arrive, but by volunteering for research, you will move us a step closer to that day. For details on the studies listed below, visit <https://www.fshsociety.org/find-a-clinical-trial/>.

Here are studies that are currently recruiting volunteers:

► **PHASE 1B/2 CLINICAL TRIAL OF RESOLARIS (ATYR1940)**

Trial Sponsor: aTyr Pharma
San Diego, California

aTyr Pharma, a company engaged in the discovery and development of therapeutics to address severe rare disease, is currently conducting two trials of Resolaris (ATYR1940) in adults with FSHD and 16- to 25-year-olds with early-onset FSHD. Send inquiries by email at clinicaltrials@atyrpharma.com or phone at (877) 215-5731.

► **STUDY ON MUSCLE STEM CELLS IN FSHD**

Principal Investigator: Michael Kyba, PhD
University of Minnesota, Minneapolis

We are studying the muscle stem cell in FSHD and, in particular, studying what the DUX4 protein is doing in these stem cells. Although the genetics of FSHD clearly implicate the DUX4 protein in the disease, we do not understand how DUX4 leads to muscle loss. This study addresses this question.

Study participants (FSHD and control individuals) will provide a small muscle biopsy from the quadriceps. The biopsy is taken using a needle and is performed by Dr. Karachunski in the Muscular Dystrophy Clinic. Topical anesthetic is used.

This study involves paired FSHD and control samples. For every FSHD participant, we need to find a control (unaffected) participant. You can help—if you have a sibling, spouse, loved one, friend, or colleague who would be willing to participate and serve as your control, please do let us know.

There is no direct clinical benefit to the study participants. Study participants will receive a token remuneration (\$200) for their time and inconvenience. This study is aimed at understanding why and how muscle is lost in FSHD.

Please discuss your interest with Joline Dalton by phone at (612) 625-7967 or by email at jcdalton@umn.edu.

► **RASCH ANALYSIS OF CLINICAL SEVERITY IN FSHD (ROC-FSHD)**

Principal Investigator: Jeffrey Statland, MD
University of Kansas Medical Center, Kansas City

Recent advances in our understanding of FSHD have identified, for the first time since discovering the mutation behind FSHD 20 years ago, a potential target for therapy, and the research community has shifted toward clinical trial planning. However, hampering

these efforts is the wide variability in disease expression, which at its heart may be due to the epigenetic nature of the disease. A barrier to identifying genetic or environmental modifiers of disease has been the lack of a clinically meaningful tool for documenting progression of disease. Such a rationally built scale would be calibrated so each increment in the scale would reflect a progression in the clinical disability of the disease. Such a scale would enable the identification of genetic and environmental modifiers of disease expression, while providing a powerful tool to stratify patients for future clinical trials, potentially reducing the variability and increasing the likelihood of identifying potentially effective therapeutics. In addition, such a tool would be invaluable for prognosis and surveillance in the clinic. Here, we propose to develop a scaled and calibrated Rasch-built clinical severity scale for FSHD (the FCSS). We are seeking fifty (50) volunteers, twenty-five (25) from the University of Kansas Medical Center, to participate in this study. Volunteers will be required to make a single visit lasting approximately six hours. Anyone with a diagnosis of FSHD who can travel to and from the University of Kansas Medical Center is eligible for this study.

Contact: Ayla McCalley, Neuromuscular Research Center, University of Kansas Medical Center, 3901 Rainbow Boulevard, Mailstop 2012, Kansas City, KS 66160 Phone: (913) 945-9937 Email: amccalley2@kumc.edu

► **FACIOSCAPULOHUMERAL DISEASE (FSHD) STUDY**

Principal Investigator: Kathryn Wagner, MD PhD
Kennedy Krieger Institute, FSHD-Wellstone Muscular Dystrophy Cooperative Research Center, Baltimore, Maryland

Volunteers with FSHD and their immediate family members are needed for a clinical research study. Volunteers will be asked to provide blood and muscle or skin samples to be deposited in a research core facility. Samples of blood, muscle, and skin will then be sent to multiple investigators for studies including gene and protein expression analysis and immortalization of muscle cells.



Dr. Kathryn Wagner (center) with young patients.

Although there is no direct benefit to the volunteer, the samples are anticipated to be a great asset in multiple studies within the FSHD-Wellstone and the larger FSHD research community. The study is especially seeking volunteers with infantile FSHD, families with more than one affected member, ethnic minorities,

and people with FSHD-related hearing loss or eye involvement. Volunteers will be reimbursed for travel and lodging costs associated with the study.

Interested individuals should contact Genila Bibat, MD, at (443) 923-2778 or by email at bibat@kennedykrieger.org. 

NEWLY AWARDED FSH SOCIETY GRANTS

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motion parameters despite normal manual muscle testing. Whereas such measurements previously required dedicated motion laboratories, synchronized networks of portable wireless motion sensors make analysis of complex functional movements more accessible and practical in the clinical trial setting.

We will conduct a 12-month longitudinal study in 20 genetically confirmed and clinically affected FSHD participants (10 mild to moderately affected, and 10 moderate to severely affected) to determine the responsiveness of wireless motion analysis to disease progression in FSHD, determine how large a change would be important to people with FSHD, and create summary scores (e.g., upper extremity, lower extremity) for future clinical trials.

► CHARACTERIZATION OF A TAMOXIFEN-INDUCIBLE DUX4 KNOCKIN MOUSE

Scott Harper

Nationwide Children's Hospital, Columbus, Ohio

\$25,000 for three- to six-month bridge funding



Scott Harper

Summary: We will submit formal grant applications to foundations, including the MDA and the FSH Society, and are considering seeking some industry funding. However, this will take time (several months), and we no longer have discretionary funds to support the mouse colony. We want to expand, characterize, and publish this model as soon as possible, and we are seeking bridge funding for this purpose. It is our goal and priority to make this model available to anyone in the field who wants it, as soon as is practicable.

► DEVELOPMENT OF ANTISENSE OLIGONUCLEOTIDE DRUGS AS THERAPEUTIC AGENTS FOR FSHD

Julie Dumonceaux

University College London, UK (formerly at Association Institut de Myologie, Paris, France)

\$94,606 for 1.5 years

Summary: The overall objective of our project is to suppress DUX4 expression and develop a therapeutic approach for FSHD based on antisense oligonucleotides (AOs). AOs are chemically modified single-stranded DNA, RNA, or chemical analogue molecules which

are able to target a specific gene (such as DUX4) and inactivate it.

The principle is simple, but creating AOs that are effective and safe is very challenging. We previously observed that targeting DUX4 3'UTR (regions that regulate gene expression) leads to an efficient extinction of DUX4 and prevents aberrant expression of genes downstream of DUX4. Our goal is now to improve DUX4 extinction by developing optimized AOs and to validate these AOs in a mouse model. To test the body-wide administration of the most active anti-FSHD AO drugs, we are creating a new mouse model carrying a reporter gene (LacZ, which produces a blue color) with the 3'UTR of DUX4 mRNA. If the drugs suppress DUX4, one will see less of the blue color. Two treatment strategies will be developed. In the first, we will use intravenous systemic delivery of therapeutic optimized AOs in naked form or conjugated to cell-penetrating moieties (e.g., octa-guanidine or CPPs). In the second case, AOs will be put into adeno-associated virus (AAV) under the control of the U7 promoter (as it has been done for exon-skipping gene therapy for Duchenne muscular dystrophy, for instance). AAVs are now well known to be able to target the muscles in a whole body without toxic effects.

► TO COVER THE REMAINING MONTHS OF GRADUATE STUDENT YUANFAN "TRACY" ZHANG IN THE KATHRYN WAGNER LAB

Tracy Zhang (Kathryn Wagner, mentor)

Kennedy Krieger Institute, Baltimore, Maryland

FSH Society Muscleepalooza graduate research award, \$21,592 for three months



Tracy Zhang

Summary: Funds are being requested from the FSH Society to cover the remaining months of graduate student Yuanfan "Tracy" Zhang in the Wagner lab. Tracy is a fifth-year cellular and molecular medicine graduate student who works exclusively on FSHD. Her thesis work is to establish, validate, and use a novel model of FSHD. She established and validated the human skeletal muscle xenograft for FSHD, which she published as a first author in *Human Molecular Genetics* (Zhang et al., *Hum Mol Gen* 2014, 23: 3180-3188). She is now using the model to show proof of concept of antisense oligonucleotide knockdown of DUX4-fl in FSHD. While this work is generally supported by the FSHD-Wellstone at UMMS, Tracy is no longer supported by the Wellstone, and funds are being requested to cover her salary and benefits to finish this project. 

Save the Date!

2016 Event Calendar

Additional meetings in Washington, DC, and other locations are being planned. Check our website at www.fshsociety.org/events for updates, details, and maps.

Saturday, May 7, 2016

12:00 p.m.–3:00 p.m.

Mid-Atlantic member meeting
Fourth Annual Spicerfest benefit concert.
Memphis, TN

Saturday, May 7, 2016

2:00 p.m.–4:00 p.m.

Oregon FSH Society members meeting
The Stockpot Broiler, Beaverton, OR

Tuesday, May 10, 2016

6:00 p.m.–9:00 p.m.

Sacramento FSH Society Members meeting
El Torito, Sacramento CA

Tuesday, May 10, 2016

6:00 p.m.–9:00 p.m.

Volleyball Tournament: Step up and Face FSH
East Brunswick High School, East Brunswick, NJ

Saturday, May 14, 2016

9:00 a.m.–3:00 p.m.

Fields Center Patient Day
University of Rochester Medical Center, Helen Wood Hall, Rochester, NY

Sunday, May 15, 2016

10:00 a.m.–12:00 p.m.

Miami Member Meeting
Coral Gables, FL

Saturday, May 28, 2016

10:00 a.m.–12:00 p.m.

Western Washington FSH Community
Luther's Table, Renton, WA

Saturday, June 4, 2016

10:00 a.m.–12:00 p.m.

Stanford FSH Society Member Meeting
Stanford Neuroscience Health Center, Wellness Room, Stanford, CA

Saturday, June 4, 2016

11:00 a.m.–12:30 p.m.

Michigan FSH Society Member Meeting
Burlington Bldg., Univ. of Michigan Health System, Ann Arbor, MI

Thursday, June 9, 2016

7:00 p.m.–9:30 p.m.

FSH Society Fundraiser at Kelly's Gastropub
Kelly's Gastropub, New Haven, CT



Revelers at the 2015 Ghostly Gala to Vanish FSHD in Los Angeles.

Saturday, June 11, 2016

11:00 a.m.–2:00 p.m.

Minnesota FSHD Spring Gathering—A Picnic
Coon Rapids Regional Park, Coon Rapids, MN

Friday, June 24, 2016

6:30 p.m.–9:00 p.m.

Third Annual Songs in the Key of Steven Blier
Grace Cathedral, San Francisco, CA

Saturday, June 25, 2016

10:00 a.m.–12:00 p.m.

Western Washington FSH Community
Luther's Table, Renton, WA

Sunday, July 10, 2016

10:00 a.m.–12:00 p.m.

Chicago FSH Society Member Meeting
Starbucks, Schaumburg, IL

Saturday, July 23, 2016

10:00 a.m.–12:00 p.m.

Western Washington FSH Community
Luther's Table, Renton, WA

Saturday, July 30

San Diego Member Meeting
Genea Biocells, San Diego, CA

Saturday, August 27, 2016

10:00 a.m.–12:00 p.m.

Western Washington FSH Community
Luther's Table, Renton, WA

Saturday, September 17, 2016

12:00 p.m.–3:00 p.m.

Mid-Atlantic Member Meeting
Children's National Medical Center, Main Campus
6th Floor Conf. Room, Washington, DC

Saturday, September 17, 2016

Casino Night

Location TBD, Atlanta, GA

Saturday, September 24, 2016

10:00 a.m.–12:00 p.m.

Western Washington FSH Community
Luther's Table, Renton, WA

Saturday, September 24, 2016

11:00 a.m.–2:00 p.m.

North Carolina Member Meeting
Triangle Presbyterian Church, Durham, NC

Saturday, October 22, 2016

10:00 a.m.–12:00 p.m.

Western Washington FSH Community
Luther's Table, Renton, WA

Sunday, October 30, 2016

5:30 p.m.–10:00 p.m.

Ghostly Gala to Vanish FSHD
Cicada Club, Los Angeles, CA

Saturday, November 5, 2016

10:00 a.m.–5:00 p.m.

2nd Annual Inherited Neuromuscular Disorders Family Conference
University Park Marriott, Salt Lake City, UT

Thursday, November 10, 2016–

Friday, November 11, 2016

FSHD International Research Consortium Workshop
Westin Copley Place, Boston, MA

Friday, November 11, 2016–

Saturday, November 12, 2016

2016 FSHD Connect Conference
Westin Copley Place, Boston, MA

Friday, November 11, 2016

6:00 p.m.–10:00 p.m.

FSH Society National Gala
Westin Copley Place, Boston, MA

Detroit get-together

Getting fired up about research and fundraising

by **AMY TESOLIN-GEE**
Midland, Michigan

About 16 FSHD patients and family members gathered on November 21, 2015, at the trendy Detroit café, Trinosophes, the first such meeting in the Motor City. FSH Society executive director June Kinoshita attended, and we had a wide-ranging discussion.

We learned about a Tyr Pharma's clinical research trial for FSHD. The first trial was for adult patients 18 years and older, but the company is interested in patients with younger ages of onset. The company is using MRI scans of muscles to check for increased water content, which is hypothesized to be due to increased inflammation and a possible sign that the muscle is in danger of degenerating. Researchers are testing the effects of compounds called physiocrines in restoring homeostasis (trying to break the cycle of inflammation).

During our discussion of fundraising and awareness, June emphasized that we are the greatest advocates for ourselves, though she understands it can be awkward—but she made the great point that we are doing it on behalf of all the other people affected, including the kids with infantile onset. Often, people who finally “come out” regarding their FSHD find that their friends, families, and coworkers are happy to step in and help. Oftentimes, friends had wondered



what they could do to help, but didn't know how.

We also brainstormed about fundraising events. June talked about the huge past success of the Steven Blier concerts in New York, an Atlanta group's plans for a casino night later this year, and a 2016 basketball event at Boston's TD Garden through a deal with the Boston Celtics. We wondered if the Detroit Tigers or other Detroit teams might offer an opportunity like that. These events can result in corporate sponsorships if someone has an “in” with a company. Running events can be good if you get running clubs involved. Runners especially like timed events to put on their runner's resume. We discussed harnessing people's competitive nature by offering prizes for the teams raising the most funds.

The FSH Society depends on volunteers to plan and organize events, and can help with mentoring and marketing. The FSH Society has a toolkit on its website with some fundraising best practices. We need to go and see what is available there!

One of the couples attending had some experience doing a fundraiser. They noted that it can be hard to do if you don't have a good help system in place, and suggested starting small.

Another thing we can do to help is participate in SmileAmazon, a program offered by Amazon that

donates 0.5 percent of every purchase to the charity you choose. Small contributions, but they really add up if everybody does it. Think of how much the FSH Society membership must spend on Amazon in one year! To get started, log in through the smileamazon.com portal, select the FSH Society as your charity, and start shopping! You can also enter through the regular Amazon portal, load up your cart, and then if you log in to smileamazon.com, your cart will be waiting there for you.

We agreed we would like to meet again in 2016. Our members are scattered around the state, so we may need to alternate among different locations. Please contact the FSH Society if you would like to join our group! [FSH Watch](#)



Panorama shot of FSH Society members gathered at Trinosophes in Detroit, Michigan.

Progress in biomarkers

Publication shows blood proteins may correlate with course of FSHD

by **JUNE KINOSHITA**
FSH Society

A recent study has reported increased levels of four proteins in the blood of people affected by FSHD. The levels correlate with the severity of symptoms. The collaborative study involved Seth Friedman and members of the radiology department at Seattle Children’s Hospital, Rabi Tawil’s lab at the University of Rochester, and Daniel Miller’s lab at the University of Washington. The proteins identified in the study may serve as “biomarkers”—entities that can be measured in blood or other bodily fluids to indicate whether a person has FSHD and how severely he or she is affected. Identifying such biomarkers has been a highly sought-after goal for drug developers.

Because the progression of FSHD is slow and unpredictable, an investigator using functional measures (such as muscle strength tests or changes in ability to carry out daily tasks) would have to monitor a group of patients in a clinical trial for a long period of time, possibly many years, to learn whether a drug is effective. A valid blood biomarker could offer a fast, objective, and more sensitive measurement of disease progression, which would help shorten the time and expense of a clinical trial.

The new study involved 48 patients at the University of Rochester and 30 patients at the University of Washington in Seattle. Comparison between the two groups showed a consistent pattern of blood protein levels that were altered by a factor of at least 1.5 in individuals with FSHD compared to those without the disease. These proteins were creatine kinase MM and MB isoforms, carbonic anhydrase III, and troponin I type 2. Levels of these four proteins correlated reliably with whether an individual had FSHD and how advanced the symptoms were.

“Other novel biomarkers were also discovered that may reveal mechanisms of disease pathology,” the study reported. “Assessing the levels of these biomarkers during clinical trials may add significance to other measures of quantifying disease progression or regression.”

The FSHD-associated proteins fell into several broad categories. The first group



From left to right: Dan Miller, Kelly Kernan, Amanda Rickard, Premi Haynes, and Lisa Petek.

consisted of proteins associated with the breakdown of skeletal muscle, similar to changes seen in other muscle diseases. A second group consisted of proteins involved in guarding cells against defective proteins, and mostly were specific to FSHD and not seen in Duchenne muscular dystrophy. A third group of proteins was involved in cell adhesion, fusion, and migration. A fourth category comprised proteins with a possible inflammatory role.

“A prospective study that follows these proteins in the same individuals over time is of primary importance, because this type of study will indicate whether protein levels correlate with changes in strength in the same individual,” said Miller. “If

a longitudinal correlation exists, these proteins can be used in the context of clinical trials that test treatments for FSHD and hopefully will shorten the trial length.”

The study was supported by grants from NIH-NIAMS, Friends of FSH Research, Seattle Children’s Translational Research Ignitions Project Program, and by Kacy Murray and the Anderson Family Foundation. [FSH Watch](#)

Reference

Petek LM, Rickard AM, Budech C, Poliachik SL, Shaw D, Ferguson MR, Tawil R, Friedman SD, Miller DG. A Cross Sectional Study of Two Independent Cohorts Identifies Serum Biomarkers for Facioscapulohumeral Muscular Dystrophy (FSHD). *Neuromuscul Disord.* 2016 Apr 22.

COMING “OUT OF THE CLOSET” ON FSHD

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affected by FSHD in Somerset County. If there are others out there, please get in touch with me. We need to talk! [FSH Watch](#)

Editor’s note: Reprinted with permission from At Your Service, Rob Stemple, *Daily American*, Somerset, Pennsylvania. Rob Stemple recently retired after over 20 years with Somerset County Blind Association. He continues to advocate on behalf of people with disabilities, and is available to speak to school and civic groups, churches, etc. He plays sing-along music at several nursing homes. He is also a member of Apostles Creed, a Contemporary Christian group based at Unity United Church of Christ that provides music for community events and fundraisers free of charge. Rob hopes to expand his music ministry now that he’s retired.

An interview with Robert Bloch, PhD

Q: *What do we know now that we didn't know before this study?*

DR. BLOCH: Before we started our research, no laboratory had successfully generated mature human muscle tissue in mice starting with myogenic precursor cells, or myoblasts. The advantage of using these cells is that they can be grown in very large numbers, and so, if methods allowed, many thousands of mice could be prepared that carried human muscle tissue prepared from an individual, or a set of individuals, with particular characteristics. This is especially important in studies of FSHD, because the disease cannot be fully replicated in mice by genetic methods.

When we started, the best any laboratory had done was create muscles in mice with fibers that were about one-third human in origin, with the rest being from the host mouse—far from the goal of 100 percent human. Our experiments have shown that we can generate human muscles in mice with fibers that are greater than 98 percent human in origin, and that we can use our methods with cells from individuals with FSHD as well as from healthy donors. We have learned how to make human muscles, including muscles from FSHD patients, grow to maturity in mice.

Q: *What does your study mean for patients?*

DR. BLOCH: Translating basic science to the clinic requires preclinical experiments to show that a promising treatment for FSHD is efficient and safe. Our study shows that we can prepare large numbers of mice carrying human muscle tissue, including FSHD tissue, to test therapies for FSHD for their efficiency and safety before we test them in human patients in Phase 1 clinical trials.

Q: *What are your lab's near-term aims?*

DR. BLOCH: In the next year or two, we will continue to improve our methods to optimize them for the production of mice for preclinical testing. We will also use our mice in collaboration with other laboratories to initiate studies of promising therapies for FSHD.

Q: *What are the longer-term goals?*

DR. BLOCH: Our long-term goals are, first, to make our technology and mice widely available to research laboratories and biotech firms who are testing potential treatments for FSHD, and second, to determine if our methods can be adapted to repair damaged muscles in patients with myopathies, muscular dystrophies, or severe muscle trauma.



Robert Bloch, PhD

MOUSE GROWS A HUMAN MUSCLE

... from page 1

The Bloch lab used immortalized myoblasts, rather than mature muscle tissue, and transplanted the cells into the hind limbs of mice, where the native muscle and satellite (muscle stem) cells had been ablated by radiation and cardiotoxin. This procedure provided a niche for the transplanted myoblasts.

In the first attempts, some of the transplanted cells survived, but they were few and stunted. But then, borrowing from research showing that electrical stimulation helps regenerate injured muscles in human patients, the Bloch lab tried applying pulses of electricity to the peroneal nerve of the limb and found that the transplanted cells survived and grew, so that most of the cells in the newly grown muscle were of human origin.

In the accompanying interview, Bloch answers *FSH Watch's* questions about what was especially noteworthy about this research and how it will be applied. [FSH Watch](#)

Reference

Sakellariou P, O'Neill A, Mueller AL, Stadler G, Wright WE, Roche JA, Bloch RJ. Neuromuscular electrical stimulation promotes development in mice of mature human muscle from immortalized human myoblasts. *Skeletal Muscle* 2016;6:4.

WORLD FSHD DAY

... from page 1

Together we unite to find a cure.

The idea for FSHD Day was inspired by the Bivianos brothers from a remote Italian island, who camped out and protested in Rome for almost two years to gain political attention from the Italian Ministry of Health. Their efforts led to increased funding and support for FSHD patients and the establishment of Italy's FSHD Day. The brothers' stamina and fight for awareness, improved medical therapies, and overall improved quality of life for those with such muscle-wasting diseases have opened a dialogue that will now continue around the world with World FSHD Day.

On June 20 of this year, we welcome you to share the World FSHD Day logo, together with your stories, teachings, fundraising activities, and inspiration over Facebook and Twitter, as we highlight the importance and global impact of FSHD.

If you are not on social media, you can email your story to june.kinoshita@fshsociety.org and we will post it for you on the FSH Society blog. [FSH Watch](#)

GHOSTLY GALA

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the last trips on the Goodyear Blimp (decommissioned in Orange County), holidays in the Hamptons and Idaho, wine country tours, and fabulous skincare and spa packages, the guests had plenty of incentives to take out their checkbooks and credit cards!

We had an amazing event coordinating committee headed up by Mimi Garcia, Patricia Doktor, Alison Korman, Chareen Kosoff, and Ellen Rennell, ably assisted by members and friends of our host committee and a volunteer corps from Santa Monica College.

With the Cicada Club's impeccable staff serving up an absolutely wonderful meal, and an after-dinner costume contest which allowed everyone to let their hair down and strut their stuff, the Ghostly Gala was a huge success!

We can't wait to have you join us for our second annual Ghostly Gala, with a "Bach to Bowie" celebration of music. Mark your calendars for Sunday, October 30, 2016!!

—Ellen Rennell, Los Angeles, California



San Francisco Mural tour



FSH Society San Francisco auction supporters enjoyed an exclusive guided tour of the famed Diego Rivera Pan American Unity mural at City College of San Francisco on October 4, 2015. Auction chair Joyce Hakansson is seated in the foreground. At the railing are Gale Tunnell and Don Cairns, who donated the tour. Their offering received 29 enthusiastic bids at \$100 per bid. Also in the photo is Will Maynez, who is the curator of the mural and who led the tour. Iconic Mexican artist Diego Rivera created the mural during a yearlong project in 1940. Don Cairns, who appears in the mural as a five-year-old, is the son of Rivera’s chief assistant, Emmy Lou Packard, who became a prominent artist in her own right.
— *Kathe Cairns, Walnut Creek, California*



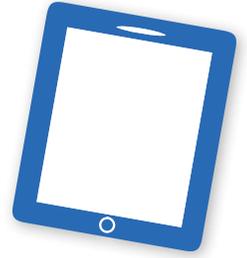
Amy Bekier feeds her soul through painting

Elm in the Sun is an 18”x24” pastel painting I created in 2013 as a celebration of light and shadow juxtaposed against the dark reflection of the woods. I enjoy working with soft pastels and oils. Ground pastel pigment is the purest form of color. When it is mixed with other mediums, it is used to create oil paint and watercolor. I started painting 12 years ago when FSHD began to slowly rob me of the ability to play sports. It has taken away the dexterity of my right hand, and I now paint solely with my non-dominant hand. This turns out to be a blessing because it forces me to approach the subject matter in a totally different way. My personal motto is, “Perfection is living with life’s imperfections. Art is seeing the beauty in it all” and fulfills my wish to “leave an echo in the halls where I have walked.”

—Amy Bekier

GET SOCIAL!

Join our online communities to get news, ask questions, and seek advice and support from fellow FSHD patients and family members. The FSH Society Yahoo! Groups forum, online since the 1990s, has tens of thousands of searchable posts. Bookmark these pages and come back often. To find our Facebook, Twitter, and Yahoo!



Groups, go to www.fshsociety.org and click on the logos in the right-hand margin. If privacy is a concern, you can use your account privacy settings to limit who can see your posts.

HAVE YOU MADE A GIFT TO THE SOCIETY IN 2016?

Thanks to the support from members like you, the FSH Society is a world leader in combating muscular dystrophy. Your donations are tax deductible, and they make a real difference. Please send your gift in the enclosed envelope. Or contribute online at www.fshsociety.org. Thank you!

CHARITY NAVIGATOR TOP PERFORMER

The FSH Society has been awarded its eighth consecutive 4 Stars by Charity



Navigator, placing us among the top 2 percent of U.S. charities for fiscal responsibility and governance.

NOT GETTING OUR EMAIL NEWS?

Sign up right on our website at www.fshsociety.org by clicking “JOIN.” If you are certain you are on our email list, please check your spam or junk folder.

