CYSTINOSIS RESEARCH NETWORK

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Winter 2022

THE CYSTINOSIS Advocate

Inside This Issue

Cystinosis Research Network Family Conference

July 13-15

CYSTINOSIS RESEARCH NETWORK

ON THE ROAD Again

NASHVILLE 2023

Gather with cystinosis families, researchers and clinicians at the Marriott at Vanderbilt University. This Nashville hotel is walking distance to Midtown, Vanderbilt Stadium, the Parthenon and Centennial Park. While in the Music City, explore Music Row, Bridgestone Arena and the historic Ryman Auditorium, home to exceptional acoustics and famously known as the birthplace of bluegrass. Downtown, you can indulge in the honky tonks and live country music spots on Broadway, which is also home to shopping, dining and more.

Scholarships will be available to those in need. Check our website and social channels in the coming months for agenda and registration information.

The President's Letter

It was my great honor last year to begin a term as President of the Board of Directors of the CRN. The board of the Cystinosis Research Network is an esteemed group of incredibly accomplished people representing all walks of life; connected through the lens of this rare disease. We have a calling to function as a best-practice Board, representing the rare sector and our members. As a consequence, we invest great attention to input, processes and supporting our staff with a clear vision: the acceleration of the discovery of a cure, development of improved treatments and enhancement of quality of life for those with cystinosis.

Assuming this leadership role could not come at a more exciting time. Ideas imagined years ago have gained significant momentum, with measurable growth in every area of the organization: educational programs, staff, and, most importantly, the benefits to members.

This past year saw the CRN's commitment to funding new research projects that will provide direct positive outcomes to not only our rare community, but the rare landscape at large. This is the same community who played an active and integral role in bringing Cystaran eyedrops back to the market. A great thank you to all whose willingness to participate helped make this a resounding success.

We traveled to Leuven, Belgium for the Cystinosis Network Europe (CNE) conference to better understand the global landscape of cystinosis, and was delighted to be accompanied by three members of the Adult

Elle, Fin, Jonathan and Shirley Dicks.

Leadership and Advisory Board (ALAB) in San Diego for the Global Genes Rare Patient Advocacy Summit. It was a time of fellowship, networking and was my sincerest pleasure to see each member's internal fire for advocacy burn that much brighter. This fall, we met for a weekend of nonstop work in Lake Forest, Illinois for our first in-person Board meeting since 2019! While planning our strategic vision for the coming year we managed to squeeze in a lovely meal, a spirited few frames bowling, but more importantly were busy working on our next in-person CRN family conference in Nashville, TN!! We rounded out the year by attending the 2022 NORD Rare Breakthrough Summit in Washington, D.C. We discussed policy efforts in the rare disease sector on a national and local scale, bringing back strategies for various fundraising avenues as well as a call to action to 'be the change we want to see.'

As we move into the new year, we owe a huge thank you to the previous Board of Directors for their dedication, service and leadership over the years, as well as to all of our members for giving your time and talents to fundraise, advocate, and educate. The litany of robust services offered by the CRN are a testament to the resilience

The President's Letter, continued

and fortitude of the remarkable warriors who make up this rare organization. Despite the uncertainties and obstacles that arose over the last two years, we are well on the way to meeting our goal of touching the lives of all individuals living with cystinosis with the launch of the Cystinosis Warrior Impact Program, as well as, an impressive catalog of free services, scholarships, and opportunities that I will touch on later in my VP Development role.

As I look ahead to the upcoming year and the challenges we will face, I would like to share one of my favorite adages: "It takes a village." There is tremendous power in our small, tight-knit community and the many talents our members bring to this organization. Through our collective action, I am confident we can fulfill our mission of one day seeing cystinosis become a disease of the past.

- Jonathan Dicks

A Kid Again®
Giving illness a time out

By Kristina Sevel, Director

We attended our fourth "A Kid Again" adventure in October with 139 other families in the Northern Ohio area. Just as we all find ourselves at home in a community of cystinosis families, I find myself so at peace with these play days. We are so thankful for these experiences with other families that we would likely never have the opportunity of interacting with.

The mission of this organization is to support families who are living with complex medical needs, giving them an adventure day where they can put some of the challenges away for just a short while. A Kid Again provides year-round, cost-free events (we call "Adventures") to help bring smiles to the faces of kids, their siblings, and their parents.

Adventures will take your family to places like the zoo, sporting events, and amusement parks. During these unprecedented times, the organization is also providing non-traditional Adventures by sending activity boxes to your home. You won't have to pay for anything, and all the details of the day are planned for you…so you can enjoy being together as a family and take your mind off the next doctor's appointment, hospital stay, or procedure. The group is condition agnostic, serving kids and families with a wide range of diagnoses.

If you have not yet joined this organization please sign up at akidagain.org/enrollnow. You will not regret the time spent together as a family.

By Fons Sondag

Introduction

In July 2022 Cystinosis Network Europe (CNE) organized the 3rd CNE International Cystinosis Conference in Leuven, Belgium. The conference was hosted by the Dutch-Flemish Cystinosis Group and Prof. Dr. Elena Levtchenko from the KU Leuven.

Thursday

Just prior to the conference on Thursday morning we had a meeting of the Community Advisory Board (CAB) of CNE. The CAB gives advice to pharmaceutical companies when they are developing new medicines or treatments. It also acts as a sounding board for pharmaceutical companies to ensure that the patient voice is heard. CRN is represented in the CAB by Christy Greeley.

On Thursday afternoon we had two parallel meetings: the Research Meeting and the Paramedical Meeting. The Research Meeting was to exchange information on new therapies and fundamental research for cystinosis. This hybrid meeting was not recorded and presentations are not made available as these may contain unpublished data. The results for the paramedical meeting can be found online at https://cystinosis.eu. It was attended by dietitians, speech therapists, physiotherapists, specialized nurses and some parents.

Friday & Saturday Family Conference

The family conference was attended by about 175 people, about half patients and families, half medical professionals and about 10 representatives from sponsoring pharmaceutical companies.

After the opening of the conference, we started with an interactive quiz to see where everyone was coming from. Then the presentations started with a general story about treatment of cystinosis by Prof. Dr. Elena Levtchenko. We then had an excellent session on the treatment of cystinosis around the world consisting of a presentation by the Center for Rare Kidney Diseases, Lyon France. That was followed by a session with eight speakers from developing and developed countries. This was a very important session to remind us where treatments are and are not available.

After an overview of cystinosis research by Prof. Dr. Francesco Emma, we had interesting presentations on monitoring cystinosis treatment, new and improved medicines, medication after kidney transplant and neurocognitive functioning. On Saturday we had presentations on bone and muscle disease, eye complications, pregnancy and male fertility in cystinosis. Saturday ended with three hopes for the future: new born screening for cystinosis, autologous stem cell transplantation and stem cell transplant followed by kidney transplant free of immunosuppression.

You can watch all recordings on: https://cystinosis.eu/ and we highly recommend you do!

On both Friday and Saturday we had poster sessions for young researchers in the field of cystinosis. They also each gave a short presentation on Friday to pitch their poster.

Sunday Workshops

On Sunday we had a presentation on quality of life followed by discussions in workshops. We had 3 workshops: one for adult patients, one for parents of children aged 6-18 and one for parents of adults. Despite some language barriers, everyone was able to take part and several important subjects were discussed. The workshops were highly appreciated.

Besides all medical and scientific information we organized a cooking workshop for adult patients, a cartoon workshop for children, a graffiti tour for teenagers, a motivational speaker for all patients and families, a walking tour through Leuven and a conference dinner for all participants.

We are very grateful to all the sponsors of our conference both pharmaceutical companies and patient organizations worldwide.

U.S. Caregiver Perspective: CNE International Cystinosis Conference

By Jonathan Dicks , President and Vice President of Development

This past July saw the CRN go international, all the way to Leuven, Belgium for the 3rd Annual CNE International Cystinosis Conference. It was an information packed conference kicked off by Elena Levtchenko with a brief historical overview of cystinosis and what the current treatment regimen consists of through the lens of the international perspective.

I was honored to present best practices in U.S. cystinosis treatment, and speak briefly from the perspective of a misdiagnosed family and the hurdles in light of all the treatment options available in the United States. I was accompanied by similar presentations with representation from Mexico, Germany, Spain, and France. While there may be many miles between us the throughline was — timely diagnosis with early therapeutics produces incredibly positive outcomes for the patient. Access for all patients for all approved treatments, as well as, reliable treatment monitoring were topics of discussion as well.

We gleaned new research insight and updates looking at the effects of an orally active Cysteamine Prodrug called CF10. The community was buzzing after animal lab results from CF10 showed the potential for less frequent and lower dosing, lack of bad breath and body odor, without damage to the gut! While the design, clinical discovery and pre-clinical development stages are almost complete, phase 1-3 clinical trials have yet to commence.

Dr. Paul Grimm presented on; life after a transplant with recommendations on medication combinations to better improve the treatment of infection, an overview of his work in stem cell transplantation followed by a kidney transplant with implications of patients living full lives free of immunosuppressive medications.

Cystinosis

Patient Assistance Programs

What is the purpose of this program?

NORD's Cystinosis Patient Assistance Programs offer eligible individuals diagnosed with Cystinosis financial support when faced with limited resources to pay for:

- out-of-pocket healthcare costs, and/or
- diagnostic testing costs, and/or
- unexpected emergency expenses

Who is eligible to apply for NORD's Cystinosis Assistance grants?

These programs are designed to help patients who:

- Are a United States citizen or U.S. resident of six (6) months or greater with evidence of residency such as a utility bill showing the patient's name and address
- Have a diagnosis of Cystinosis
- Fall within the Program's financial guidelines and adhere to application requirements that are set in advance by NORD

What kinds of assistance can I request from NORD?

NORD's program can assist eligible individuals/families with expenses in a number of categories:

- The Cystinosis Copay Program assists eligible individuals who have health insurance with funding to cover health insurance deductibles, copayments & coinsurance costs associated with the care of Cystinosis.
  - Some examples of these expenses may be:
    - medical expenses paid toward health insurance deductible
    - copayment for a medical office visit
    - out-of-pocket cost for an Emergency Room visit
    - a coinsurance payment for a consult with a Cystinosis specialist
  - This program does not assist with copayments for medications

- The Cystinosis Medical Assist Program assists eligible individuals who are uninsured, or for whom coverage has been denied with out-of-pocket costs for medical expenses such as medical visits, laboratory & diagnostic testing, wound care products and other specific medical expenses. Additionally, mileage for travel to and from a Cystinosis related medical appointment may be reimbursed in this program. Medication costs are not covered.

- The Cystinosis Emergency Relief Program assists eligible individuals with the cost of unexpected or emergency non-medical expenses that cannot be afforded without short-term assistance.
  - *Some examples of these expenses may be the cost of repair for a car or major appliances, unexpected utility costs or cell phone bill that cannot be afforded due to lost wages from time off related to care of ill family.*
  - *Other types of emergency requests will be considered on an individual basis.*

FAQ

What is NORD?

The National Organization for Rare Disorders (NORD), a 501(c)(3) organization, is an independent charity dedicated to the identification, treatment and cure of rare "orphan" diseases such as Cystinosis through education, advocacy, research and patient service programs.

NORD was founded by families struggling to obtain access to treatments and whose advocacy for change led to the passage of the Orphan Drug Act in 1983. NORD assists eligible patients (those with medical and financial needs) in affording the treatments and medical services their healthcare professionals have prescribed.

Funding for NORD comes from a variety of sources including corporate donations, foundation grants, public contributions, and membership dues.

Is there a fee for applying for assistance?

No, NORD does not charge our applicants when applying for help.

NORD does not recommend or endorse any particular medical treatment but encourages patients to seek the advice of their clinicians. Donations to NORD for this and other programs may be made by contacting NORD at **rarediseases.org**.

Cystinosis

Patient Assistance Programs

What is the application process?

Awards are granted on a first come, first served basis. Patients may be referred to the program by their health care provider, their case managers, or they may self-refer. The RareCare® Patient Services Representative will guide the applicant through the application process, verify eligibility for inclusion in the Cystinosis Program(s), determine financial eligibility using our Electronic Income Verification System (EIV) and award assistance.

What happens if an applicant does not meet the criteria of the Electronic Income Verification?

The RareCare℠ Patient Services Representative will offer to e-mail, fax, or mail the brief program application and disclosure forms to the patient. The applicant may then complete the application, sign the disclosure form, provide the appropriate financial documentation to verify financial need, and return them via fax, email, or USPS mail.

How long before a decision is made on an application for assistance?

The application decision process can take as few as 5 minutes over the telephone. Applications completed and submitted via email, fax or US mail will be processed within three (3) business days of receipt.

Is there a limit to a patient's financial award?

A decision to place a "cap" on funding or limit the scope of assistance to beneficiaries is at NORD's discretion and is determined based on the amount of donations made to the fund, as well as the anticipated volume of applicants expected to utilize the program, and their anticipated financial need.

How do I apply for assistance from NORD's Cystinosis Patient Assistance Program?

Phone: 855-201-5087
Fax: 203-486-8033
e-mail: cystinosis_assist@rarediseases.org

9am - 7pm (E.S.T.) Mon – Thurs and 9am - 6pm Fri

US MAIL to: NORD
Attention: Cystinosis Program
55 Kenosia Avenue, Danbury, CT 06810

Once a patient is accepted into the assistance program(s) how long are they eligible?

Copay and Medical Assist awards are issued for a calendar year.

Emergency Relief awards are offered as payment support for a one-time capped emergency need.

How does the payment or reimbursement process work?

Copay and Medical Assist awards may be prepaid by NORD with appropriate documentation or reimbursed to the patient in accordance with appropriate receipts and documentation.

Emergency Relief awards will either utilize a NORD issued debit card allowing authorized purchases or will reimburse the patient directly for their approved expenses.

All claims submitted for reimbursement must be provided within 30 days and include receipts or other evidence of payment, such as a credit card statement.

Reimbursements will be made within ten (10) business days of receipt by NORD.

Are there expenses which cannot be covered by NORD'S Emergency Assistance Program?

Yes, NORD's goal is to be as flexible as possible in regards to patient's emergency needs, but some expenses which are not permissible by law are:

- Federal, state, or local tax payments, including property taxes, child support payments, legal fines and/or fees
- Luxury goods and services or vacation costs are not eligible for consideration

NORD does not recommend or endorse any particular medical treatment but encourages patients to seek the advice of their clinicians. Donations to NORD for this and other programs may be made by contacting NORD at **rarediseases.org**.

2/2019

2nd Medical Training Course on Cystinosis to Nephrologists and Ophthalmologists

We would like to thank Cystinosis Research Network for their generous contribution to make possible this excellent training course on cystinosis for nephrologists and ophthalmologists in Mexico.

Cystinosis Organization Mexico has helped more physicians from various specialties to become aware of this low-frequency condition and in turn be trained to provide adequate medical care to patients with cystinosis.

Thanks to the collaboration with organizations such as CRN, cystinosis expert doctors from different parts of the US, and the union of families, step by step in Mexico the issue of rare diseases has been getting stronger, and conditions such as cystinosis now have diagnostic tests, comprehensive treatment (which is distributed by the Mexican health services) and doctors capable of following up with patients.

We will continue to work for the good of our patients with cystinosis in Mexico.

Victor Gomez

2nd MEDICAL TRAINING COURSE ON

CYSTINOSIS

TO NEPHROLOGISTS & OPHTHALMOLOGISTS

August 26 - 28, 2022
SAN MIGUIEL DE ALLENDE, MEXICO

The 2nd Cystinosis Training Course was successfully carried out, doctors from Zacatecas, Guadalajara, Toluca, and Mexico City attended punctually to the appointment previously established by our organization, Real de Minas Hotel in San Miguel de Allende was the venue for the course.

Alfonso Huante Anaya MD, nephrologist, and Erika Vargas Quevedo MD & PhD, specialist in Rare Diseases were the coordinators of the course.

Below, we share the relevant aspects of this training course:

Gemma Ariceta MD, Pediatric Nephrologist, Hospital Va'Hebron Barcelona Spain

She shared with us general data on cystinosis, including diagnosis, with focus on the renal damage that causes cystinosis, as well as the importance of cystine levels and clinical case including discussion among those present on some manifestations that present cases of Fanconi syndrome/renal tubulopathy.

Ariceta MD also shared important data on specific treatment including Cystagon/Procysbi and Cystadrops/Cystaran, presented some tables demonstrating the effectiveness of the treatment and how it works in patient's bodies.

Konreaad Veys, Pediatric Nephrologist, Researcher at the Pediatric Nephrology Laboratory of KU Leuven, attached to the University Hospital Leuven, Belgium.

He shared with us the details of hematopoietic stem cell transplantation, presenting advances including a clinical case.

In his complementary talk, he told us about the report on the research study of chitriosidase as a biomarker that will work in the future to determine cystine monitoring in patients with cystinosis.

Alfonso Huante Anaya MD, Pediatric Nephrologist graduated from the National Institute of Pediatrics and member of the IPNA.

He talked about renal complications in cystinosis, sharing a whole scheme in tubulopathies, Fanconi syndrome and other complications, reporting a clinical case and putting it up for discussion.

Erika Vargas Quevedo Pediatrician, Pediatric Internal Medicine, specialist in rare diseases attached to the Centro Medico Nacional 20 de noviembre ISSSTE.

She shared a typical clinical case of cystinosis A/B and discussed diagnosis, treatment, complications, and actions.

Hong Lian MD, Medical Ophthalmologist attached to Quinze-Vingts Hospital Paris France (Video recorded Previously)

She shared with us the generalities about cystine crystals in cornea, treatment with cystadrops and some statistics about the efficacy of the treatment, as well as recommendations during the use of the treatment.

He also told us about some important data on studies performed on patients with cystinosis during the use of cystadrops and alternatives in the use of drugs to alleviate some adverse effects.

This meeting turned out to be a great success and agreements were reached including:

- Mutual strengthening for the benefit of cystinosis patients in Mexico.
- Expanding support in raising awareness on cystinosis
- Teamwork to make possible the analysis of cystine levels.
- Teamwork for research projects

Our thanks to

CYSTINOSIS RESEARCH NETWORK

for their generous contribution that made possible this medical meeting

Education and Awareness Committee Update

By Marybeth Krummenacker, Vice President of Education and Awareness

As we wind down 2022, begin to get life “back to normal” in 2023, and look forward to meetings in person, I am so proud of CRN and how we have continued to maintain and represent the community around the world. Although challenging over the last few years, we are committed to our cystinosis families in keeping you updated on events and opportunities through this newsletter, our website (cystinosis.org), email, and social media.

We have finished up our academic scholarship awards and chose three wonderful young people who are looking to further their education. Our latest recipients, Rico Corbin, Farah Naimi and Jordan Sexstone have all demonstrated that they are most deserving and qualified and I am always impressed when reading through the applications at all they have accomplished! Please read a little about our awardees on page 13.

The Cystinosis Research Network was represented at the Cystinosis Conference Europe (CNE) in Belgium this past July by our President, Jonathan Dicks and Vice President of Research, Christy Greeley. CNE is an umbrella grouping of patient support advocacy and research organizations in Europe and beyond. Again, this is our opportunity to share with world leaders in cystinosis research and advocacy who we as an organization are and what we do. Jonathan had the chance to introduce himself as the new President of CRN and to network with various European groups and find out what is going on in cystinosis research around the world.

Jonathan was in attendance at the Global Genes meeting in California along with members of our Adult Leadership Advisory Board (ALAB), Sara and Jana Healy and Steve Schleuder. Summit sessions provided attendees with insights about the latest in rare disease innovations, best practices for advocating on an individual and organizational level, and actionable strategies to take home. CRN also attended the NORD Breakthrough Summit in October to continue networking and advocating in the rare disease community, fostering our relationship with new groups. CRN has had opportunity to learn from other rare disease groups and to understand the importance of working together to improve the quality of life for so many. We need to be reminded as we are coming up on 40 years since the passing of the Orphan Drug Act of 1983. Without that important piece of legislation, drugs like Cystagon, Procysbi and Cystaran would have never been developed and FDA approved. Of note, Cystagon is #41 on the list of the first 100 drugs approved as a direct result of that important piece of legislation.

Education and Awareness Committee Update, continued

Finally, for the first time in over three years, I attended an “in-person” CRN Board meeting in Chicago. We have begun the process to plan for an in-person family conference which will be held July 13-15 in Nashville, Tennessee! Watch our website and social media for updates and announcements! I have said it for over 30 years, there is nothing like meeting another family who lives with what you do every single day…to give a mom a hug that she never forgot is so very powerful to hear 30 years later! (thank you Barb Kulyk for sharing that story with me). I cried when she told me how that hug made her feel and the fact that what she observed at her first conference was a group of moms who were smiling!

We are blessed in so many ways with our strong partnerships in industry which we continue to develop and work together to allow us to bring so many wonderful programs to our community. I continue to be amazed at all we have done and continue to do as an organization. We have had twists and turns and “bumps in the road” but we remain strong in our efforts to educate everyone who will receive our message of a “promise for new and improved treatments and an eventual cure.” I am so proud to be a part of a wonderful group of individuals who have committed their lives to making life better for those of us living with cystinosis. I welcome our two newest Board Members, Chelsea Meschke and Megan Morrill, and I look forward to working together moving forward. CRN continues to demonstrate our commitment to the cystinosis community as we advocate and educate and continue to be a well-respected presence in the rare disease world!

CRN Board of Directors Meeting

This fall, after three long years apart, the CRN Board of Directors and our extended team finally had the opportunity to meet in person. Christy Greeley hosted the team in Chicago for two days of team building, family conference and 2023 program planning. We also had the opportunity to meet with the team from Horizon to share insights and ideas for collaboration. Our new board members Megan Morrill and Chelsea Meschke were able to dial into the meetings as well, providing a wonderful chance for them to get up to speed so quickly after joining the Board.

What’s in store for next year? Most importantly, we will host the first in person CRN conference since 2019, as we go “On the Road Again” to Nashville, TN in July. Look for expanded family support services, research funding, and advocacy and educational programming as well.

Scholarships Awarded

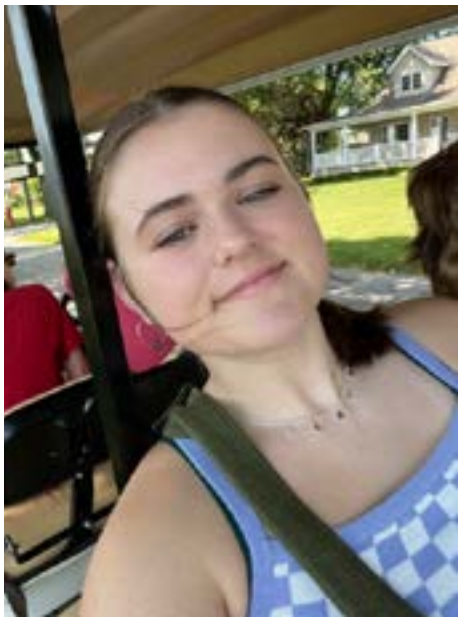
By Gail Potts, Director

The Scholarship committee is pleased to announce the 2022 Academic Scholarship recipients. All of these young people have presented themselves well in their academic performance and in their essays.

FARAH NAIMI

Individual Living with Cystinosis Scholarship

This year the CRN Academic Scholarship for an Individual with Cystinosis went to Farah Naimi. Farah will be attending Moraine Valley Community College, IL. At the present time, her goals have not been decided but she thinks she is deciding between the medicine field or law. Living with cystinosis has helped her to gain much knowledge in the medical field and educational laws of 504's and IEP's. It has spiked interest in law and medicine. Her letters of recommendation reflect on her dedication to her studies, drive and motivation while facing medical challenges.



JORDAN SEXSTONE

Sierra Woodward Sibling Scholarship

Jordan Sextone is the recipient of the Sierra Woodward Sibling Scholarship and will attend West Virginia University to study forensic science. She chose this institution because it offers advanced degrees in forensic science which no other university offers. Jordan was member of the National Honor Society, Key Club International, as well as high school volleyball and track. She has had an active role in helping to meet her sister's needs at home so she is very familiar with the daily life of individuals with cystinosis. One of her letters of recommendation described Jordan as honest, trustworthy, mature, passionate, and kind.

CORBIN RICO

Deanna Lynn Potts Scholarship

The Deanna Lynn Potts Scholarship was awarded to Corbin Rico who will be attending Georgia Southern University. His goal is to attain a bachelor's degree in finance. His grandfather was his role model growing up, teaching him the value of a good work ethic. He gets through hard times by remembering the importance of a positive attitude and believes in working hard to overcome barriers in life. One of Corbin's teachers remarked on his overcoming numerous barriers and always moving forward. He has worked extra hard to accomplish what he sets out to do.

The Cystinosis Research Network wishes these young adults the best in their academic pursuits.
For more information on scholarship opportunities and deadlines, visit cystinosis.org/support-resources/scholarships or email gpotts47@yahoo.com.

cystaran®
(cysteamine ophthalmic solution) 0.44%

A Crystal-Clear Solution, in an easy-to-use bottle

To treat corneal crystals in patients with cystinosis.

Please visit www.cystaran.com to learn more

What is CYSTARAN®?

CYSTARAN (cysteamine ophthalmic solution) 0.44% is an eyedrop medication used to treat cystine crystal accumulation in the corneas of patients who have cystinosis.

What is the most important safety information I should know about CYSTARAN?

- To help prevent contamination of the dropper tip and eyedrop medication, try to make sure that CYSTARAN is dropped directly onto the eye without touching it. Try not to touch the eyelids or surrounding areas with the dropper tip of the bottle when you are using CYSTARAN. Keep the bottle tightly closed when not in use.
- CYSTARAN contains an ingredient called benzalkonium chloride which can be absorbed by soft contact lenses. Remove contact lenses before using CYSTARAN eyedrops and wait at least 15 minutes before reinserting them.
- CYSTARAN should only be used as an eyedrop medication.

What are the side effects of CYSTARAN?

- The most common side effects of CYSTARAN, which have occurred in at least 10% of people using the medication, were sensitivity to light, eye redness, eye pain and irritation, and headache.

The risk information provided here is not comprehensive. To learn more, talk to your healthcare provider or pharmacist about CYSTARAN. The full FDA-approved product labeling can be found at www.cystaran.com.

You are encouraged to report negative side effects of prescription drugs to the FDA. Visit www.fda.gov/medwatch or call FDA at 1-800-FDA-1088.

US-CYS-22000022 V1

Global Genes RARE Patient Advocacy Summit

By Jonathan Dicks, President and VP of Development

I was honored to attend my very first Global Genes RARE Patient Advocacy Summit in San Diego this past September. I was simply blown away by the incredible pull this event has in bringing together so many like-minded souls focused on advocacy work in the rare arena. I was joined by three members of CRN's Adult Leadership Advisory Board (ALAB) who hopped right into their own advocacy efforts. They not only attended Freshman Orientation, but manned an exhibitor booth where they presented a poster on ALAB-driven projects and established new connections, all while attending sessions throughout the day. I was incredibly proud of Steve, Jana, and Sara for stepping outside of their comfort zone and allowing this event to rekindle their internal flame for rare advocacy. Check out ALAB's feedback from a patient lens on page 16.

We kicked off the week with our Global Advocacy Alliance Meeting. This was a huge networking event that allowed us all to come together in one place for interactive programming designed for organizations, like CRN, to engage, learn and build off one another.

I attended a wonderful session dealing with the unique demands placed on siblings of a person with a rare disease. We discussed from a parent perspective how to best care and expertly split focus to honoring the distinct life lived apart from their rare sibling's needs. Olympic sprinting gold medalist Gail Devers gave a passion-filled keynote address to the congregation recounting her own diagnostic odyssey, and how she had to fight with all she had just to be heard and validated. We then wrapped up the evening with the Rare Champions of Hope Awards ceremony, a wonderful event highlighting those going above and beyond in the rare community!

All in all, I left with a few more "rare toolkit" items that I could cultivate and use at a moment's notice in my own local advocacy work. These sessions not only provided insight about the latest in rare disease innovations, but best practices for advocating on an individual level, with actionable strategies to take home.

ALAB Perspective
Global Genes RARE Patient Advocacy Summit

By Jana Healy, ALAB Chairperson

ALAB (Adult Leadership AdvIsory Board) had the privilege of attending the Global Genes Summit in September courtesy of Cystinosis Research Network and Horizon. As the chair of ALAB, I had the opportunity to attend along with co-chair, Steve Schleuder, and Sara Healy.

We had a booth at the conference where we met and interacted with a number of conference attendees, sharing our mission and the support we provide to the adult cystinosis community through our initiatives. We met some other amazing advocates living with rare disease and felt a sense of community in attending the sessions. Panelists shared their rare stories of adversity, perseverance, and hope. In one of the sessions, a rare disease patient, who is also a parent, shared the effect on the children and the inspiration and motivation from the entire family to do their part in working towards a cure. (If you are interested in the topic of parenting with rare diseases make sure to tune into our upcoming podcast.) Another session highlighted the stress rare disease can have on partnerships/marriage focusing on the importance of communication, relying on our support systems for help, and working on ourselves to form better connections with others.

We found out about a number of resources available for rare patients including the Assistance Fund [tafcares.org] which helps out underinsured Americans who cannot access what they need to stay healthy. They have helped many children and adults access treatments and care. Another organization, Danny's Dose, raises awareness of the current gap in emergency treatment for all with special medical needs. They aim to change the current protocols, help educate emergency service personnel and educate affected families on proper emergency planning.

We also learned some valuable ways to have a broader reach in the community from social media hacks like using specific hashtags and collaborating with both grassroots organizations and virtual networks within rare disease. The summit really highlighted how large our rare disease community is outside of our cystinosis corner.

The connections, support, and resources available to rare disease patients and families are truly astounding when compared to just a few years ago. In a way, it's amazing and inspiring to be a part of rare disease in this time of increasing awareness and research advancement. We are grateful to have had the opportunity to attend the summit, representing those with cystinosis, and being able to share the incredible efforts of the Cystinosis Research Network in supporting patients and advancing research.

Language should never be a barrier to seeking healthcare, education or important daily services.

In an effort to eliminate language barriers, **Bromberg & Associates** has created a no-cost program, sponsored by **Horizon Therapeutics**, to offer translation and telephonic interpretation for Spanish-speaking individuals and families impacted by specific health conditions.

If the patient or family member has been diagnosed with any of the following conditions, they qualify for document translation and interpreting services by telephone provided by the **Bromberg & Associates** team at no-cost:

- Rare metabolic conditions
- Rare kidney disease
- Uncontrolled Gout
- Primary Immune Deficiencies
- Graves and/or Thyroid Eye Disease

To enroll in the program:`

Complete the HIPAA form.

If patients or their family members have questions, they can call (844) 405-1866 and enter the PIN# 200.

You can also:

Email Translator@BrombergTranslations.com to have the form emailed to them.

or

Send a text message to the number (313) 284-4075. A Spanish-speaking representative will be available.

Once you complete and sign the form, we will send you instructions on how to use our services.

To obtain translation and telephonic interpreting services, please review the following options:

OPTION 1: Connect with an interpreter by telephone:

Once the patient and/or their families submit the HIPAA form, they will receive instructions to connect to a toll-free phone line which will allow on-demand access to a professional interpreter that can assist them with healthcare encounters, emergency calls, educational meetings, community services, depositions and court hearings, and calls to government agencies.

OPTION 2: To obtain a document translation:

Once the patients and/or their family members submit the HIPAA form, they can scan and email any document for translations to Translator@BrombergTranslations.com. Examples of documents they can send for translation are :

- personal documents
- medical records
- forms and applications to government agencies and insurance companies

El idioma no debe ser una barrera para buscar atención médica, educación o servicios diarios importantes.

Con el objetivo de eliminar las barreras del idioma, **Bromberg & Associates** ha creado un programa gratuito, junto a **Horizon Therapeutics**, para ofrecer traducción e interpretación telefónica a personas y familias que hablan español y que tienen determinadas enfermedades.

Si usted o alguien de su familia tiene alguna de las siguientes enfermedades, puede recibir los servicios de traducción y de interpretación telefónica del equipo de **Bromberg & Associates** de forma gratuita:

- Enfermedades metabólicas poco comunes
- Enfermedades de los riñones poco comunes
- Gota no tratada
- Inmunodeficiencias primarias
- Enfermedad ocular de Graves y/o tiroidea

Para inscribirse en el programa:

Complete el formulario digital de HIPAA

Si tiene preguntas o necesita el enlace para acceder al formulario, llame al (844) 405-1866 y marque el número de PIN 200

Puede también:

Enviar un correo electrónico a Translator@brombergtranslations.com

o

Enviar un mensaje de texto al número (313) 284-4075. Un representante estará disponible para hablar con usted en español.

Una vez que complete y firme el formulario, le enviaremos las instrucciones sobre cómo usar nuestros servicios.

Para obtener servicios de interpretación telefónica y de traducción, por favor revise las siguientes opciones:

OPCIÓN 1: Hablar con un intérprete por teléfono.

Una vez que envíe el formulario de HIPAA, recibirá instrucciones para conectarse a una línea telefónica gratuita que le permitirá hablar con un intérprete profesional que puede ayudarle en consultas médicas, llamadas de emergencia, reuniones escolares, declaraciones y audiencias judiciales, y llamadas a organismos gubernamentales.

OPCIÓN 2: Si quiere traducir un documento.

Luego de enviar el formulario de HIPAA, envíe una foto de su documento por correo electrónico a Translator@BrombergTranslations.com.
Algunos ejemplos de documentos que puede traducir son:

- documentos personales
- historias clínicas,
- formularios y solicitudes a organismos gubernamentales y compañías de seguros

Cystinosis neuro study in New York.

The early days.

Remembering Debbie Towery

By Annie Bogan

I recently read something online that likened our relationships in life to a bus trip. Other passengers get on and off along the way; some ride with us for an extended time; some, but for a brief moment. Many become irrelevant or insignificant, easily forgotten; a few, however, are monumental to our journey.

Debbie Gehrke Towery was a monumental passenger for me!

The loneliest I have ever felt was the day my daughter, Emily, was diagnosed with cystinosis. It was 2001, before social media, and information was very limited. By the grace of God, I discovered the Cystinosis Research Network early on and, within just a couple months of diagnosis, we headed to our first family gathering. We lived in North Carolina and were instantly drawn to the Towery family, our "neighbors" from South Carolina. Their daughter, Sophia, was the same age as Emily and was recently diagnosed. By the end of the weekend, our southern accents and boisterous laughter earned us spots in an elite group of Southern Cystinosis Mamas still known today as "the Dixie Chicks." Little did I know then just how vital these women would be in my life.

From that first meeting in Cocoa Beach, Debbie and I became "cystas." Over the years, we traveled the country together; bounced ideas off of each other; had dinners with doctors; attended conferences; and our girls participated in medical research together all over the United States. We were once evacuated from a hotel in San Diego during a major fire – each of us pushing our babies in strollers while pulling suitcases behind us; we cried together in our Chicago hotel room after an especially hard day of conference; and took the wrong Uber car in the Bronx after leaving the clinic where the girls were taking part in neuro studies.

The girls at the beginning of it all.

During our 21 years of friendship, Deb and I came to share so much more than a faulty gene. We went through divorces together, and marriages, and our daughters' kidney transplants. We watched our children become adults and ourselves become grandmothers. We didn't speak every day – sometimes went months between phone calls – but we each knew the other was just a call or text away.

When Deb called me in November 2021, I assumed it was regarding a return trip we were planning to New York. Instead, she told me she had been diagnosed with pancreatic cancer. In July, at the age of only 54, Debbie went to her heavenly home.

Debbie fought cancer with the same determination and strength I saw her battle against cystinosis on Sophia's

Remembering Debbie Towery, continued

behalf for all those years. She wasn't depressed; she didn't feel sorry for herself; and she never asked "why me." As always, she kept moving forward gracefully. She knew what she was facing and her focus was 100% on her family…her children, sisters, grandson, and friends. She didn't wallow in pity or focus on regrets. Instead, she took charge and gave instructions. The last time I saw her, about six weeks before her passing, I could tell she was trying to comfort ME on her fate. Weak and frail, she made sure to pack ME snacks for my three-hour ride home. I still have that ziploc bag of m&m's.

I remember all those years ago – when Emily was first diagnosed with cystinosis – seeing the parents of young adults as "veterans" within our community. As a veteran myself now, if I can offer one piece of advice to a newly diagnosed family, it's this:

Find your Debbie! Sit with her on the bus! Take the trips and attend the conferences! Cry together! But more than anything, LAUGH! Make memories! Follow Deb's example… don't let cystinosis become the defining force in your life… or that of your child's!

Many years ago, she mentioned us getting a tattoo together. We never followed through with it but I still have the message:

"Look on my page and look at the heart tattoo with Proverbs in it… I think that would be awesome for us to get together!!! And then when our girls are old enough they get the same one!!! Keeping it real!!!! Love ya"

It was from Proverbs 31:25 and reads "She is clothed in strength and dignity and she laughs without fear of the future."

My beautiful cysta, Debbie.

Debbie was the epitome of strength and dignity and I can't wait to hear that sweet laugh of hers again one day. I am, simply, so VERY thankful I was able to be part of her journey on this earth.

Family Support Care Package Program

The CRN Care Package Program is provided as a source of inspiration and comfort. During this journey, individuals and families may face some very trying and difficult times. Our hope is that our community can feel our support by receiving one of these boxes.

We currently have four types to choose from:

Newly Diagnosed boxes are for those families that have received a cystinosis diagnosis within the last year. We have all been on the end of receiving that news and these boxes provide information, support and comfort during that difficult and confusing time.

Kidney Transplant boxes can be requested for those who are approaching their transplant date or have recently received their transplant. The boxes include care and comfort items as well as other age appropriate items to occupy patients during their recovery period.

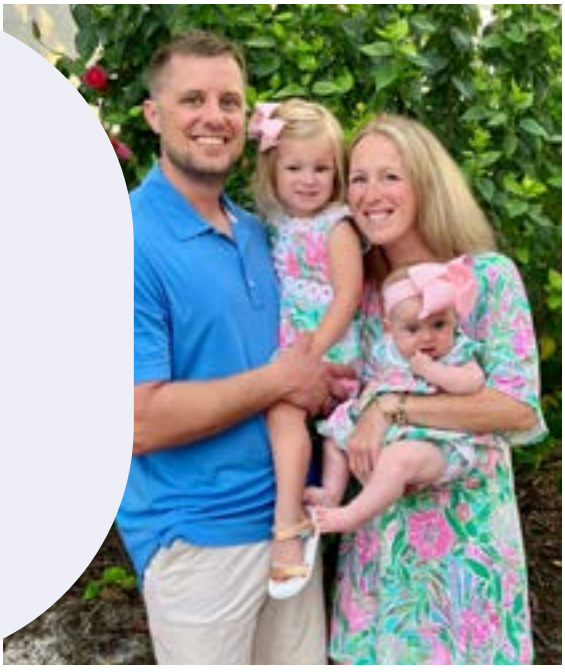
Wellness boxes are sent to those who might need some extra love during a difficult time, mentally or physically. They include items that will lift spirits and provide support and love during hard moments.

Bereavement boxes can be requested for those who have lost a loved one, due to cystinosis, or otherwise. It is important that our families know that we are there for them.

Our request form an be found on our website at cystinosis.org/care-package. Please note, at this time we are only shipping to North America. If you have any questions please email jenwyman@comcast.net.

"After Kennedy's diagnosis we felt very lost and alone. Soon after our ICU stay we received a cystinosis care box in the mail. It was such a wonderful surprise. We felt so touched, it was such a thoughtful gift and provided so much comfort. It made us not feel so alone. We feel so welcomed into the cystinosis family and cannot thank everyone enough for their support."

- Beverly Kelley



Designed for Cystinosis

By Devin Adorjan

My name is Devin Adorjan. I am a 34-year-old Fashion Design student living with cystinosis in Strathroy, Ontario, Canada.

I think my love for design started with me trying to find something I could do with my hands. Since a lot of people with cystinosis suffer from muscle deterioration, I was encouraged to find something I enjoyed doing that could help with dexterity and muscle deterioration in my hands. I explored a lot of different areas from journal writing, painting, drawing, makeup etc. At a young age I was working on things like Barbie clothes and eventually altering my own clothes. In my teens I had so many sketchbooks just full of clothing designs. In my early 20's, I met some amazing friends that introduced me to Cosplay...I think for me that was the proverbial nail in the coffin that showed me I really wanted to be a Fashion Designer. Unfortunately, since it was not your average career choice, I was very scared to take the Fashion Design Program at Fanshawe College and it was not until this year that I finally got the courage to do so.

In one of my classes, we get assignments for every chapter in our book. When I saw one that told me to make a design to help a community, the cystinosis community came instantly to mind. I had a g-tube from 1 to 14 years old and remember how uncomfortable they could be. A lot of times the fabric would irritate the area, the seams of the clothes were often near the belly, the clothing would show the g-tube (making me really self-conscious) or it was just generally very hard to get access the g-tube to use. At times, I needed to remove clothing for access. I also had a similar issue when I had a HD catheter. After talking to other cystinotics, I realized I wasn't the only one that had this issue, and this was still a very big problem to this present day.

I created multiple designs with easy access, hidden pockets, seams staying away from the hips and fabric not clinging to your hips and midriff. I also created a top with a comfortable pocket placed inside for your central venous catheter so it would not keep moving and bending.

I would use modal fabric which is bio-based and more eco friendly than cotton and it's also breathable. This will decrease the chances of bacterial growth and be comfortable to the individual.

I would also use lyocell fabric which is one of the most sustainable fabrics currently on the market. It is made using natural materials and don't require toxic chemicals. The best part is - both fabrics won't break the bank so garments can be made for your average individual on a budget.

I also took style and design into consideration making the wearer feel beautiful and comfortable. I hope that one day I can make others feel beautiful no matter their gender, color, race or disability.

Follow Devin on Facebook, account name Dev_Ador_Designs.

New Directors Nominated to CRN Board

By Jonathan Dicks, President and VP of Development

I wanted to take a moment and speak directly to the community in gathering our voices to give a heartfelt welcome to Megan Morrill and Chelsea Meschke, our newest CRN Directors! For almost two years we've been running with a lean group of dedicated advocates, each fiercely passionate, utilizing their individual talents to collectively build a well-functioning and cohesive unit. We saw this as an opportunity to further galvanize our Board and thus began the nomination process.

With a full list of potential choices we were challenged not only to find candidates with a passion for advocacy, we also had to find individuals ready and able to commit to the three year term and the responsibilities it entails. This was no short order as life in the rare space is complicated and the opposite of predictable. Throw in a 9-5 job, education requirements and raising a family…the ask is high, but we were confident the right people were out there just waiting for an opportunity to "be the change they wanted to see."

Chelsea Meschke, hailing from Michigan, mom to two beautiful boys with cystinosis, was up for the calling. Like most in our small community, this diagnosis took their family by storm. Chelsea and husband Brian took this diagnosis and utilized it as a catalyst to develop as parents and as a couple over the last five years.

Professionally, Chelsea has spent the last ten years as a social worker, with eight of those years spent in the hospice and palliative care sector of health care. This position has given her insight to a multitude of different situations with families, care teams and patients. Chelsea views each patient from a lens that endorses different perspectives, all to better serve the individualized needs according to what is most beneficial to the most desirable outcomes. These skills will serve as a wonderful addition to not only the goals of the Board, but in Chelsea's own personal advocacy as well. We look forward to Chelsea's appointment and know her passion, personality, and drive for advocacy will be an asset to the Board!

Megan Morrill also hailing from the great state of Michigan is an adult living with cystinosis and so excited to join the Board. She has always held strong to the belief and importance of self-advocacy, playing an active role in the cystinosis community as a former member of the Adult Leadership Advisory Board and recent Cystinosis Memorial Fund awardee.

Megan's career as an occupational therapist brings a fresh, patient-centered perspective adding knowledge on ways to advocate and promote health and well-being within the cystinosis community. Over the past two years in practice, Megan has gained valuable insight and training on ways to increase quality of life through medical and holistic practices, along with gaining leadership skills through working on various interdisciplinary teams. She has vast experience working with a full spectrum of patient populations ranging in ages from three all the way to 88 in the fields of neurology, pediatrics, and orthopedics including outpatient and inpatient therapy. She is well-versed in grant writing for 501c(3) nonprofits and is currently working towards certification in equine assisted psychotherapy and hippotherapy!

Megan is a rockstar and displays daily her poise, professionalism and grace under fire. We are so happy she has accepted and can't wait to see her blossom in this new advocacy role!

"I've always loved being an advocate for people, and joining the CRN I get to help families and kids just like my own, and be an advocate for them."

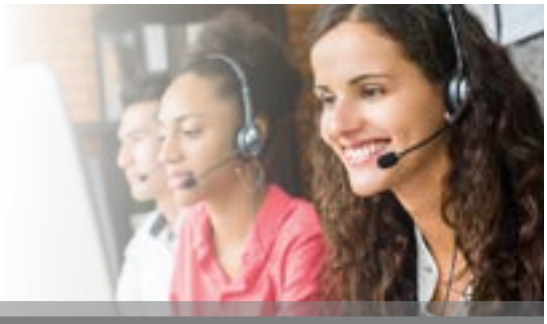
- Chelsea Meschke

"I hope to use my career and life experience to promote the health and well being of the rare disease population, along with creating meaningful connections with adults and families that have been impacted by cystinosis!"

- Megan Morrill

Patient Advocate Foundation's

RARE DISEASE CareLine



We Care About Your Treatment Journey and We're Here to Help.

CONTACT US FOR FREE!

Patient Advocate Foundation recognizes that people living with rare, ultra rare or orphan disease face unique challenges. Our mission is to help access care and treatment recommended by their physician. PAF remains committed to offering financial, access to care and social needs navigation to those affected by a rare disease.

The Rare Disease CareLine provides navigation assistance with financial and practical challenges that impact your ability to access healthcare. Whether you need help resolving coverage issues such as off-label denials, network limitations, benefit exclusions, prior authorization, finding resources for financial aid, understanding and selecting coverage options, or applying/appealing for disability, we are here to support you.

All services are confidential and free of charge.

PAF Patient Advocate Foundation

This program is operated by Patient Advocate Foundation.

ARE YOU ELIGIBLE?

- Diagnosed with a Rare Disease and under the care of a physician?
- A U.S. citizen or permanent resident of the U.S.?

IF SO, WE CAN HELP!

- Reduce financial burden with charitable and community resources
- Enroll in health insurance, disability and social programs
- Navigate insurance denials, appeal support, and coding/billing issues

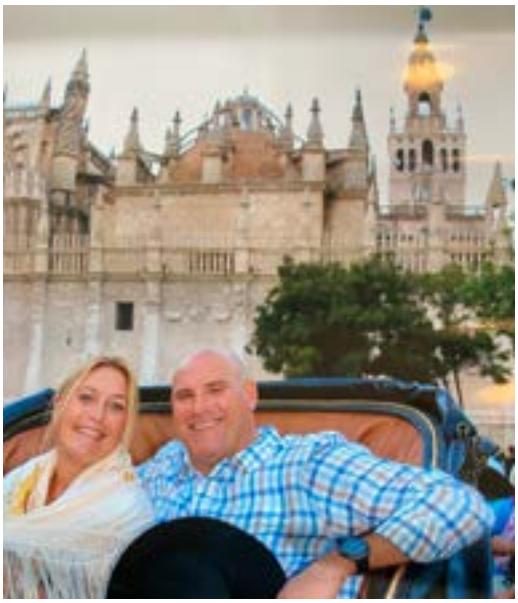
CONNECT WITH US TODAY!

(800) 532-5274 option 2

raredisease.pafcareline.org

Family Support Committee Update

By Jen Wyman, Vice President of Family Support



We have had many newly diagnosed families this year while also losing many members of our cystinosis family. We've experienced heartache and heartbreak and sometimes living just means keeping our heads above water. Sometimes things just feel like they are swallowing your soul. We all deal with it in different ways. Some go silent, dealing with their darkness in their own way and resurfacing when it feels right. Some reach out in every possible way, surrounding themselves with loved ones and seeking understanding and comfort anywhere they can. There is no wrong way, just your way. Please know that whenever that time is, CRN family support is here to help in any way we can.

Coming in 2023 -- Family Support Video Calls

Have a topic you'd like to discuss? Email suggestions to jenwyman@comcast.net or kristinasevel@gmail.com.
Check our social media and email blasts for more information.

Join the Cystinosis Research Network

Get connected! Stay informed! Together we can find a cure!

Become more active within our global network of caring families, concerned individuals and healthcare professionals working together in the fight against cystinosis. The Cystinosis Research Network's vision is the discovery of improved treatments and ultimately a cure for cystinosis. We take great pride in carrying out our motto:

"Dedicated to a Cure. Committed to our Community"

The Cystinosis Research Network is proud to provide valuable resources to the community, free of charge. Resources include but are not limited to:

- The latest cystinosis information through our biannual CRN Newsletter, our website (cystinosis.org), online support groups and social channels and email updates.
- CRN Family Conferences and Regional Meet Ups. Exchange knowledge and create friendships with other families and individuals living with cystinosis. Learn first-hand the latest discoveries about cystinosis from the medical professionals.
- Access to Cystinosis Research Network's representatives in the areas that are most relevant at any given time to you or your loved one affected by Cystinosis.

HAVE YOU ATTENDED AN IMPACT PROGRAM YET?

The IMPACT Program is specifically designed for people living with cystinosis and their families, and sponsored by Horizon Therapeutics throughout 2022

IMPACT

IMPACT Adults

IMPACT Teens

IMPACT Family & Caregivers

- **Learn about living with cystinosis**
- **Connect with others impacted by this condition—hear and share ideas, feelings, and helpful advice**
- **Learn about medication:**
  - the critical importance of continuous cystine control through cystine-depleting therapy (CDT)
  - PROCYSBI (cysteamine bitartrate) delayed-release capsules and delayed-release oral granules for the treatment of nephropathic cystinosis
- **Meetings will occur in both the virtual (online) setting and live, in person**

Even if you've attended an IMPACT Program previously, please check back in with us!

The IMPACT Program has new topics created specifically for different cystinosis patient experiences—**adults, teens, and families/caregivers** of people living with cystinosis.

To RSVP to one of these meetings or to find out about programs occurring near you, please call 602-953-2552 or visit www.procysbi.com/Cost-Savings-and-Support

USE AND IMPORTANT SAFETY INFORMATION

What is the most important safety information I should know about PROCYSBI?

PROCYSBI can cause serious side effects, including:

- **Skin, bone, and joint problems.** People treated with high doses of cysteamine bitartrate may develop abnormal changes of their skin and bones, such as stretch marks, bone injuries (such as fractures), bone deformities, and joint problems. Check your skin while taking PROCYSBI. Tell your doctor if you notice any skin changes or problems with your bones or joints. Your doctor will check you for these problems.
- **Skin rash.** Skin rash is common with cysteamine bitartrate and may sometimes be severe. **Tell your doctor right away if you get a skin rash.** Your dose of PROCYSBI may need to be decreased until the rash goes away. If the rash is severe, your doctor may tell you to stop taking PROCYSBI.

PROCYSBI®
(cysteamine bitartrate)
delayed-release capsules
delayed-release oral granules

Please see additional IMPORTANT SAFETY INFORMATION on the next page, and visit www.hzndocs.com/PROCYSBI-Patient-Information.pdf for the Patient Package Insert.

IMPORTANT SAFETY INFORMATION (continued)

- **Stomach and bowel (intestinal) problems.** Some people who take other medicines that contain cysteamine bitartrate may develop ulcers and bleeding in their stomach or bowel. People treated with PROCYSBI may also develop abnormal swelling and narrowing of the large bowel which must be treated promptly. **Tell your doctor right away** if you get abdominal pain, bloody or persistent diarrhea, bloating, nausea, vomiting, loss of appetite, vomit blood, poor weight gain or weight loss.
- **Central nervous system symptoms.** Some people who take other medicines that contain cysteamine bitartrate develop seizures, depression, and become very sleepy. The medicine may affect how your brain is working (encephalopathy). **Tell your doctor right away** if you develop any of these symptoms.
- **Low white blood cell count and certain abnormal liver function blood tests.** Your doctor should check you for these problems.
- **Benign intracranial hypertension** (pseudotumor cerebri) has happened in some people who take immediate-release cysteamine bitartrate. This is a condition where there is high pressure in the fluid around the brain. Your doctor should do eye examinations to find and treat this problem early.

Tell your doctor right away if you develop any of the following symptoms while taking PROCYSBI: headache, buzzing or "whooshing" sound in the ear, dizziness, nausea, double vision, blurry vision, loss of vision, pain behind the eye, or pain with eye movement.

What is PROCYSBI?

PROCYSBI (cysteamine bitartrate) delayed-release capsules and delayed-release oral granules is a prescription medicine used to treat nephropathic cystinosis in adults and children 1 year of age and older. It is not known if PROCYSBI is safe and effective in children under 1 year of age.

Do not take PROCYSBI if you are allergic to penicillamine or cysteamine.

Before taking PROCYSBI, tell your doctor about all your medical conditions, including if you:

- drink alcohol.
- have a skin rash or bone problems.
- have or have had stomach or bowel (intestinal) problems including ulcers or bleeding.
- have a history of seizures, lack of energy, unusual sleepiness, depression, or changes in your ability to think clearly.
- have liver or blood problems.
- are pregnant or plan to become pregnant. It is not known if PROCYSBI will harm your unborn baby. Tell your doctor right away if you think that you are pregnant. Talk with your doctor about the benefits and risks of taking PROCYSBI during pregnancy
- are breastfeeding or plan to breastfeed. You should not breastfeed during treatment with PROCYSBI. Talk with your doctor about the best way to feed your baby if you take PROCYSBI.

Tell your doctor about all the medicines you take, including prescription and over the counter medicines, vitamins, dietary and herbal supplements. Know the medicines you take. Keep a list of them to show your doctor and pharmacist when you get a new medicine.

What should I avoid while taking PROCYSBI?

- Do not drive or operate machinery until you know how PROCYSBI affects you. PROCYSBI can make you sleepy or less alert than normal.
- Do not drink alcohol if you take PROCYSBI. Drinking alcohol while taking PROCYSBI may change how PROCYSBI works and may cause an increase in the amount of PROCYSBI in your blood that may cause serious side effects.

What are the possible side effects of PROCYSBI?

PROCYSBI can cause serious side effects, including:

- **See "What is the most important information I should know about PROCYSBI?"**

The most common side effects of PROCYSBI include: vomiting, nausea, stomach (abdominal) pain, pink eye, diarrhea, cold, tiredness, flu, headache, problems with body salts or electrolytes, infection of ear, nose or throat, joint pain.

These are not all the possible side effects of PROCYSBI. Call your doctor for medical information about side effects. You may report side effects to FDA at 1-800-FDA-1088.

For additional important safety information, please visit www.hzndocs.com/PROCYSBI-Patient-Information.pdf for the Patient Package Insert, and discuss with your doctor.

PROCYSBI®
(cysteamine bitartrate)
delayed-release capsules
delayed-release oral granules

HORIZON

The Barlow Family

By (Aunt) Marianne Barlow

Until 31 August 2022, there were only 20 registered cases of cystinosis in South Africa. Since then, this statistic has risen to 22. And the little human faces behind these last two numbers are our own 19-month-old identical twin boys, Josh and Jason.

Our miracle triplets, Josh, Jason and Jane, were born on 6 March 2021, at 33 weeks, weighing 1.2 kg on average. They were born in Peglerae Hospital in Rustenburg, a large mining town in the North West Province. Jane came home a few weeks before her brothers. The boys had undergone a succession of nerve-racking surgeries before eventually being released three months after birth.

Jane was initially the tiniest, but all three babies were growing and developing into plumpish little cherubs by six months. However, the boys were suffering increasingly from digestive issues that had been present since birth. Meanwhile, by eight months, Jane quickly started overtaking her brothers in strength, weight and physical milestones. Of course, girls often advance quicker than boys, but two months later, Jane was doing “Spiderman” crawls while her brothers were barely sitting. Although the boys were physically lethargic, they displayed excellent fine motor skills and from just five months, they could listen attentively during story book time. They are clearly highly intelligent!

The pediatrician attributed their slow physical progress to the severe discomfort caused by their digestive issues. He advised us to take them to an occupational therapist for therapy that would strengthen their muscles.

At nine months, several invasive tests and procedures were conducted on the boys to ascertain whether intestinal surgery would be necessary to improve their severe digestive problems. They had been struggling to pass stool for days on end.

The pediatrician advised us to give them spring water and change their milk formula, which yielded some improvement to their bowel movement. Each visit to the pediatrician would result in new dietary adjustments and supplements, which each time were implemented with renewed hope and vigor. Each time, our hopes would be dashed with the boys getting sick, vomiting and refusing to eat or drink milk. This would invariably lead to more weight loss.

Soon after their first birthday, they started developing an insatiable thirst for water. Their cravings were so severe, they would even scoop up water in the bath and from water features. It was most unsettling and yet no medical professional could explain the reason for this. The boys were also very vulnerable to illness and the slightest viral infection would result in hospitalization and rapid weight loss.

At 13 months, after they had been unable to keep milk and solid food down and shed even more weight,

The Barlow Family, continued

Josh and Jason.

they were hospitalized again. Further tests were conducted which showed that the boys were unable to absorb calcium and vitamin D. Special supplements and a stringent nutritional regime was put in place by the pediatrician and dietician. For a short time, it seemed as though their condition was improving. However, the cycle of hospitalization continued. At one stage, Josh underwent tests and spent a few days in the hospital for what was described as “severe acid reflux.” He was discharged but there were still no answers.

As part of their new regime for growth, our pediatrician had put the boys on a permanent course of antibiotics to protect them and strengthen their immune systems. Throughout these challenges, we always kept hoping and praying that things would improve with time and that the interventions would yield results and positive outcomes. But the boys continued to deteriorate. When they were admitted to the hospital again after a bad bout of flu during the week of 15 August 2022, we were feeling quite desperate. Yet, our pediatrician could not provide answers and, instead, our boys were discharged with no plan in place. The best the pediatrician could do was to arrange an appointment with a specialist whose schedule was booked up three months in advance.

Our poor, weak and exhausted babies came home. No medication or antibiotics could put an end to their relentless vomiting. And, heartbreakingly, our little troopers still managed to muster smiles throughout episodes of violent projectile vomiting. We realized that if we kept them in the care of the local medical fraternity, they would die.

On Sunday, 20 August 2022, I packed up, buckled up the boys and drove to the renowned Olivedale Clinic in Johannesburg, Gauteng Province. Desperate and exhausted, I literally just arrived on their doorstep with my two sick baby boys. We were treated with such compassion at Olivedale and were instantly admitted. The pediatrician, who was not even supposed to be on duty that day, is an absolute godsend. Dr Vala immediately started conducting the correct tests and could soon give us a name for their condition: cystinosis/ Fanconi Syndrome.

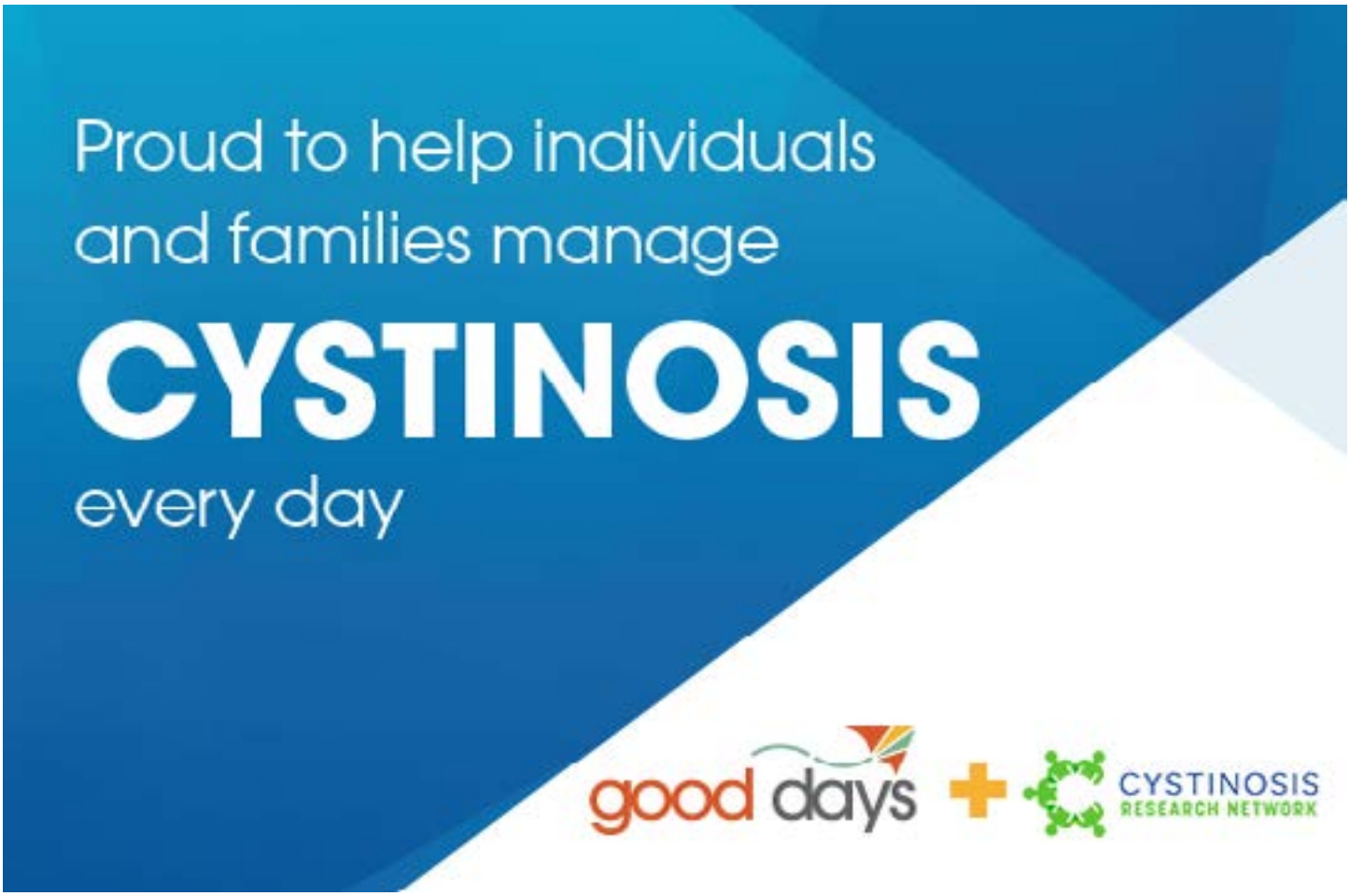
The realization of what cystinosis entailed was utterly devastating and I wept uncontrollably for many hours that night. However, following the example of my two little warriors, who have braved so much pain and yet still managed to have a sense of humor, I gathered myself and started taking practical steps. I immediately made contact with support groups in South Africa and the USA. Quality literature and testimonials about cystinosis gave me so much understanding and so much hope. Conversations with other parents in the same situation gave me so much strength.

In the meantime, our two little heroes are still in Olivedale Clinic. They have both undergone the procedure for a stomach peg. They are responding well to the medication and finally gaining weight. They will be here until they are strong enough and all is in place for them to come home.

We as a family have now relocated to Johannesburg where our boys are close to the best medical care our country has to offer. Our beautiful mischievous boys, Josh and Jason, continue to be a source of inspiration to us all. We visit daily and older sis (Meghan) and triplet sis (Janie), are ever so gentle and loving with their brothers.

In the meantime, we are all hoping and praying that continued and relentless research will yield a cure for this rare condition.

The Barlow children with granny.



Nephropathic Cystinosis: Apply for Assistance

Good Days provides financial support for patients who cannot afford the treatment they urgently need. Good Days has streamlined the enrollment process so patients can receive immediate determination of eligibility for financial assistance.

Eligibility Criteria

- Patient must be diagnosed with a covered disease and program must be accepting enrollments
- Patient must have a valid Social Security number to apply for assistance and receive treatment in the United States
- Patient must be seeking assistance for a prescribed medication that is FDA approved to treat the covered diagnosis
- Patient is required to have valid insurance coverage
- Patient income level must meet program guidelines

Enrollment Checklist

1. Patient contact and demographic information
2. Health insurance information
3. Diagnosis and medication
4. Prescribing physician's name and phone number
5. Estimate of patient's household income and household size

Get started at mygooddays.org/apply.

NORD Breakthrough Summit

By Jonathan Dicks, President and Vice President of Development

What a difference three years makes. It was just before the country locked down that I found myself in Washington, DC for Rare Disease Day on Capitol Hill. We had just attended our first CRN conference in Philadelphia and I was a bright-eyed parent ready and willing to jump feet first into the rare world. Three years later and back I went to DC for the NORD Breakthrough Summit with a new perspective for advocacy work and hit the ground running.

We wasted no time jumping into policy work and did so from the international perspective discussing current international efforts to advance rare disease research and address global inequities in access to diagnosis, medicines and care. We delved further into research representation inequities to better understand the current initiatives enacted to address these challenges and to ensure diverse and equitable representation in rare disease research.

I attended seminars centered around best practices for accelerated approval pathways and discussed current efforts to ensure its implementation continues as originally intended. We then heard from the patient perspective dealing with patient-focused drug development (PFDD) which is a systematic approach designed to ensure that patients' experiences, perspectives, needs and priorities are captured and meaningfully incorporated into new drug development and evaluation. The primary goal of PFDD is to better incorporate the patient's voice in drug development and evaluation.

Possibly the most powerful takeaway was the understanding that real change and advocacy in policy is realized not only at the federal level, but in the local interactions with key opinion leaders and state rare disease councils. Patient needs come long before possible therapies are available, and the goal is to address these unmet needs of the rare community and enhance overall quality of life.

Live Like Laura Fun Fund Update

By Frankie McGinnis

These are the wonderful families that came to support me and say goodbye to my squirrel. Just a portion of the village that loves us.

So here we are again with another newsletter and another update about this fund. I have pondered what to write, do I tell of the beautiful video I keep on my phone of one recipient on his scooter? The one he uses to keep up with his friends? The trips that several have taken? The beautiful coming out story that one recipient shared with me and the great adventure that was funded?

Live Like Laura Fun Fund Update, continued

I decided what I must tell you about is why I do this, I have to be transparent and tell you the real motivation. Twenty-five years ago, I heard the words, “Laura has cystinosis” and my life changed. Those first years were so very hard, we had dial up internet and minimal family support. Even with how little was available at that time I luckily found the mothers. These women, oh these precious women, they made me feel seen and they “got” it. Through the years, organizations, and conferences the people I interacted with became my family. When Laura died and I lost her physical presence, the idea came to my mind that I could walk away. I could pretend this word, cystinosis, never came into my life. How tempting that was. Even though my daughter lost her fight, I could not pretend that I did not see the fight of all those who have loved us all these years, that the new families struggling, desperate, scared did not exist. Pandoras box was open, my heart knew and we had lived this journey, to deny it, or forget cystinosis would be turning my back on so much that made my daughter who she was and so much of who I am. So yes, I do this to honor the beautiful soul that was gifted to me for too short of a time but I also do it because I love my family, you. I always said I would accept this in my life if I knew in some way life would be better or in some way easier for those who followed in Laura’s footsteps. In my small way, I pray this fund blesses those that apply, that you find a moment when you forget, that an obstacle is lifted and that you live. I will read your stories, your dreams, see the videos and pictures and I will know that for that moment your life is a wee bit better. I will know the joy that my daughter lived her life with is being felt by someone and, for that moment, my family will be well. This is why I do it.

Live Like Laura scholarships are open at cystinosis.org/lllff.

Financial Update

By Tim Wyman, Treasurer

The Cystinosis Research Network continues to utilize its financial resources to further its mission to secure a promising future for the cystinosis community through the support and funding of research grants that lead to improved treatments and ultimately a cure for cystinosis. The CRN is a tax-exempt organization granted “501(c)(3)” non-profit status by the I.R.S. The CRN Federal Tax ID # is 04-3323789.

Total income for the 10 months in 2022 was $322,149 which consisted mainly of $276,000 in grants received and $42,604 from fundraising. Expenses totaled $490,698 for a -$168,549 net income year-to-date. The majority of expenses were $242,463 towards research grants (cystinosis.org/research) and $75,555 to education. Additionally, CRN awarded $13,000 in scholarships (cystinosis.org/support-resources/scholarships) and $17,598 in sponsorships. Thanks to grants and fundraising by many in the cystinosis community, CRN’s current equity (assets minus liability) stands at a healthy $493,772 which is critical in funding additional research.

Development Committee Update

By Jonathan Dicks, President and Vice President of Development

What a crazy year it has been getting back to the in-person feel of living life again post-pandemic. The commonplace interactions I once took for granted; the visceral connection of a hug or a stranger's smile strike me differently these days. I will always look back in awe at the resiliency of this community in the face of uncertain times. We rose above and still managed to get out (virtually in many cases) to advocate, fundraise, and educate our communities. "Cystinosis takes zero days off" I would say to myself, that quickly became my personal mantra and source of much strength in the trying times.

As a father it galvanized my resolve to stay true to the regimen that keeps Elle stable and free from extraneous hospital stays. In my role as VP of Development that mantra kept my focus keenly aware of the task of cultivating new relationships with stakeholders not only within the cystinosis rare space but in my own local community as well.

I am pleased to announce another robust year filled with an impressive array of no-cost services, the return of local CRN-driven in-person meet-ups, and the incredible announcement of our next in-person CRN Family Conference slated for Nashville, TN this coming July!

All these incredible services, planned events, and opportunities to fund new, innovative research proposals require a substantial financial investment. Without the generosity of our industry partners; Horizon Therapeutics, Leadiant Bioscience, Recordati Rare Disease, and AVROBIO, none of these potential ventures would be possible. We have grossed over $280,000 in direct funding via an array of targeted and open-ended grants in 2022, and look to eclipse this number in 2023. Our trusted partners all share the same conviction that every person with a rare disease has the right to the best possible treatment, I agree wholeheartedly.

The CWIP (Cystinosis Warrior Impact Program) created with the singular goal of positively impacting every person living with cystinosis is in full swing since its launch in May. We will accomplish this by utilizing

Development Committee Update, continued

our vast resources, examples could include: matching a newly diagnosed caregiver with an experienced family, helping prepare a cystinosis teen with tutoring assistance, providing an adult with mentor services or training them to give back by becoming a mentor themselves. This long-term goal will only be possible with the assistance of our network of patients, caregivers, loved ones, partners, and healthcare professionals. We hope you feel empowered to take part in this endeavor to positively impact our rare disease community. Interested? You can email info@cystinosis.org to get started AND to refer a friend for services.

pcsforpeople

Our PCs for People program is in its second year and continues to touch lives in the most positive of ways. We have, to date, placed over 48 laptops and desktops with a year of high-speed internet access in the homes of our CRN patients and/or caregivers at absolutely zero cost to the client. Send me a message at jdicks@cystinosis.org and I'll reply with a brief questionnaire and get the entire process facilitated from start to finish. It really is that simple.

BROMBERG & ASSOCIATES

Bromberg & Associates continues to offer CRN translation and telephonic interpretation for Spanish-speaking individuals/families and have expanded their reach to cystinosis patients all over the world offering translation services in over 200 distinct languages, with an ever-expanding list (see pages 17-18 for details).

Center for Chronic Illness

The Center for Chronic Illness are offering free, professionally-facilitated support groups and health education programs for those impacted by cystinosis as well as a separate monthly group specifically for parents with a diagnosed child (see pages 50-51).

American Kidney Fund
FIGHTING ON ALL FRONTS

The American Kidney Fund have launched a digital fact sheet to help you successfully prepare for and navigate through a telehealth physician visit. Check it out at http://bit.ly/3FeNEyP.

Care Package Program

Are you or a loved one newly diagnosed? Transitioning towards the transplant stage, or to an adult primary care provider? Check out the incredible services of our Care Package Program which was created to help individuals and families with cystinosis during trying times. We will send a personalized package with educational materials and supportive tools based on your point within the cystinosis journey. To sign up for a complimentary package head over to https://cystinosis.org/care-package/ and fill out the brief form.

Please keep checking in on all our social media accounts for some awesome events. We had another successful Giving Tuesday all over the USA and abroad. With 2022 coming to an end, there's still plenty of time to make a great personal impact into local outreach and advocacy events. Don't see one? Give us a ring and we'll walk you through how to easily fundraise for not only for the remainder of 2022, but map a plan of action for Rare Disease Day fast approaching on February 28th and Cystinosis Awareness Day on May 7th.

The 2nd Annual Cystinosis Golf Tournament was held on June 18 at the Wild Wing Golf Course in Myrtle Beach, SC. Gail Potts pulled off another successful event raising $8,500 in just one afternoon of golf! We are so thankful and appreciative of your dedication to this community Gail, great work! Please check out her event on page 35.

The Adult Leadership Advisory Board (cystinosis.org/alab) is in full swing planning their pet bandana fundraiser. Please consider showing your support and picking up a few for all our furry friends out there who play such an integral role in helping us traverse the hard days when we all need a 'mental health moment.'

Have a question about how to do something like this? Or maybe you have a unique fundraising idea but are unsure where to start? Be on the lookout for a "fundraising playbook" coming in 2023 for quick and easy tips on successfully navigating the fundraising area, as well as a how-to guide for starting your own 501(c)(3).

Myrtle Beach Golf Fundraiser

By Gail Potts, Director

The 2nd Annual Cystinosis Golf Tournament was held on June 18 at the Wild Wing Golf Course in Myrtle Beach, SC. I'm happy to say it was a successful event raising $8,500. The tournament was sold out with 120 golfers playing. Our CRN President, Jonathan Dicks, was present and made an impressive overview of cystinosis, which was very well received. We were also honored to have Jeff Larimore, a past CRN President, playing along with Tom D'Amato, Director Patient Advocacy, from Horizon Therapeutics. It was wonderful having the support of the cystinosis community there.

This event was a Captain's Choice format. A 9 AM Shot Gun Start was delayed due to a storm the previous night requiring some grooming of the course for the golfers. The weather was less oppressive than last year's temperature for the event and we were able to keep up with the water demand, thankfully.

The golfers began registering at 8 AM and were given the opportunity to purchase mulligan and raffle tickets. We were able to assemble 55 raffle gifts and baskets with donations from local merchants. We collected donations from restaurants, hair salons, nail salons, spas and theaters. The baskets were embellished with wine, cheese, golf accessories, other accessories and snacks. We had 20 hole sponsors with the signs being donated by Addyson Westfall's grandmother, Amy Wells of Ohio. Tori and Addyson had planned on being at the tournament with Kerry and Tom but a doctor's appointment in California became available that week. We missed having them there.

There were more volunteers helping out at the tournament this year and in helping to assemble raffle baskets. I am extremely thankful for those who played golf at the event and those who played behind the scenes. After approaching a women's group, a photographer in the group volunteered her time to take pictures for me.

The feedback from players was very positive. All that approached me afterwards remarked about the good time they had playing and learning a little about cystinosis. It was good to be able to raise more awareness of cystinosis.

Cystinosis Memorial Fund Grants Awarded

By Karen Gledhill, Secretary

The Cystinosis Memorial Fund (CMF) was created to give individuals with cystinosis the opportunity to receive up to $1,000. The grant can be used for a range of expenses from paying for a college class, or purchasing a new software program to paying for a student meal plan or muscle wasting prevention program.

We are pleased to have awarded many grants this year. Please take a minute to read the stories some of those winners have shared with us.

If you are considering applying, please go to https://cystinosis.org/cmf.

ERNESTO RICO JUAN — Physiotherapy & Nutritionist

I'm Ernesto from Spain and I am 32 years old. Since 2018 I have had myopathy in my hands. To be stable, I need to go every week to physiotherapy to train my hand and arm muscles.

These weekly sessions cost a lot of money for me and some months I could only afford one or two sessions. Thanks to the grant from the CRN, I can go every week and improve my muscles working with my physiotherapist, Ángela. She helps me a lot doing exercises with my hands and arms using rubber bands for one hour. These sessions are very helpful because I feel improvement in my myopathy to do some tasks like catching things, getting dressed, working, playing piano, and many tasks where I use my hands.

To improve my muscles I also go to a nutritionist. My nutritionist prescribes me a special diet high in protein and other nutrients good for improving muscles. These sessions are expensive too, so CRN's Memorial Fund helps me to be able to pay for these sessions, otherwise I would have to go fewer times.

These two basic therapies for me keep my myopathy from getting worse and help me stay healthy and lead a normal life using my hands and arms.

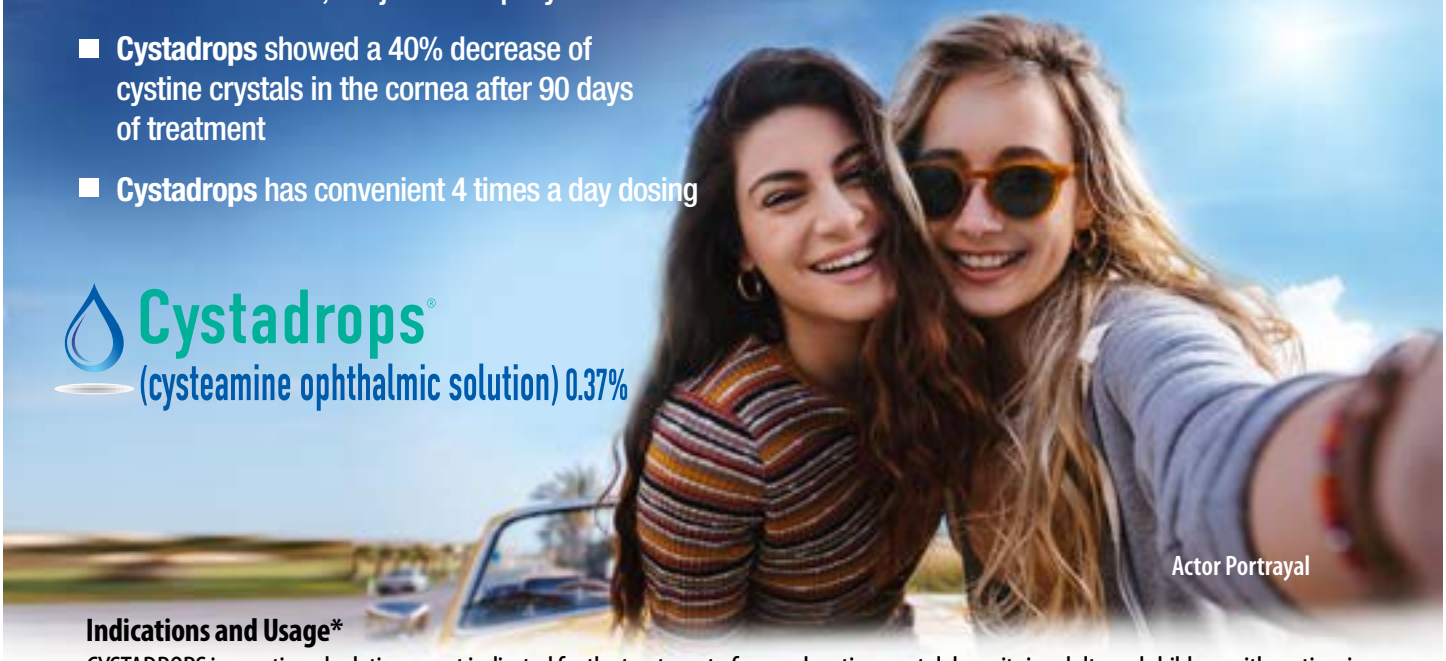
From here I want to thank the CRN because their grant has helped me financially to attend all the physiotherapy and nutritionist sessions to improve my hand and arm muscles and to be able to lead a more normal life using my hands.

Continued on Page 48

The efficacy you can see. The convenience that matters.

- **Cystadrops** dissolves cystine crystals throughout the entire cornea, not just the top layers
- **Cystadrops** showed a 40% decrease of cystine crystals in the cornea after 90 days of treatment
- **Cystadrops** has convenient 4 times a day dosing

Cystadrops®
(cysteamine ophthalmic solution) 0.37%



Actor Portrayal

Indications and Usage*

CYSTADROPS is a cystine-depleting agent indicated for the treatment of corneal cystine crystal deposits in adults and children with cystinosis.

Important Safety Information

- To minimize the risk of contamination, do not touch the dropper tip to any surface. Keep bottle tightly closed when not in use.
- A condition where the pressure inside the skull increases for unknown reasons has been reported with cysteamine taken by mouth or cysteamine eye drops (used at the same time as cysteamine taken by mouth). This condition went away with the addition of medicine that increases the production of urine.
- Contains the preservative benzalkonium chloride. Contact with soft contact lenses should be avoided. Remove contact lenses prior to application. Lenses may be reinserted 15 minutes following administration.
- The most common side effects are eye pain (stinging), blurred vision, eye irritation (burning), eye redness, discomfort at instillation site (sticky eyes or sticky eyelids), eye itching, watery eyes, medicine deposit on the eye lashes or around the eyes
- **To report SUSPECTED SIDE EFFECTS, contact Recordati Rare Diseases Inc. at 1-888-575-8344, or FDA at 1 800-FDA-1088 or www.fda.gov/medwatch.**

* For use by individuals with cystinosis

Visit www.cystadrops.com for full prescribing information

RECORDATI RARE DISEASES GROUP
Focused on the Few®

Cystadrops®
(cysteamine ophthalmic solution) 0.37%

Special drops for special eyes...your eyes

PATIENT BRIEF SUMMARY
CYSTADROPS® (sys-tah-drops) (cysteamine ophthalmic solution) 0.37%, for topical ophthalmic use

Summary:
Read this information before you start using Cystadrops and each time you get a refill. There may be new information. This information does not take the place of talking to your doctor about your medical condition or your treatment.

What is Cystadrops?
Cystadrops is a prescription cystine-depleting solution used for the treatment of corneal cystine crystal deposits in adults and children with cystinosis.

What should I know about using Cystadrops?
- To minimize the risk of contamination, do not touch the dropper tip to any surface. Keep bottle tightly closed when not in use.
- Cystadrops contains the preservative benzalkonium chloride. Contact with soft contact lenses should be avoided. Remove contact lenses prior to application. Lenses may be reinserted 15 minutes following administration.

Before you use Cystadrops, tell your doctor if you:
- are using any other eye drops
- wear contact lenses
- are pregnant or plan to become pregnant. It is not known if Cystadrops will harm your unborn baby.
- are breastfeeding or plan to breastfeed. It is not known if Cystadrops passes into your breast milk. Talk to your doctor about the best way to feed your baby if you use Cystadrops.

How should I use Cystadrops?
See the complete Instructions for Use for detailed instructions about the right way to use Cystadrops.
- Use Cystadrops as your doctor tells you.
- Use one drop of Cystadrops in each eye, four times each day.
- If you miss a dose, administer the dose as soon as feasible, and then continue the treatment with the next scheduled dose.
- Keep Cystadrops in the refrigerator until ready to use. After opening, write date on carton and after each dose, keep the bottle tightly closed and store at room temperature in the original carton.
- Discard bottle at the end of 7 days, even if medication is still in the bottle. The solution is only stable for 7 days after opening.

What are the possible side effects of Cystadrops?
The most common side effects are eye pain (stinging), blurred vision, eye irritation (burning), eye redness, discomfort at instillation site (sticky eyes or sticky eyelids), eye itching, watery eyes, medicine deposit on the eye lashes or around the eyes. A condition where the pressure inside the skull increases for unknown reasons has been reported with cysteamine taken by mouth or cysteamine eye drops (used at the same time as cysteamine taken by mouth). This condition went away with the addition of medicine that increases the production of urine.

These are not all the possible side effects of Cystadrops. Tell your doctor if you have any side effects that bother you. You may also report side effects to **FDA at 1-800-FDA-1088.**

How should I store Cystadrops?
- **Before First Opening:** Before opening, store new, unopened CYSTADROPS in the refrigerator between 36°F to 46°F (2°C to 8°C). Keep the bottle in the outer carton in order to protect from light.
- **After First Opening:** After opening, store opened CYSTADROPS at room temperature between 68°F to 77°F (20°C to 25°C). Do not refrigerate after opening. Keep the dropper bottle tightly closed in the outer carton in order to protect from light. Discard 7 days after first opening

Keep Cystadrops and all medicines out of the reach of children.

General information about the safe and effective use of Cystadrops.

Medicines are sometimes prescribed for purposes other than those listed in a Patient Information leaflet. You can ask your pharmacist or doctor for information about Cystadrops that is written for health professionals. Do not use Cystadrops for a condition for which it was not prescribed. Do not give Cystadrops to other people, even if they have the same symptoms you have. It may harm them.

What are the ingredients in Cystadrops?
Active ingredient: cysteamine 3.8 mg/mL (equivalent to cysteamine hydrochloride 5.6 mg/mL);
Preservative: benzalkonium chloride 0.1 mg/mL;
Inactive Ingredients: carmellose sodium, citric acid monohydrate, disodium edetate dihydrate, hydrochloric acid and sodium hydroxide (to adjust pH to 4.6-5.4), and water for injection.

Manufactured by: Baccinex SA, 2822 Courroux, Switzerland
Manufactured for: Recordati Rare Diseases Inc., Lebanon, NJ 08833, U.S.A

For the most recent prescribing information, please visit
www.recordatirarediseases.com/us

Revised: August 2020

Available for patients using CYSTADROPS

*The PATIENT ADVOCACY LIAISON (PAL) PROGRAM**

Scan QR Code to enroll now

Personalized one-on-one support is available for patients receiving treatment with CYSTADROPS and their caregivers. Dosing and adminstration questions along with valuable outside resources are within easy reach. The PAL program is also available in Spanish. Enrollment is voluntary.

*Information provided by the PAL program is for educational purposes only and is not intended to replace the advice of patients' healthcare providers.

Helga, Patient Advocacy Liaison (PAL)
Recordati Rare Diseases
Patient Support Services

To find out more – visit www.cystadrops.com/resources-faq/

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Special drops for special eyes...your eyes

ALAB
ADULT LEADERSHIP ADVISORY BOARD

The Adult Leadership Advisory Board (ALAB) is a group comprised entirely of adults living with cystinosis.

ALAB's mission: To share our stories and strength to educate, motivate and empower the entire cystinosis community. Through partnerships with the CRN and other organizations, ALAB focuses on issues and challenges through developing programs, opportunities, and mentorship. Our goal is to create a group that will not only benefit from the experience but will contribute to the entire cystinosis community.

Podcast: Cystinosis Rare: A Journey into the Unknown

The next episode, scheduled for January 2023, will feature voices from the adult cystinosis and rare disease community on the perspectives of what it's like to be a person living with rare disease and being a parent. Managing our own health is difficult and the addition of daily responsibilities and taking care of children can be even more challenging. This episode will cover both the joys and also the obstacles that come with parenthood.

Dog Bandana Fundraiser

Animals are such an important part of our lives and so many in the community own pets. They are there for us through our good and bad times; they improve and bring happiness to our lives in so many ways. We wanted to highlight our furry friends, by selling dog bandanas to raise money for ALAB. The funds from this fundraising effort will help us to expand our current programs and to help spread awareness and education throughout the community.

We would love to highlight your journey with your furry friends. When you purchase a bandana, send us a picture of them wearing the bandanas and share your story. We will share your picture and story on social media! Be on the lookout for communications about purchasing the bandanas soon or visit cystinosis.org/alab for updates.



University of California San Francisco IRB Approval EFFECTIVE DATE 02/04/2022

Interested in taking part in a research study on fertility issues in males with nephropathic cystinosis?

About the Study: Dr. Minnie Sarwal (Nephrologist, UCSF), Dr. James Smith (Director of Male Reproductive Health, UCSF), and Dr. Polina Lishko (Human Reproductive Health Specialist, University of California Berkeley) are conducting a study to learn the cause of fertility issues in adult, male patients with nephropathic cystinosis who are treated with cysteamine. This study is currently jointly funded by Cystinosis Ireland (CI) and Cystinosis Research Network, USA (CRN). While the majority of men with cystinosis have not fathered children, there have been cases of some men becoming a father through assisted fertility. This has not been an easy journey and this study aims to find out more on the causes of male infertility in the hope it might help future treatment.

Primary Goals of the Study:

1. To better understand what causes male fertility issues in nephropathic cystinosis
2. To design novel therapies to potentially prevent young boys from losing male reproductive function, and
3. Patients with current infertility issues will be offered an option for sperm preservation for future use. Follow-up to be discussed with Dr. Smith after initial visit.

What the Study Involves:

- Participation in this study would involve one visit to UCSF. The visit would include the following: Clinical examination, a blood test, ultrasound (of the testes which is a painless procedure similar to ultrasound used for pregnant women) examination for testicular volume and architecture, semenanalysis, sperm motility (this means how fast sperm swim which can indicate the health of the sperm), morphology, the concentration of white blood cells, the level of fructose in the semen (semen is an organic bodily fluid, which contain sperms. Higher the absolute fructose concentration in the semen, lower is the number of sperms), and pH (pH is a measure of how acidic/basic water is. The pH of semen plays a crucial role in maintaining quality of sperm ensuring fertilization). Testicular and epididymal (coiled tube behind each testis) biopsies, sperm will be obtained by the TeSE (a procedure to collect sperm directly from testes), well-established techniques, performed routinely by Dr. James Smith. We will also collect semen via masturbation.
- All interested participants will have an online consultation via zoom with Dr. Smith to discuss this process prior to the visit to UCSF. Please see below the contact info if you would like to participate.
- If you are travelling to UCSF, part payment will be provided to help defray the cost of the travel. All clinic, blood draw,imaging and procedure costs at UCSF will be covered. For biopsies and TeSE local anesthesia will be used. When the biopsy is taken, you will feel pressure or minor discomfort. Mild narcotic to relieve the pain will be given. You would need to take it easy and rest for a week or two to recover fully.
- You will receive a free consultation with Dr. Smith, counselling for your results, and the test results will be available to your care team.

Benefits of Participating: Participation in this study will help us to understand the causes of male infertility in cystinosis. Understanding the cause will provide novel insights into new surgical and therapeutic approaches to either prevent or reverse male infertility in cystinosis. You will get a detailed report of your clinical, biochemical, and semen examinations. You will not be involved in treatment at this phase, however we hope that the results from this research will lead to the development of future treatment trials. All male participants with cystinosis will be offered the option of sperm preservation.

Who May Participate: You are eligible to participate if you are greater than 18 years of age (no upper limit) with a diagnosis of nephropathic cystinosis.

If you would like to participate in this study or if you would like more information, please contact minnie.sarwal@ucsf.edu or the study coordinator, Jim Cimino at 415/514.0192 or email to jim.cimino@ucsf.edu

Research Committee Update

By Christy Greeley, Vice President of Research, Executive Director

From left to right; Jack, Christy and Alex Greeley.

CRN has funded over $5.5 million total in research grants and fellowship, including a cystinosis fellowship at the National Institutes of Health, research and education programs in the United States and many countries around the world including Egypt, Mexico, England, Scotland, Italy, Belgium, France, Germany and much more. CRN has also co-funded research projects with Cystinosis Ireland and does so currently. CRN research topics have focused on every aspect of cystinosis with the purpose of understanding the disease and finding improved treatments and a cure. Topics include research and therapies related to neurological, genetic, ophthalmological, gastrointestinal, muscular, nephrology, pulmonary, skin, fertility, improved medications, psychological and much more. It's our honor to collaborate with our international cystinosis advocacy colleagues to support the best researchers around the world.

CURRENT CRN GRANT COMMITMENTS

Development of a patient-reported outcome to measure the health-related quality of life of children and adolescents with cystinosis

Drs. Katharina Hohenfellner and Julia Quitmann

Grant Amount: $155, 075.09, two year study

Patient-Reported Outcome measures (PROM) are questionnaire-based tools that can help healthcare professionals understand the health status or disease burden from the patient's perspective. These tools can be used to evaluate new therapies or to improve the healthcare provided. Disease-specific instruments that measure health-related quality of life (HrQoL) is particularly informative, as they capture the needs and challenges of specific patient groups particularly well. As a multidimensional construct, HrQoL includes physical, emotional, mental, social, and behavioral components of well-being from the patient's perspective HrQoL can be measured using four different types of instruments: generic, chronic-generic, condition[1]specific and treatment-specific instruments. Generic questionnaires represent the full range of health conditions, address groups independent of their respective health state and are effective for comparisons between two cohorts (e.g., patients with cystinosis and healthy controls). Chronic-generic instruments are focusing on a chronic condition independent of its specific characteristics, while specific questionnaires are tailored to problems associated with a specific condition (e.g., cystinosis) or treatment (e.g. patients receiving a kidney transplantation). Despite the significant impairments experienced by patients with cystinosis, very few studies investigate HrQoL in this patient group and e disease specific HrQoL measures are lacking. Thus, the primary aim of this planned study is to develop a PROM for children and adolescents with cystinosis. This instrument will capture the HrQoL from both the child/adolescent and parent perspectives. It will be applicable to clinical trials ranging from randomized clinical trials (RCTs) to surveillance designs, focusing on the impact of cystinosis and its treatment. The preparations have already started. We are currently developing the questionnaire "QUALIFY" (Health-related quality of life of children and adolescents with cystinosis) through intensive literature research and interviews with young German patients and their parents. This preliminary version of QUALIFY needs to be cross-culturally validated in a larger sample (= investigated whether the instrument measures what it is supposed to measure) and adapted to the English, Spanish and French language. The study will take place in four phases within a

24-month timeline (Figure 1). Patients and parents will be recruited by both clinicians and patient organizations of the participating countries. In the first phase, the preliminary German version of QUALIFY will be translated into English, French and Spanish. In phase 2, these new versions of QUALIFY will be used in an online pilot test to analyse their preliminary psychometric properties. A cognitive debriefing will be conducted so that patients and parents can reflect on the comprehensibility, completeness, and applicability of the instrument. In the third phase, the refined questionnaires will be applied in an online field test to evaluate their final psychometric properties (incl. internal consistency, convergent validity, reliability). In the fourth phase, a final report and publications for scientific journals will be written. The final product will be a cross-cultural, psychometrically validated, practically feasible, and conceptually suitable instrument for children and adolescents with cystinosis. It will be available in English, Spanish and French for further (inter-)national studies. With further international collaborations, this tool can be linguistically validated and cross-culturally 2 adapted for use in a wide range of countries. Although the project in this grant application refers to the development of PROM for children, the development of a PROM for adult patients is planned as a follow-up project.

Cognitive Control Systems in Cystinosis

Sophie Molholm, PhD Co-Principal Investigator, John Foxe, PhD Co-Principal Investigator

Grant Amount: $315,193, two year study

Seminal behavioral studies by Trauner and others in human patients have suggested the presence of cognitive dysfunction in cystinosis. Our own work suggests some behavioral and neural differences and difficulties with sensory memory in this population. However, the neurocognitive phenotype associated with CTNS mutations and its developmental path are still poorly understood, and the prime areas of neurocognitive vulnerability in this population are in need of much more thorough characterization. This is critical to developing effective therapies to compensate for or improve on areas of cognitive vulnerability. To this end, we propose to characterize different components of executive functioning (memory updating, set shifting, conflict monitoring, and inhibition) in cystinosis. Focus on this area is motivated by our previous work, the literature on cognitive weaknesses in cystinosis thus far, and by first person reports collected during interactions with patients and families. We will use high-density electrophysiology (EEG)—a non-invasive method that allows one to directly measure functional brain activity at the millisecond scale and thus reliably assess the integrity of information processing at the neural level—and standardized cognitive functional assessments to test 15 children, 15 adolescents, and 15 adults with cystinosis and the same number of age-matched unaffected healthy controls. Twenty heterozygotes and age matched controls will also be tested to examine the role that mutation versus disease plays in the cognitive phenotype of cystinosis,

Significance: Greater knowledge of the neurocognitive dynamics of executive function in cystinosis has the potential to critically advance the development of interventions for these individuals. In addition, identification of neural markers will provide objective assays of treatment efficacy on brain function.

Chitotriosidase as a Therapeutic Monitor for Cysteamine Therapy in Cystinosis: a Retrospective Validation Study

Mohamed A. Elmonem, Koenraad R.P. Veys, Lambertus P. van den Heuvel, William A. Gahl, Elena Levtchenko

Grant amount: $44,000, one year study

Nephropathic cystinosis lacks a practical therapeutic monitor for cysteamine therapy. The currently used white blood cells (WBC) cystine assay, although very specific for the disease, has many clinical and technical drawbacks limiting its routine use in most countries. Chitotriosidase enzyme activity in plasma is a potential alternative to WBC cystine in nephropathic cystinosis monitoring. Chitotriosidase is mainly produced in various tissues by activated macrophages upon stimulation by cystine crystals. We have previously demonstrated that the enzyme is significantly elevated in the plasma of cystinosis patients compared to both healthy and renal controls. Moreover, in a two-year longitudinal study chitotriosidase enzyme activity was a significant independent predictor of WBC cystine levels and was superior to WBC cystine as an indicator of the number of extrarenal complications in cystinosis patients. When compared to WBC cystine, plasma chitotriosidase assay is simpler, faster, more economical

and needs a much smaller sample making it more convenient, especially in young children. Furthermore, the enzyme is extremely stable for years at minus zero temperatures. In the current proposal, we plan to validate our results in a large cohort of previously recruited cystinosis patients followed up at the NIH Clinical Center in Bethesda, Maryland, USA. Stored samples at -80°C of 150 cystinosis patients will be retrospectively assayed for chitotriosidase enzyme activity, and will be correlated to documented parameters of kidney function, extra renal complications and a WBC cystine-based long-term compliance score.

IMPACT – Improvement of Motoric Abilities in Patients with Cystinosis

Katharina Hohenfellner, MD

Grant Amount: $77,000, one year study

The concept presented here, follows the established approach for the rehabilitation of children “Auf die Beine”, which was developed in Cologne for children and adolescents with limited mobility, e.g. caused by cerebral palsy or patients with osteogenesis imperfecta (https://unireha.uk-koeln.de/kinder-jugendreha/behandlungskonzept-auf-die-beine/). The training design with home exercise and short training sessions considers the fact that the target patient group is already under great strain due to the severity of the disease (medication, special diet, possibly dialysis). The project follows the official recommendations for the use of a vibration plate (4,5). Patients train with Galileo vibration plates according to a fixed training schedule which provides for 10 short training sessions per week (maximum 2 per day). Within one training session,

Gathering with the Cystinosis EuroCAB programme.

four exercises will be performed. The control group will perform the same exercises without vibration plates, but with dumbbells. Patients will initially undergo an intensive training course and will receive regular supervision during the three-month home training phase. The study is designed as a randomized controlled trial. Due to the very rare underlying disease a matched pair design was chosen to achieve comparability between the two groups. The patients will be matched based on their age, sex, and major previous surgeries. A baseline and two follow-up clinical assessment, one after the three-month home training phase and one after the follow-up phase, will take place. The primary endpoint is the change in muscle strength (in %) from the baseline examination to the measurement after the training phase. In the control group (CG), a mean shift of 0 % is expected, since no vibration training is carried out. Patient orientation: empowering patients by supporting an active lifestyle and enabling patients to positively influence the course of the disease themselves. Optimization of clinical outcomes: improving cardiorespiratory performance and increasing muscle strength in patients. Improvement of patient-oriented end points of care: improving quality of life.

GRANT AWARDED FEBRUARY 2021 BY THE CYSTINOSIS RESEARCH NETWORK AND CYSTINOSIS IRELAND

Perturbations in the V-ATPase Pathway Drive Pathology in the Male Reproductive System in Cystinosis

Principal Investigator Professor Minnie Sarwal, Professor of Surgery, Division of Multi Organ Transplantation, University of California San Francisco (UCSF), USA and co-applicants, Dr James F. Smith, Associate Professor and Director Male Reproductive Health, Department of Urology, University of California, San Francisco and Dr Polina V Lishko, Associate Professor, Department of Molecular and Cell Biology, University of California Berkeley, USA

The research project is a total investment of €300,000 from Cystinosis Ireland and CRN (€150,000 each) over the next three years.

Cystinosis is a very rare inherited genetic disease that causes the build-up of cystine, an amino acid is normally present in very small amounts in every single cell of a healthy person. The excess cystine forms sharp crystals that damage

the body's cells. Many of the body's organs are affected by cystinosis including the kidneys and the eyes in particular. However in men, there can be an impact on fertility and the ability to produce sperm (azoospermia). Whereas in the past, the life expectancy of men living with cystinosis was short and their physical wellbeing relatively poor, today there are an increasing proportion of men living with cystinosis who are well and who want to consider parenthood. This research project aims to study the molecular and cellular changes that can cause azoospermia in men with cystinosis. The research will be a first step towards developing an effective treatment that will give men living with cystinosis the opportunity to become fathers. The knowledge generated from this research will also improve our overall understanding of the disease and in particular of certain poorly understood cystinosis symptoms that appear to be caused by malfunctions other than the accumulation of cystine. In selecting this proposal for co-funding, the Boards of Cystinosis Ireland and CRN agreed that this is a scientifically significant proposal focused on a very important and strategic research topic for cystinosis patients. This project builds upon research and results generated from two previous projects co-funded by Cystinosis Ireland and the Irish Government's health research funding agency (the HRB) – a project led by Professor Minnie Sarwal in UCSF, USA entitled "Targeting Autophagy in Nephropathic Cystinosis" and a project led by Professor Elena Levtchenko in UZ Leuven, Belgium entitled "Unravelling the mechanisms of azoospermia and potential future treatments in male cystinosis patients".

CRN AND CYSTINOSIS IRELAND CO-FUND UCSF STUDY OF MALE INFERTILITY

We are pleased to announce a collaboration between the Cystinosis Research Network (CRN) and Cystinosis Ireland to fund a male infertility in cystinosis study at the University of California San Francisco (UCSF). The collaboration was made possible, in part, from a private contribution from CRN board members, Anna and Paul Pruitt and from Cystinosis Ireland's Seedcorn Funding Programme. Dr. Sur, a postdoctoral fellow in Professor Minnie Sarwal's Laboratory at UCSF, is the Principal Investigator in the "Cellular Resource for Studying Male Infertility in Cystinosis" proposal. Both organizations look forward to this partnership and providing greater insights concerning cystinosis and male infertility.

A Cellular Resource for Studying Male Infertility in Cystinosis, Minnie Sarwal, MD, PhD, Professor of Surgery, (Director, Precision Transplant Medicine) University of California San Francisco (UCSF), James Smith, MD, MS (Director, Male Reproductive Health Center Urologist), University of California San Francisco (UCSF), Ann Harris, Professor, Department of Genetics and Genome Sciences, School of Medicine, Case Western Reserve University, Cleveland, Ohio, Elena Levchenko, Professor, Department of Pediatric Nephrology, Leuven, EU, and Swastika Sur, MSc., PhD Postdoctoral Scholar, Sarwal Lab, University of California San Francisco, Department of Surgery.

Total Grant: €10,000

Principal Investigator, Swastika Sur, a Postdoctoral Fellow at the University of California San Francisco, has outlined a research proposal focused on infertility in men with cystinosis.

In addition to various endocrine organs that are affected in cystinosis, hypergonadotropic hypogonadism has been reported as a frequent finding in male cystinosis patients. Although spermatogenesis has shown to be intact at the testicular level in some patients, no male cystinosis patient is known to have naturally fathered a child. The sole treatment for cystinosis is the aminothiol cysteamine, which is highly effective in reducing the intracellular levels of cystine. However, this drug is ineffective in the treatment of male infertility in these patients.

A previous study of the pathophysiology of cystinosis-mediated infertility used a CTNS-/- mouse model. However, the CTNS-/- mouse model generated on C57BL/6 background was found to not be suitable for clarifying the pathogenesis of male infertility in cystinosis. This mouse model partially mimics the renal phenotype of the human disease but was found to have normal testicular morphology and function.

Therefore to this date, the exact pathophysiology of male infertility observed in patients with cystinosis is not yet fully understood, which is a critical unmet need due to the growing population of cystinosis patients, treated with cysteamine reaching young adulthood.

This project proposes to generate isogenic immortalized epididymis and testicular cell models to study infertility associated with cystinosis, by using CRISPR/Cas9 technology to develop

Research Committee Update, continued

a deletion in the CTNS gene of normal human epididymis and testicular cells. The Sarwal group's ongoing collaborations with Dr Smith at UCSF has enabled access to a rich tissue resource of normal testicular and epidydymal samples that will be used for generating this cystinosis- specific resource. The Sarwal research group also has ethical approvals in place at UCSF and at KU Leuven that will allow Dr Sur to approach cystinotic patients for access to patient biosamples.

Previously, the Sarwal research group successfully generated human immortalized CTNS-/- proximal tubular epithelial cells, and confirmed the phenotype of these newly developed cell line in terms of intracellular cystine levels by HPLC-MS/MS.

In this project, Dr Sur will focus on generating human immortalized CTNS-/- epididymal and testicular cells, followed by phenotype validation so that these cell lines can serve as a resource for the research community to study the pathophysiology of male infertility observed in cystinosis.

The Specific Aims of this project are the following:

- Aim 1: Generate human immortalized CTNS -/- epididymal and testis cell lines by CRISPR/ Cas9 and confirm the phenotype to further downstream study of male fertility associated with cystinosis
- Aim 2: Map the molecular perturbations in both cell lines with deletion of CTNS and in tissue samples from male cystinotic patients, by using state of the art genomics that the Sarwal Lab has legacy expertise-in. This will define the clinical utility of the resource generated in Aim 1.

This project will provide a first of its kind human cellular models to study cystinosis-mediated male infertility.

CYSTINOSIS COMMUNITY ADVISORY BOARD/CYSTINOSIS NETWORK EUROPE

I continue to participate as the U.S. representative in the Cystinosis EuroCAB programme, a project of EURORDIS, the European Rare Disorder Organization. The Community Advisory Board's (CAB's) objective is to improve patient access to novel therapies and treatments. This is achieved by engaging with clinical trial sponsors at the earliest stages of their research processes. The CAB also works with pharmaceutical companies on topics like educational materials and other appropriate topics. As well as meeting with industry sponsors, the Board engages with early-stage researchers as part of PPI - Public and Patient Involvement in research. The CAB met in person for the first time since 2019 as part of the Cystinosis Network Europe conference this past July in Leuven, Belgium. It was an honor to work together with these cystinosis advocacy leaders from all over the world as we work together to inform industry and academic research with the patient perspective. We look forward to continued partnership with researchers and industry worldwide to improve the quality and speed with which Cystinosis treatments are developed with the patient's voice in mind.

NATIONAL INSTITUTES OF HEALTH

As a reminder, patients may contact

the National Institutes of Health to be enrolled in the cystinosis protocol and for consultative care. For more information, please contact:

Joy Bryant, (301) 443-8690, bryantjo@mail.cc.nih.gov

EDUCATIONAL RESOURCES

All of CRN's educational materials including brochures, guides and other publications have been updated and are available on the CRN Website. Look for an expanded Dialysis and Transplant section coming soon which will include a broad range of information and resources for those facing these challenges.

Please visit the Research page on the CRN website for updates on CRN funded studies as well as other research from around the world. Also be sure to check out the many cystinosis related articles and publications available in our Publications and Guides library at https://www.cystinosis.org/support-resources/publications-guides/.

AVROBIO Announces Completion of Patient Dosing in First Gene Therapy Clinical Trial for Cystinosis

First five patients in Phase 1/2 trial show systemic gene therapy effect across multiple tissues evaluated, including eyes, skin, gastrointestinal mucosa and neurocognitive system

AVROBIO planning to initiate company-sponsored trial in 2023

CAMBRIDGE, Mass.—(BUSINESS WIRE)—AVROBIO, Inc. (Nasdaq: AVRO), a leading clinical-stage gene therapy company working to free people from a lifetime of genetic disease, today announced that the sixth and final patient has been dosed in the collaborator-sponsored, Phase 1/2 clinical trial of an investigational gene therapy for the treatment of cystinosis. Cystinosis is a life-threatening disease that causes progressive multi-organ damage, including early, acute kidney disease progressing to end-stage kidney disease.

> *"We look forward to our interactions with regulators on our clinical and Chemistry Manufacturing and Controls (CMC) strategy."*

The Phase 1/2 clinical trial for cystinosis is evaluating the safety and efficacy of this hematopoietic stem cell (HSC) gene therapy approach in adult patients affected by the most severe and common form of cystinosis who previously had been treated with the current standard of care, cysteamine. Pharmacodynamic and clinical efficacy endpoints include evaluation of the effect of treatment on leukocyte cystine levels, kidney function, corneal cystine crystal accumulation, muscle strength, as well as measures of visual motor integration, visual perception and motor coordination. The first patient was dosed in 2019 in this University of California San Diego (UCSD) trial, funded in part by grants to UCSD from the California Institute for Regenerative Medicine (CIRM), Cystinosis Research Foundation (CRF) and National Institutes of Health (NIH).

"Completing the dosing of the first and only gene therapy trial for cystinosis represents a major milestone for a patient community living with a devastating genetic disease. Unmet medical needs impact the lives of patients and their family members every day," said Stephanie Cherqui, Ph.D., lead study investigator and associate professor of Pediatrics at UCSD. "To date, the results from the trial show the potential of this investigational gene therapy to stabilize or reduce the impact of cystinosis on different tissues throughout the body with a one-time dose."

Preliminary data from this trial suggest that this approach is well tolerated, with no adverse events (AEs) related to the drug product reported to date. All AEs reported were related to myeloablative conditioning, study procedures, the underlying disease or pre-existing conditions. The majority of AEs were mild or moderate and resolved without clinical sequelae. Clinical data to date indicate this investigational gene therapy approach provides therapeutic effect in multiple tissues evaluated, including the eyes, skin, gastrointestinal mucosa and the neurocognitive system.

"With proof-of-concept demonstrated, we continue to lay the groundwork for an AVROBIO-sponsored clinical trial planned to begin in 2023," said AVROBIO Chief Medical Officer, Essra Ridha, M.D., MRCP, FFPM. "We look forward to our interactions with regulators on our clinical and Chemistry Manufacturing and Controls (CMC) strategy."

About AVR-RD-04

AVR-RD-04 is designed to genetically modify patients' own HSCs to express the gene encoding cystinosin, the protein that is critically deficient in people living with cystinosis. AVR-RD-04 has received Rare Pediatric Disease Designation and Fast Track Designation from the U.S. Food and Drug Administration (FDA) and Orphan Drug Designation from FDA and the European Medicines Agency. AVROBIO is planning for regulatory agency interactions to discuss clinical development and regulatory strategy, with the intent of initiating a company-sponsored clinical trial in 2023.

About cystinosis

Cystinosis, a rare, progressive disease that is believed to impact thousands of patients worldwide, including approximately 1,600 patients in the U.S., Europe and

AVROBIO Announces Completion of Patient Dosing in First Gene Therapy Clinical Trial for Cystinosis, continued

Japan, is marked by the accumulation of cystine in cellular organelles known as lysosomes. Untreated cystinosis is fatal at an early age. The current standard of care for cystinosis, a treatment regimen that can require dozens of pills per day, does not prevent overall disease progression and carries side effects, such as breath and body odor and gastrointestinal symptoms, which can impede compliance. More than 90% of treated cystinosis patients require a kidney transplant in the second or third decade of life.

About AVROBIO

Our vision is to bring personalized gene therapy to the world. We target the root cause of genetic disease by introducing a functional copy of the affected gene into patients' own hematopoietic stem cells (HSCs), with the goal to durably express the therapeutic protein throughout the body, including the central nervous system. Our first-in-class pipeline includes clinical programs for cystinosis and Gaucher disease type 1, as well as preclinical programs for Gaucher disease type 3, Hunter syndrome and Pompe disease. Our proprietary plato® gene therapy platform is designed to be scaled to support late-stage clinical development and commercialization globally. We are headquartered in Cambridge, Mass. For additional information, visit avrobio.com and follow us on Twitter and LinkedIn.

Forward-Looking Statements

This press release contains forward-looking statements, including statements made pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. These statements may be identified by words and phrases such as "aims," "anticipates," "believes," "could," "designed to," "estimates," "expects," "forecasts," "goal," "intends," "may," "plans," "possible," "potential," "seeks," "will," and variations of these words and phrases or similar expressions that are intended to identify forward-looking statements. These forward-looking statements include, without limitation, statements regarding our business strategy for and the potential therapeutic benefits of our preclinical and clinical product candidates, including AVR-RD-04 for the treatment of cystinosis, the potential benefits and incentives provided by FDA's rare pediatric disease designation for AVR-RD-04, the design, commencement, enrollment and timing of planned clinical trials, preclinical or clinical trial results, product approvals and regulatory pathways, our plans and expectations with respect to interactions with regulatory agencies, anticipated benefits of our gene therapy platform including potential impact on our commercialization activities, timing and likelihood of success, the expected benefits and results of our implementation of the plato® platform in our clinical trials and gene therapy programs, and the expected safety profile of our preclinical and investigational gene therapies. Any such statements in this press release that are not statements of historical fact may be deemed to be forward-looking statements. Results in preclinical or early-stage clinical trials may not be indicative of results from later stage or larger scale clinical trials and do not ensure regulatory approval. You should not place undue reliance on these statements, or the scientific data presented.

Any forward-looking statements in this press release are based on AVROBIO's current expectations, estimates and projections about our industry as well as management's current beliefs and expectations of future events only as of today and are subject to a number of risks and uncertainties that could cause actual results to differ materially and adversely from those set forth in or implied by such forward-looking statements. These risks and uncertainties include, but are not limited to, the risk that any one or more of AVROBIO's product candidates will not be successfully developed or commercialized, the risk of cessation or delay of any ongoing or planned clinical trials of AVROBIO or our collaborators, the risk that AVROBIO may not successfully recruit or enroll a sufficient number of patients for our clinical trials, the risk that AVROBIO may not realize the intended benefits of our gene therapy platform, including the features of our plato® platform, the risk that our product candidates or procedures in connection with the administration thereof will not have the safety or efficacy profile that we anticipate, the risk that prior results, such as signals of safety, activity or durability of effect, observed from preclinical or clinical trials, including in collaborator-sponsored clinical trials, will not be replicated or will not continue in ongoing or future studies or trials involving AVROBIO's product candidates, the risk that we will be unable to obtain and maintain regulatory approval for our product candidates, the risk that the size and growth potential of the market for our product candidates will not materialize as expected, risks associated with our dependence on third-party suppliers and manufacturers, risks regarding the accuracy of our estimates of

AVROBIO Announces Completion of Patient Dosing in First Gene Therapy Clinical Trial for Cystinosis, continued

expenses and future revenue, risks relating to our capital requirements and needs for additional financing, risks relating to clinical trial and business interruptions resulting from the COVID-19 outbreak or similar public health crises, including that such interruptions may materially delay our enrollment and development timelines and/or increase our development costs or that data collection efforts may be impaired or otherwise impacted by such crises, and risks relating to our ability to obtain and maintain intellectual property protection for our product candidates. For a discussion of these and other risks and uncertainties, and other important factors, any of which could cause AVROBIO's actual results to differ materially and adversely from those contained in the forward-looking statements, see the section entitled "Risk Factors" in AVROBIO's most recent Quarterly Report, as well as discussions of potential risks, uncertainties and other important factors in AVROBIO's subsequent filings with the Securities and Exchange Commission. AVROBIO explicitly disclaims any obligation to update any forward-looking statements except to the extent required by law.

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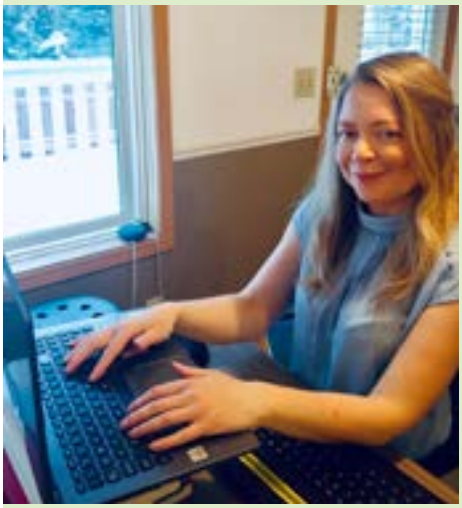
Cystinosis Memorial Fund Grants Awarded, continued from Page 36



CHERYL SIMEONS — Master's Program Tuition

The Cystinosis Memorial Fund means an opportunity for financial assistance as I enter my clinical practicum for my Master's Program. My clinical practicum consists of eight months or 400 hours of direct client work in counseling and comes at a high financial cost. I had a goal of becoming a therapist for many years, but health issues and inadequate self-image prevented me from making it happen. I have now gained the confidence to tackle this difficult journey and realize this career path is the right fit for me and fuels my passion. I look forward to entering this field as a licensed therapist and working toward my goal of helping clients with chronic illness and trauma. The CMF will truly help me reach my goal by providing me with the opportunity to lighten my financial burden as I enter this next phase in my career journey.

MEGAN MORRILL — Yoga

I am so grateful to have received a grant from the Cystinosis Memorial Fund! This grant paid for a year membership of yoga at my local studio and has allowed me to attend yoga classes weekly to prevent muscle wasting. Yoga has been so beneficial to both my physical and mental health, but it gets expensive as I am a full time student and have limited finances right now. Receiving funding from the Cystinosis Memorial Fund has allow me to continue to participate in yoga to increase my quality of life. I am truly grateful!

HAVE YOU OR YOUR CHILD BEEN DIAGNOSED WITH CYSTINOSIS?

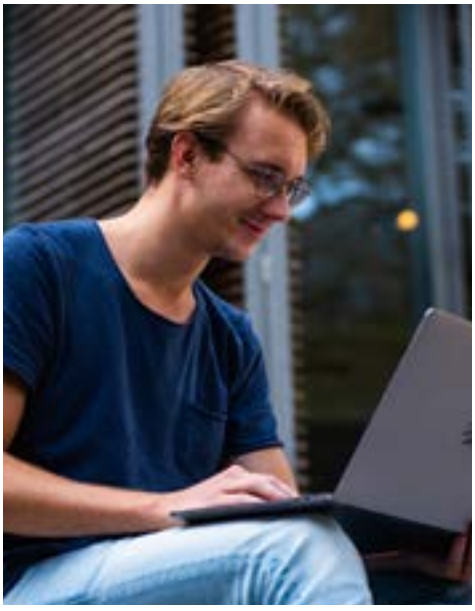
you/they may qualify for a research study looking at how the brain works in cystinosis

THIS IS A 3-DAY STUDY INCLUDING EEG AND COGNITIVE TESTING.

TRAVEL AND ACCOMMODATION EXPENSES WILL BE COVERED

CONTACT
ANA.ALVESFRANCISCO@EINSTEINMED.ORG
OR 718-862-1824 TO KNOW MORE!

EINSTEIN
Montefiore



Living with Cystinosis Support Group

A supportive, web-based
peer support group for those
living with cystinosis
facilitated by
Kerry Heckman, MSW, LICSW

3rd Tuesday of each month from
4-5pm PST / 7-8pm EST
To sign up, visit
thecenterforchronicillness.org/groups

Contact us at
info@thecenterforchronicillness.org
or (425) 296-2705 with questions.
www.thecenterforchronicillness.org
This program is free of cost.

Center for Chronic Illness

Supporting Loved Ones of those Living with Cystinosis Support Group

A web-based peer support group for loved ones of
those living with the rare disease, cystinosis
facilitated by Kerry Heckman, MSW, LICSW

3rd Tuesday of every other month
(March 15th, May 17th, July 19th, Sept 20th, Nov 15th 2022)
6-7pm (PST) / 9-10pm (EST)
To sign up, visit www.thecenterforchronicillness.org/groups

Contact us at info @thecenterforchronicillness.org
or (425) 296-2705 with questions
www.thecenterforchronicillness.org
This program is free of cost.

Center for Chronic Illness

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CYSTINOSIS RESEARCH NETWORK

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Cystinosis is a rare, genetic, metabolic disease that causes an amino acid, cystine, to accumulate in various organs of the body, including the kidneys, eyes, liver, muscles, pancreas, brain and white blood cells. Without specific treatment, children with cystinosis develop end stage kidney failure at approximately age nine. The availability of cysteamine medical therapy has dramatically improved the natural history of cystinosis so that well treated cystinosis patients can live into adulthood.

CRN VISION

The Cystinosis Research Network's vision is the acceleration of the discovery of a cure, development of improved treatments, and enhancement of quality of life for those with cystinosis.

CRN MISSION

The Cystinosis Research Network is a volunteer, non-profit organization dedicated to advocating and providing financial support for research, providing family assistance and educating the public and medical communities about cystinosis.